

# Electric Vehicles As Part Of Our Region's Innovative Energy And Environmental Solutions

## *Get Ready Tampa Bay*

Greg Miller  
Tampa Bay Regional Planning Council

January 12, 2011

New North  
Transportation Alliance



# Alternative Energy and Innovative Technologies



*A Broad Array of Renewable Energy Projects:*

## **Solar Photovoltaics**

Econlockahatchee (Econ) Solar Generation Study  
SolarWise for Schools

## **Solar Thermal**

Solar Water Heating with EnergyWise  
Residential solar thermal end-use study

## **Electric Transportation**

Plug-In Electric Vehicles

## **DSM – Smart Grid**

Next Generation Load Management

**Solar PV**



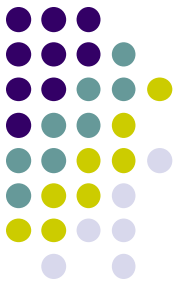
**Solar Thermal**



**Electric Transportation**



# There Are Several Types Of Electric Vehicles



- Hybrid Conversions
  - Standard hybrids converted to plug-in with an after-market battery kit
- Dual-Mode Plug-in Hybrid (PHEV)
  - Gas engine and electric motor work together to optimally power the drive train
- Extended Range Electric Vehicle (E-REV)
  - Capable of medium range, high speed all-electric drive with small engine as back-up generator
- Battery Electric Vehicles (BEV or EV)
  - Greater battery capacity for long range, all-electric drive and no back up engine



