FLORIDA SOLAR ENERGY CENTER®

Creating Energy Independence

Opportunities in Electric Cars and Building Energy Efficiency

FSEC PAB Meeting

February 10, 2012

"Game Changers" The New Electric Cars

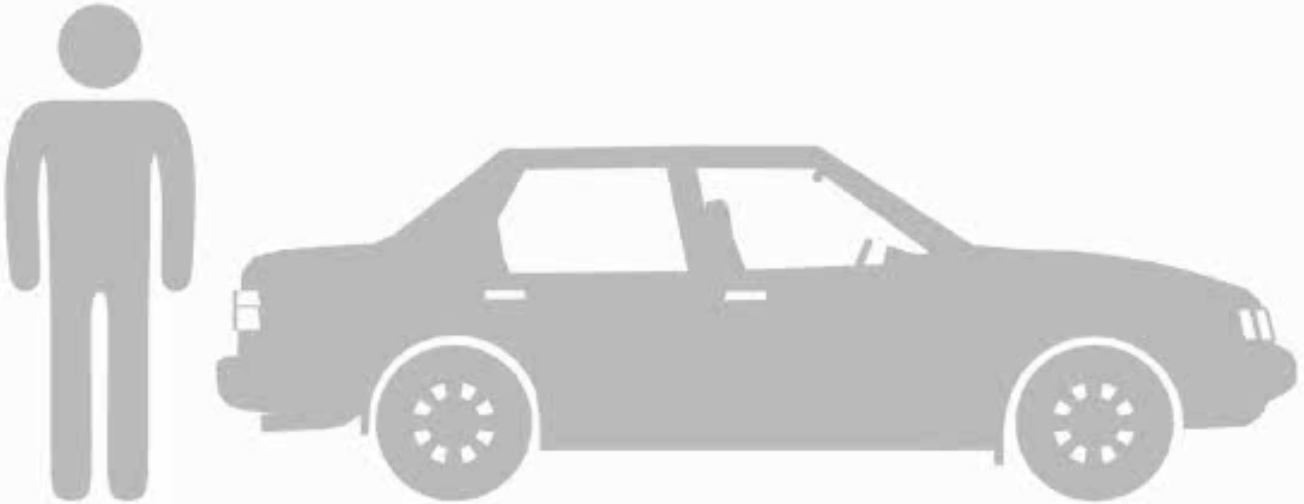
- 80% of VMT is less than 40 miles per day
- 26% of Florida vehicles are small cars
- 4,000 kWh/yr for 12,000 miles
- **If all small cars electric**
  - 1.4 billion gallons of gasoline saved per year
  - $2.1 billion net cost savings per year
  - 15 TWh (billion kWh) additional energy needs per year (4 MORE LARGE POWER PLANTS)!

Nissan Leaf (all electric)

Chevy Volt (plug-in hybrids)

Total Cost of Electric Car ~ Cost of Gasoline Car at the end of 5 years

Drive for Free



4:17 minute video
http://vimeo.com/24514610

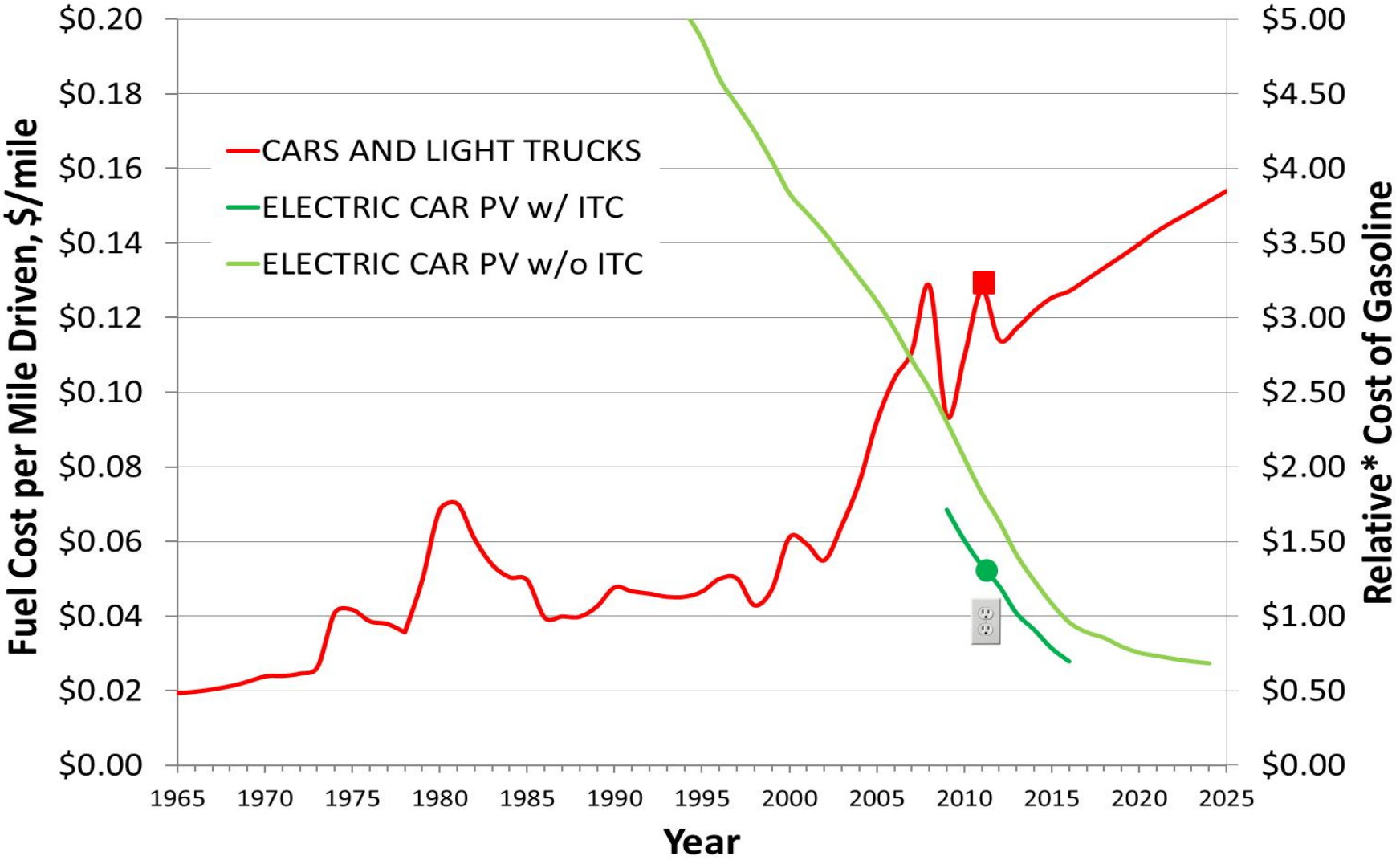
Residential Electricity is Equivalent to $0.99 Per Gallon Gasoline

	Fuel Efficiency	Fuel Price	Cost per Mile	Cost per 12,000 Miles
	25 mpg	$3.25 per gal	13¢ per mile	$1,560
Electric Car 	3 miles per kWh	12 ¢/kWh ($0.99 per gal equiv.)	4¢ per mile	$480 (Drive for Free?)

Residential Photovoltaic Power is Equivalent to $1.33 Per Gallon Gasoline

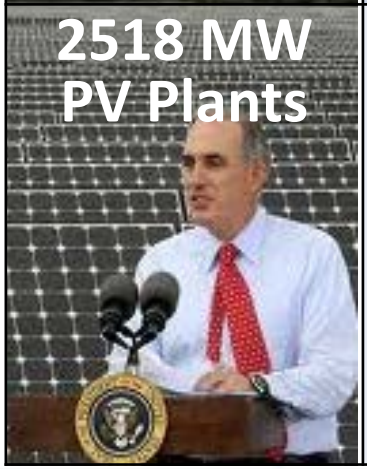
	Fuel Efficiency	Fuel Price	Cost per Mile	Cost per 12,000 Miles
	25 mpg	$3.25 per gal	13¢ per mile	$1,560
	3 miles per kWh	16 ¢/kWh ($1.33 per gal equiv.)	5.3¢ per mile	$640