Toyota Prius

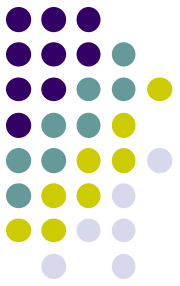


Chevy Volt



Tesla Roadster

# Nearly every OEM has a plug-in vehicle planned by 2012...



## PHEV or EREV

## ALL ELECTRIC

Production



GM PHEV



Chevrolet Volt



Toyota Prius



Nissan Leaf



Smart



Mitsubishi iMIEV



Cadillac Converj



BYD 3DFM



Fisker Karma



Ford Focus



Ford Transit Connect



Tesla

Demo/Concept



Ford Escape PHEV



BMW Concept



VW Golf TwinDrive



Chrysler/Fiat EV



Mini-E



Subaru R1e



Hyundai Blue-Will



Volvo C30



Kia Ray



Mercedes BlueCell



Tesla Model S

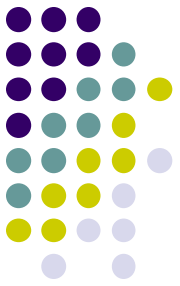


Toyota FT-EV

# 2011 Chevy Volt

– E-REV Technology

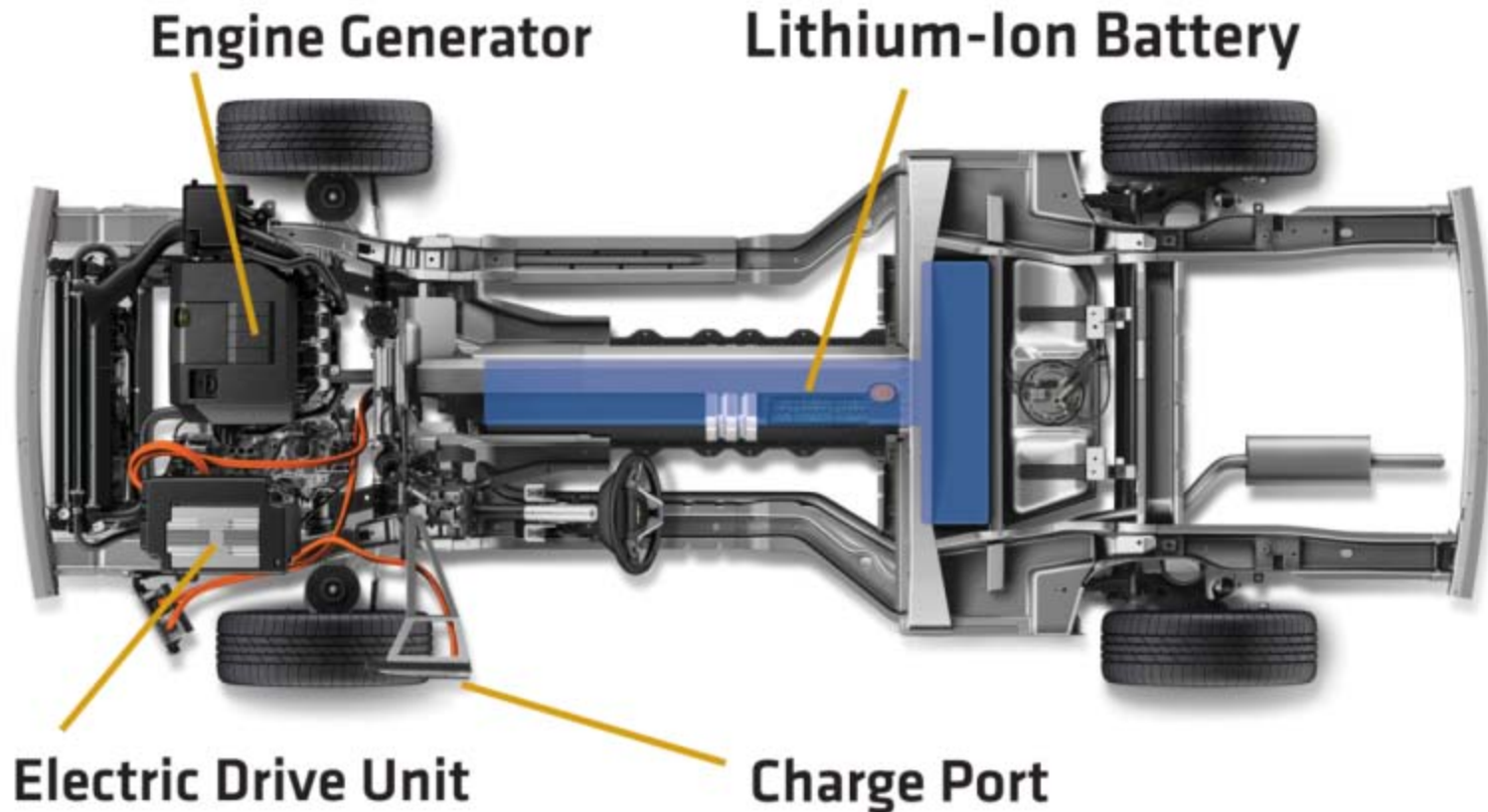
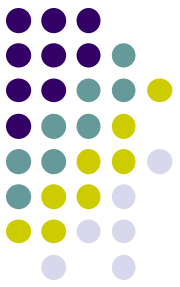
Extended - Range Electric Vehicle



## Pricing

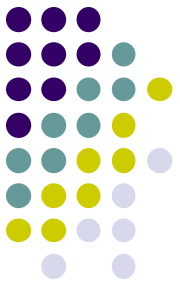
- \$41,000 MSRP
- \$7,500 tax credit
- \$33,500 with incentives
- \$350/mo. Lease

# Chevy Volt E-REV\* Technology



\*Extended-Range Electric Vehicle

# Nissan Leaf

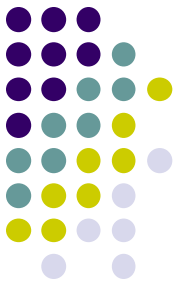


## Pricing

- \$32,780 MSRP
- \$7,500 tax credit
- \$25,280 with incentives
- \$349/mo. Lease (36)
- \$2,200 for 220v charging station
  - Up to half back as tax credit