PV $1.33 a gallon today less than a $1 tomorrow



*** Costs are relative to current costs of $3.25 per gallon gasoline at a vehicle efficiency of 25 mpg**

PV Electrons Half the Cost of Gasoline and Cheaper than Coal

	Installed date	Capacity Factor	Electricity Production	Cost per MWh (2015)	Job-Years
	~2018	0.80	3.5 TWh	$65-$150	250
	~2015	0.17	3.5 TWh	$105 - $115	57,900 ½ manufacturing; ½ installation

"Back of the Envelope" Numbers
All Small Cars PV Electric by 2030

Annual Florida Gasoline use	8.4 billion gal/y
Florida on-road vehicles	14.7 million
Florida Small Cars (26.3%)	3.88 million
Displaced Gasoline (16.9%)	1.4 billion gal/y
Displaced Gasoline Cost ($3.25 /gal)	$4.64 billion/y
PV Electricity (4 POWER PLANTS)	15.5 TWh/y
PV Capital Cost ($5 Wp-dc installed)	$40 billion
PV Job-Years (manuf. & install.)	238,000
PV Electricity Cost ($0.168 /kWh)	$2.5 billion/y
Cost Savings	$2.2 billion/y
Displaced OPEC oil imports	67 %

FSEC

Florida will drive PV powered electric cars!

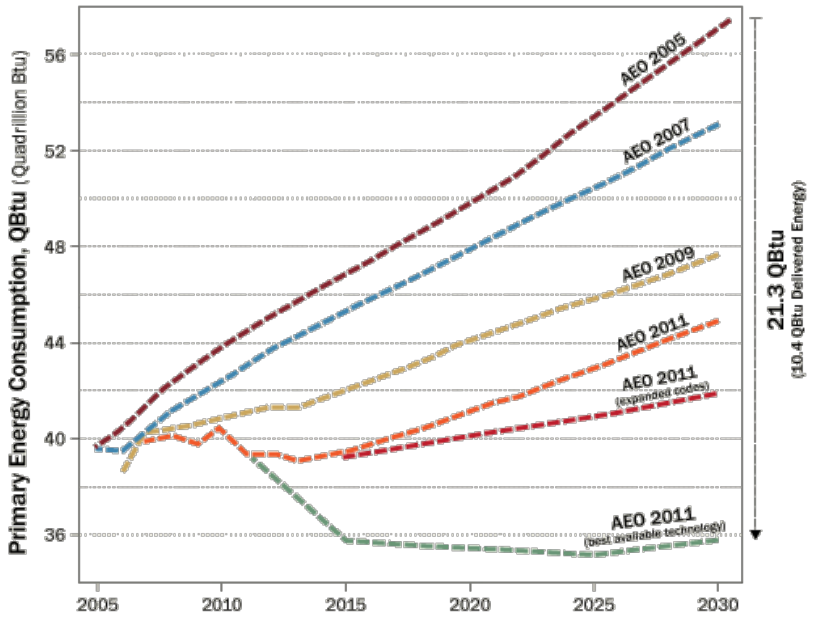
Will the PV be made in China or Florida?

Will the electric cars and their batteries be made in Florida?

The answer should be YES! and at maximum job creation and less cost

U.S. EIA Annual Energy Outlook

- The U.S. EIA's Annual Energy Outlook (AEO) for the Building Sector primary energy use has changed substantially over time.
- Why? . . .
- Because we are finally "getting it" as a country.