# Q and A on the Nissan Leaf



- Q: What is the acceleration and top speed of this car?
  - A: The LEAF handles and accelerates like a V6 car and has a top speed of up to 90mph.
- Q: When will the LEAF be available in the U.S.?
  - A: The LEAF will be on the road in some states in 2010. Mass-production will begin in 2012.
- Q: How long does it take to charge the battery?
  - A: The battery will charge in 4-8 hours on a 220V home charging unit. At quick-charge stations, it will charge to 80% in about 26 minutes.
- Q: How far can you drive on a single charge?
  - A: The LEAF will have a range of 100 miles per charge under average, everyday driving conditions.
- Q: How much will the LEAF cost?
  - A: At this point, we're unable to give an exact price, but we're targeting a price in the range of other typical family sedans.

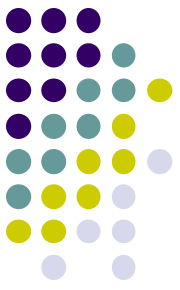
# Ford global electric vehicle plan



- March 2, 2010
- As part of the Ford global electric vehicle plan, the company will launch two zero-emission, full-electric vehicles in Europe. The [Transit Connect Electric](#) light commercial vehicle will be introduced in 2011, followed by the [Ford Focus Electric](#) in 2012. In addition, two next-generation hybrid-electric vehicles and a plug-in hybrid will be introduced in Europe in 2013



Focus Electric will be rechargeable through wall outlets and is targeted to get up to 100 miles per charge, making it ideal for daily commuters and others who drive predictable “around town” routes. Charging the car’s lithium-ion batteries will take between six to eight hours using a 220V wall outlet or longer using a 110V outlet. Focus Electric will also feature a user-friendly interface similar to the Ford Fusion Hybrid’s SmartGauge™ display to provide the driver with information on vehicle range and battery charge.



# Pros and Cons of EVs

## Pros

- Reduced emissions.
  - Some vehicles by 2/3
- Much lower per mile operating cost.
- Reduced reliance on imported petroleum products.
  - Utilities are switching to NG and other cleaner fuel mixes.
- Potential use of renewable energy
  - Electric utilities use many sources of energy to generate electricity.

## Cons

- All Electrics (EVs) can have range issues. “Range Anxiety”
- Limited “public” places to plug in.
  - But 80% charging done at home
- Initial purchase prices may be higher than comparable ICE vehicles.
  - Especially without incentives
- Public concern over disposal of spent batteries
  - Newer type batteries are less toxic



# PHV Benefit Analysis

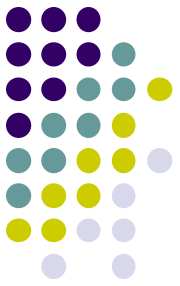
**70 cents/gallon**  
Based on \$2.50 gas  
and 13.8 cents kWh electricity

Technology	MPG	Cost / Mile*
PHEV	22 miles / 70 cent charge	\$0.031
Hybrid	46 mpg	\$0.054
Standard ICE	25 mpg	\$0.10

- Analysis Utilizes \$2.50 Retail Gasoline Price and \$0.138 / kWh Charge
- 30 – 40 mile electrically assisted driving range when using a combination of battery pack and internal combustion engine (ICE)
- PGN results: Initially ~ 22 mile all electric range, pre software upgrade. Mid – upper 20s, post installation.



# What is the value proposition of vehicle electrification? Cleaner Emissions (100 mile profile)



$$\text{24 kWh charge}^* \times \frac{\text{Nissan LEAF EV: } 1.171 \text{ lbs CO}_2}{\text{kWh}^{**}} = \mathbf{28.10 \text{ lbs CO}_2}$$

$$\text{3.571 gal fuel} \times \frac{\text{Nissan Versa}^{***}: 19.4 \text{ lbs CO}_2}{\text{gal}} = \mathbf{69.28 \text{ lbs CO}_2}$$

Reduction of greenhouse gas = **59.4%**

\* Assumes charge depleted battery module

\*\* Assumes 2009 Progress Energy Florida system average emissions

\*\*\* Fuel economy based on 24/32 mpg automatic transmission vehicle

# Smart Grid: Connecting PHEVs to Home, Office, and Anywhere in Between



“A revolution in smart electronics is going to give consumers unprecedented ability to control energy consumption and save money.”

**The Wall Street Journal  
September 29, 2008**

R12 Monday, September 29, 2008

## CONSUMER TECHNOLOGY

# People Power

*The more you know about your energy use, the less energy you may use*

By Rebecca Smith

**A** REVOLUTION in smart electronics is going to give consumers unprecedented ability to control energy consumption and save money.

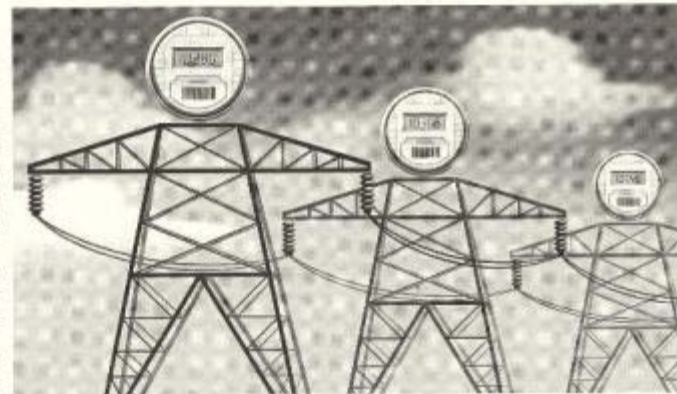
Making it possible is the introduction of inexpensive electronics—including thermostats and controllers—that can be assembled into simple home networks able to control equipment such as air conditioners, lights, water heaters and furnaces. The home systems, in turn, are the building blocks of a smart grid that seamlessly flows information on energy usage and cost from consumers to utilities and back again.

Ultimately, mass use of these energy-saving devices should lead to more-efficient utilization of expensive power plants and transmission lines—reducing the amount of life capacity and helping the energy sector cut pollution.

“We have a tremendous opportunity to bring the industry out of the Dark Ages” and take advantage of the most modern electronics, says Mark Jacobs, chief executive of Reliant Energy Inc., a Houston-based energy company that generates and sells electricity.

### Two-Sided Conversations

The first step in this revolution is the deployment of millions of smart meters that communicate wirelessly—replacing traditional electro-mechanical meters that must be read manually. Once a home or business has an advanced meter in place, it has a two-way communication path allowing information to be shared with utilities or pulled into the home where other devices can respond,



ties talk up ways to cut energy bills and consumption. For instance, many utilities plan to roll out pricing plans that give consumers price breaks for reducing consumption away from peak times.

And to get the devices out to the market as quickly as possible, equipment manufacturers will make them available through utilities, online and at retailers. Tenergy Networks Inc., a maker of energy displays and controllers based in Boulder, Colo., is making its products available through utilities and also plans to have them in big box stores next year.

ties that are Z-Wave compatible.

The protocol favored by utilities, so far, is ZigBee—the standard being promoted by a consortium called the ZigBee Alliance, created in 2002, that now has 280 member companies, including utility suppliers Itron Inc., Greenbox Technology Inc., Tenergy and Trilliant Inc.

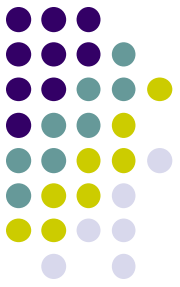
Utilities believe ZigBee devices can be made secure and limit the ability of hackers to break in. “What we don’t want is someone hacking into these systems and shutting down cities,” says Bob Helle, head of the ZigBee Alliance.

managing thermostats costing \$50 to \$200, controllers costing \$10 to \$50, and in-home displays costing \$30 to \$200.