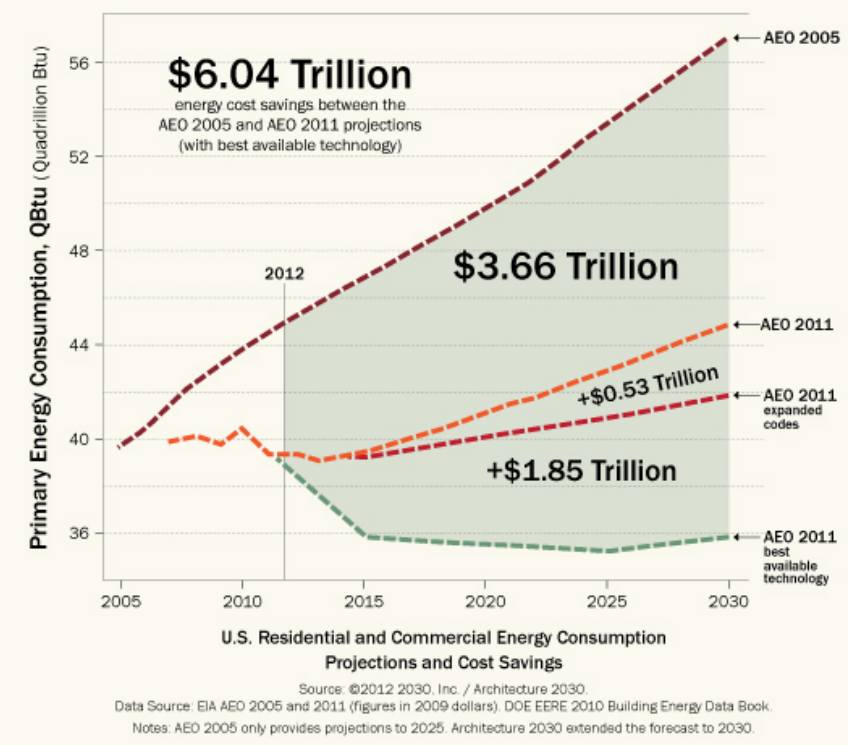


U.S. Residential and Commercial Energy Consumption Projections from 2005 to 2030

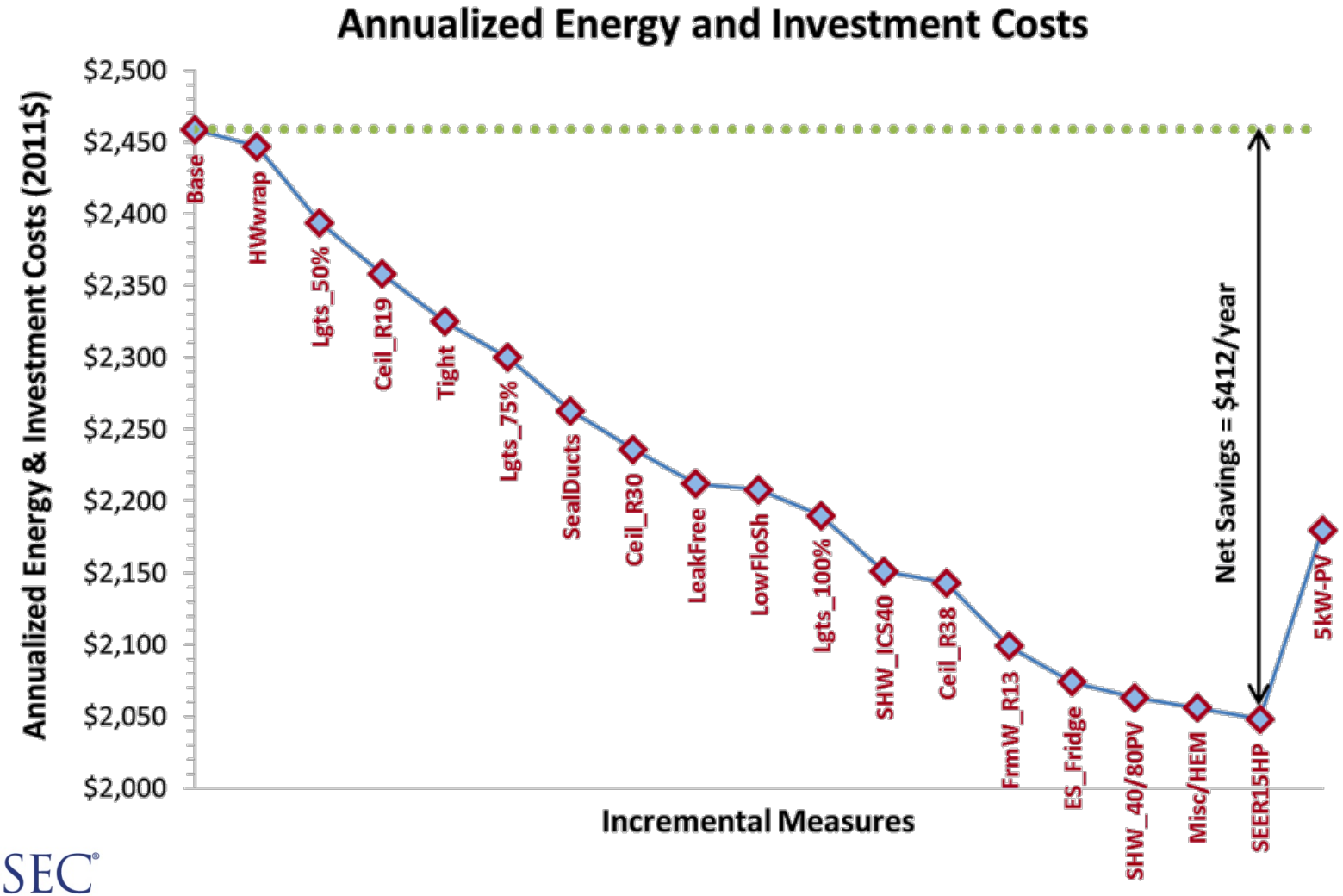
Source: ©2012 2030, Inc. / Architecture 2030. Data Source: EIA AEO 2005, 2007, 2009 and 2011.
Notes: 21.3 Qbtu of primary energy is the equivalent of approximately 10.4 Qbtu delivered energy, or the energy delivered from 994 large 500MW coal plants.
AEO 2005 only provides projections to 2025. Architecture 2030 extended the forecast to 2030.

EIA Cost Savings Projections

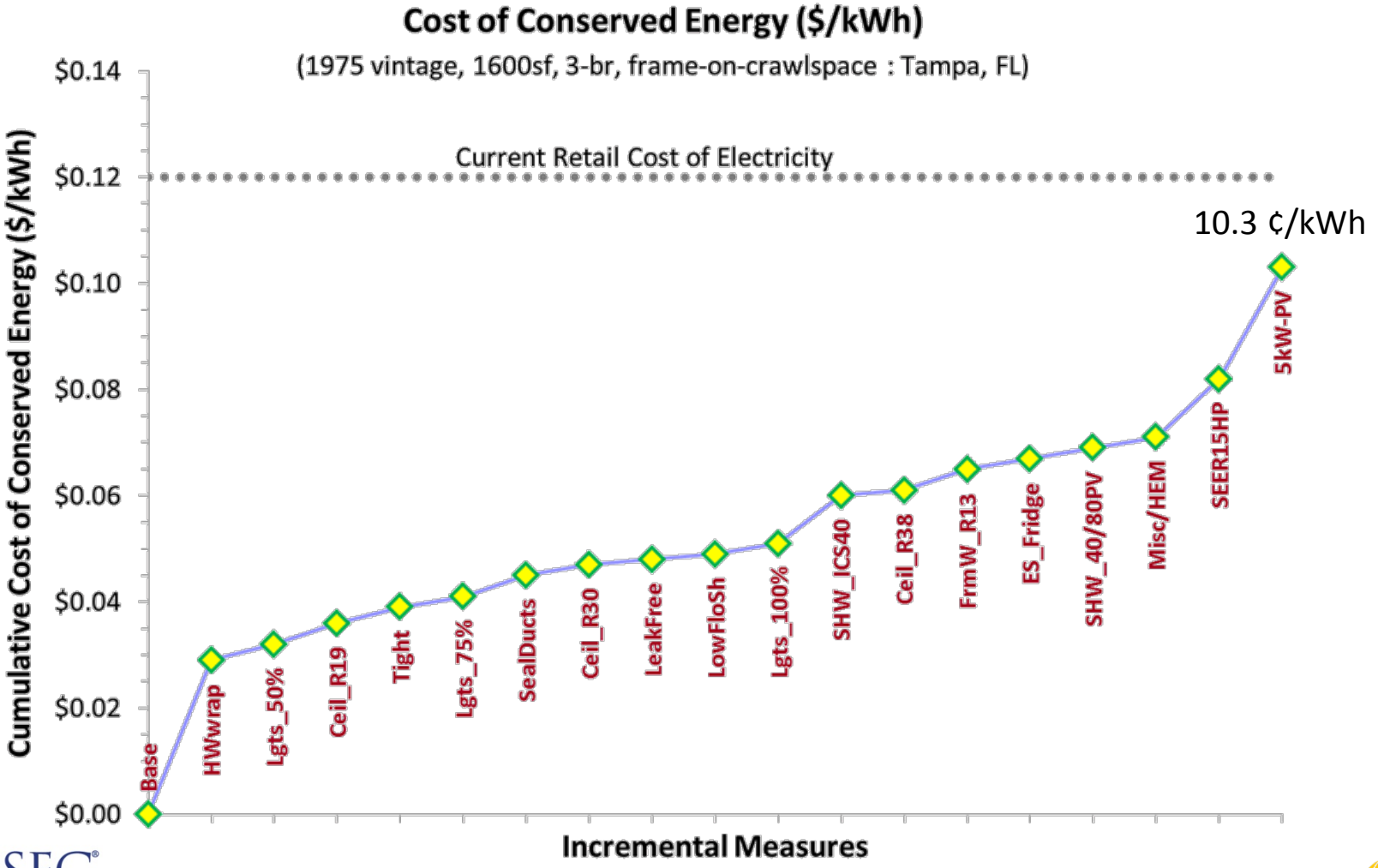
- EIA projects huge cost savings from increased energy efficiency.
- Proving once again that “the quickest, easiest and least costly kWh is the one that we do not use.”