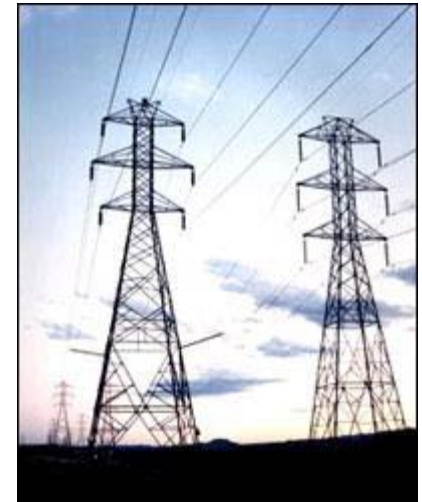
The Z-Wave protocol had an early lead in Europe and focus on home products. Z-Wave’s alliance members include Intel, Cooper Wiring Devices Inc., Leviton Manufacturing Co. and Universal Electronics Inc. Unlike ZigBee, Z-Wave is proprietary, meaning it’s licensed to users by its creator, Zenoss Inc.

But it hasn’t done as well as ZigBee in winning over U.S. utilities so far.

# Capacity vs Demand



The existing off-peak electrical capacity could fuel daily commutes for 73% of all U.S. cars, trucks, SUVs, and vans as PHEVs.\*



*\*Source: U.S. Dept. of Energy, 2007: Impacts Assessment of Plug-in Hybrid Vehicles on Electric Utilities and Regional U.S. Power Grids*

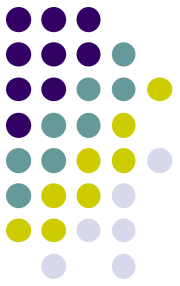
# Are We Ready To Plug In?



120 VAC  
standard  
plug



# Installation of Charging Stations in Public Places



Solar Port

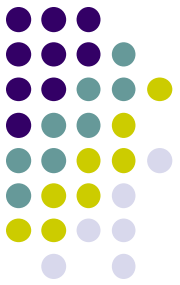
Cal Berkeley Campus



Elkhorn, Iowa (Pop. 650)



San Francisco



# Q and A: General

- Q. Where will most charging be done?
  - A. At home. Home charging can be accelerated with 240 charging stations.
- Q. When will we see a lot of EVs on the road?
  - A. White House has set a target of 1 Million EVs by 2015.
  - A. Some studies have used an estimated 25% penetration by 2050.
- Q. Is there money available to help “get ready?”
  - A. Tax Credits
    - Up to \$7,500 tax credit for light duty vehicles
    - 10% tax credits for conversions
    - Up to 50% credits for infrastructure
  - A. Stimulus money and other DOE monies are sometimes available for infrastructure.

# Get Ready Tampa Bay (GRTB)



- GRTB is a regional collaboration between the Tampa Bay Regional Planning Council, local governments, electric utility companies, business partners, and other interested groups to prepare Tampa Bay for the roll-out of electric vehicles in the very near future.

# Get Ready Tampa Bay

## Partners



### ● Utility Companies

- Progress Energy
- Tampa Electric (TECO)
- Florida Power & Light
- Lakeland Electric

### ● Businesses & Associations

- Suncoast Electric Vehicle Association
- Tampa Bay Partnership
- Smart USA
- NovaCharge, LLC
- GoSmart Technologies, LLC
- and others.....

### ● Local Governments

- Hillsborough, Manatee, Pasco, and Pinellas Counties
- Many cities including: Clearwater, Dade City, Dunedin, Gulfport, Oldsmar, St. Petersburg, Seminole, S. Pasadena, Tampa, and Zephyrhills

# Project Get Ready: Education, Outreach and Collaboration



- Initiative led by Rocky Mountain Institute
- Focus on helping cities/local regions identify barriers and propose solutions
- Created a menu list of options
  - Must have, nice to have, etc.
- Provides a forum to interact with other partner cities and technical advisors
- Participants must provide time commitment

# Goals for Get Ready Tampa Bay



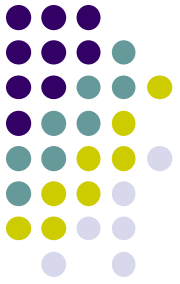
- Get Tampa Bay electric car “ready.”
- Attract OEMs to Tampa Bay
- Positive economic impact and green jobs growth
- Reduce vehicle emissions and less total GHGs
- Increase use of alternative and/or innovative energy
- Increased energy independence

# Technical Advisory Group Roles and Activities



- Collaborate and Incubate ideas
- Marketing
- Public outreach and education
- Get fleet managers and businesses involved
- Promote installation of vehicle-charging stations.
- Update local codes
- Educate electricians and building inspectors to expedite the permitting process.
- Help expedite the standardization of codes and charging facilities

# Who else is getting ready? Project Get Ready Cities



## Orlando

Orlando, Florida is the most recent city to join Project Get Ready with their Get Ready Central Florida initiative.



## Rhode Island

We're excited to announce that the state of Rhode Island has just joined PGR in January 2010!



## Houston, Texas

The City of Houston is currently working on two major efforts in preparation for the electrification of vehicles.



## Greater Denver, Colorado

A total of 12 communities and more than two dozen governmental and private business partners have joined Denver in plans to get ready.



## Toronto, Ontario

The Toronto Atmospheric Fund is working with partners in the municipal, utility, corporate and non-profit sectors to prepare the local landscape for plug-in vehicles to be part of Toronto's sustainable transportation plan.



## Indianapolis Region

The Indianapolis Region is working with the Energy Systems Network to get ready. Check back here in the coming weeks for a regional charter, partner listings, working groups, and much more.



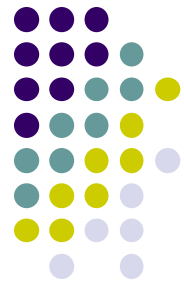
## Raleigh & Research Triangle Region, North Carolina

Raleigh is getting ready! The City of Raleigh, Progress Energy, Advanced Energy, and RMI are collaborating to kick-off the Raleigh readiness initiative. Working groups are forming now. The Raleigh project is quickly expanding to collaborate with the entire Triangle region.



## Portland, Oregon

Portland, Oregon is getting ready. PGR is working with interested citizens and companies in Portland to convene stakeholders and synthesize all the existing energy and work put into the plug-in vehicle revolution.



# Get Ready Tampa Bay

for electric transportation

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; and Technical Group Announcements by Clicking on the Join Button on the

## GRTB Presents to Clearwater Rotary - September 1

### GRTB Charges up the USF TAMPA CAMPUS - August 2

Representatives from diverse departments of the University of South Florida gathered in Tampa on August 2 for an Electric Vehicle Roundtable session. Sponsored by Get Ready Tampa Bay and hosted by USF's Center for Urban Transportation Research, representatives from GRTB, Progress Energy, and TECO, briefed University officials on the state of development and deployment of electric vehicles in the Tampa Bay Region. Top faculty and staff from USF Offices of Sustainability, Corporate Relations, Facilities, and Parking & Transportation, all participated in the session as did USF researchers. College of Engineering Dean John Wiencek, the Clean Energy Research Center and the Center for Urban Transportation Research all shared past and current research activities that support the deployment of E.V.s. The main objective of the EV Roundtable was for industry, policy makers, USF campus administrators, and the USF research community to exchange information on their respective activities and issues relating to preparation for electric vehicles and to identify potential areas for coordination and collaboration. Avera Wynne, of GRTB, was able to share details of the Get Ready program with the



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Tampa Bay

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[GetReadyTampaBay.org](http://GetReadyTampaBay.org)