Existing Home Retrofits



The Cost of Efficiency



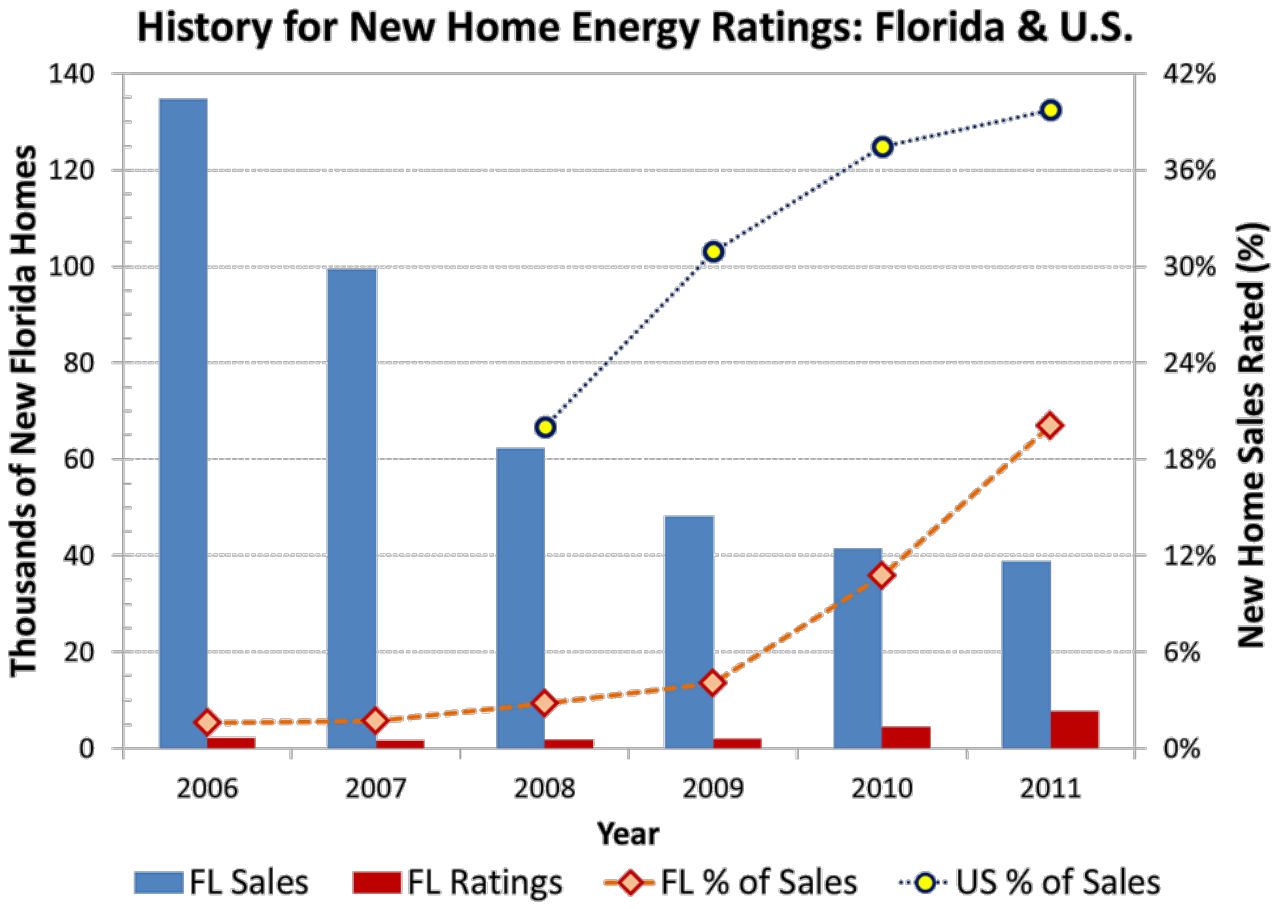
Cost Effectiveness

- Efficiency savings of 56% achieved = net energy cost savings greater than $400 per year
- Adding 5 kW PV system increases energy savings to 95%
- About 2/3 of efficiency savings come from non-HVAC energy improvement measures and about 1/3 come from HVAC improvements.

The Opportunity

- On a broad scale:
  - Retrofitting just 1.5% of Florida's homes to save 56% would reduce electric use by about 2.3 TWh/year (~1% of total statewide use)
  - Economic spending of about $1.25 billion
  - New job creation of about 25,000 job years
  - Net cost savings to ratepayers (after financing all improvements) of $49 million.

The Emerging Infrastructure



A Potential Business Model

- HVAC contractors replace more than 600,000 air conditioners and heat pumps each year in Florida.
- Why – because they wear out at a rate of almost 7% per year and we have 8.3 million existing homes.
- What if they, in collaboration with other businesses and experts, provided additional home energy efficiency services as well?

Florida HVAC Industry

HVAC Type	No. Units*	Average Price	Sales ($mil)	% Sales
Replacements	622,500	$5,000	$3,113	94.5%
New Homes	45,000	$4,000	$180	5.5%
Total/Average	667,500	$4,933	$3,293	100%

* Estimated as 6.67% of existing homes at 1.125 units per home and 100% of 2011 new home sales at 1.125 units per home.

Result

- Replacement represents almost 95% of HVAC industry revenues.
- Need to impact only about 20% of the existing replacement market to achieve 1.5% penetration of housing stock
- Would increase industry revenues by about 38%, adding about $1.25 billion in new revenues to a $3.3 billion HVAC industry.

Question

- What public policy options can Florida develop to encourage innovative business models that will enhance the development of energy efficiency and renewable energy in the state?