

# I. Meeting Packet



**State of Florida**  
**Public Service Commission**  
**INTERNAL AFFAIRS AGENDA**  
Tuesday, March 3, 2015  
Immediately Following Commission Conference  
Room 105 – Gunter Building

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1. Staff Briefing—Status of Solar Energy in Florida. (Attachment 1).
2. Executive Director's Report. (No attachment)
3. Other Matters.

BB/sc

OUTSIDE PERSONS WISHING TO ADDRESS THE COMMISSION ON  
ANY OF THE AGENDAED ITEMS SHOULD CONTACT THE  
OFFICE OF THE EXECUTIVE DIRECTOR AT (850) 413-6463.





# Public Service Commission

CAPITAL CIRCLE OFFICE CENTER • 2540 SHUMARD OAK BOULEVARD  
TALLAHASSEE, FLORIDA 32399-0850

## -M-E-M-O-R-A-N-D-U-M-

**DATE:** February 27, 2015

**TO:** Braulio L. Baez, Executive Director

**FROM:** Walter Clemence, Public Utility Analyst II, Office of Industry Development and Market Analysis *w*  
David Dowds, Public Utilities Supervisor, Office of Industry Development and Market Analysis  
Mark Futrell, Director, Office of Industry Development and Market Analysis *mf*

**RE:** Overview of Solar Energy in Florida

**Critical Information:** Please place on the March 3, 2015 Internal Affairs.  
**BRIEFING ONLY**

This memorandum is to provide an informational overview of current and new solar deployments in Florida, cost trends for solar installations, and a discussion of customer-owned renewable generation and statistics on customer-owned installed capacity. No Commission action is requested.

### Existing Solar Resources

Florida has 218 megawatts (MW) of installed solar capacity as of December 31, 2013. Florida utilities have installed approximately 117 MW of solar photovoltaic (PV) and solar thermal capacity in Florida. Utilities have contracted for an additional 39.5 MW of installed capacity, and customers have installed approximately 60.5 MW of distributed solar generation behind their meters.

Utility Owned			Gross MW
FPL	Desoto Next Gen Solar Energy Center	PV	25
FPL	Space Coast	PV	10
FPL	FPL Juno Beach Living Lab	PV	0.0970
FPL	Business PV for Schools	PV	0.1600
FPL	Martin Solar	Thermal	75.0
TECO	Museum of Science & Industry	PV	0.0182
TECO	Walker Middle School	PV	0.0034
TECO	Manatee Viewing Center	PV	0.0372
TECO	Middleton High School	PV	0.0089
TECO	Tampa's Lowry Park Zoo	PV	0.0128

TECO	Florida Aquarium	PV	0.0086
DEF	Econlockhatchee Photovoltaic Array	PV	0.0070
DEF	DEF owned Installations	PV	0.9230
FMPA	NOAA Eco-Discovery Center	PV	0.0300
GRU	Small Distributed Rooftop PV Panels	PV	0.0086
OUC	OUC Reliable Plaza PV System	PV	0.0320
TAL	Multiple Utility-owned installations	PV	0.2230
JEA	Multiple Utility-owned installations	PV	0.2220
LAK	Airport Phase 1	PV	2.3000
LAK	Airport Phase 2	PV	3.0000
LAK	Sun Edison - Civic Center	PV	0.2500
	Source: Ten Year Site Plan	Utility Owned	117.34

<b>Existing Non-Utility Owned Generation</b>			<b>Gross MW</b>
FPL	Rothenbach Park	PV	0.2500
FPL	First Solar	PV	0.2000
GRU	Multiple Aggregated Distributed Facilities	PV	18.6
OUC	Fleet Solar Project	PV	0.3350
OUC	Gardenia Solar Project	PV	0.2680
OUC	Stanton Solar Farm	PV	5.1
JEA	Jacksonville Solar	PV	15.0
	Source: Ten Year Site Plan	Non-Utility	39.73

### **Customer-Owned Solar Generation**

In 2002 the Commission adopted Rule 25-6.065, Florida Administrative Code, to allow residential customers to interconnect customer-owned solar systems of up to 10 KW and provided that any excess energy generated by the customer's system would be purchased by the utility. In 2008, the FPSC approved a revised rule that applies to all customers and provides for an expedited interconnection process and allows for net metering of customer-owned renewable energy systems of up to 2 MW.

In 2008, the effective year of the revised rule, customer-owned renewable solar generation accounted for approximately 3 MW of renewable capacity. As of 2013, approximately 60.5 MW MW was customer-owned solar PV.

<b>Customer-Owned Solar Generation</b>												
	# of Customer-Owned Solar Systems						kW Gross Power Rating					
	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
<b>IOU</b>	383	1,045	1,855	2,803	3,799	4,818	1,696	7,653	12,442	19,441	30,401	43,876
<b>Municipal</b>	137	313	493	614	791	1,007	797	3,378	4,099	5,002	7,021	11,787
<b>Rural Electric Cooperative</b>	57	267	461	549	684	853	272	1,955	2,667	3,262	4,099	4,865
<b>TOTAL</b>	577	1,625	2,809	3,966	5,274	6,678	2,765	12,986	19,208	27,705	41,521	60,528

**Proposed Solar Resources**

The most recent Ten Year Site Plans showed that utilities planned to add 4.5 MW of solar PV during the 2014-2023 timeframe.

<b>Planned Utility-Owned Generation</b>			<b>Gross MW</b>
FPL	Business PV for Schools	PV	0.5000
FPL	CISP (Community Solar)	PV	3.8800
TECO	LEGOLAND	PV	0.0255
TAL	Multiple Installations	PV	0.1200
	Source: Ten Year Site Plan	Utility Owned	4.53

As part of the Ten Year Site Plan process, utilities also identified the as-available energy contracts that they plan to enter into within the 2014-2023 timeframe, as shown in the following chart.

<b>Planned Non-Utility Generation</b>			<b>Gross MW</b>
DEF	Blue Chip Energy Lake Mary	PV	10.00
DEF	Blue Chip Energy Sorrento	PV	40.00
DEF	National Solar Gadsden	PV	50.00
DEF	National Solar Hardee	PV	50.00
DEF	National Solar Suwannee	PV	50.00
DEF	National Solar Highlands	PV	50.00
DEF	National Solar Osceola	PV	50.00
TAL	TBD	PV	1.70
TAL	Innovation Park	PV	0.40
TAL	Yulee Street	PV	0.85

LAK	Sun Edison	PV	6.00
LAK	Sun Edison-Sutton	PV	6.00
LAK	Sun Edison-TBA	PV	7.50
LAK	Sun Edison-TBA	PV	5.00
	Source: Ten Year Site Plan	Non-utility	327.45

In addition to the aforementioned projects, staff highlights below a few projects that were announced subsequent to the release of the 2014 Ten Year Site Plans.

***Florida Power and Light Company’s Solar Projects***

- On January 26, 2015, FPL announced its plans to construct three 74 MW solar photovoltaic facilities by the end of 2016, at three sites:
  - Citrus Solar Energy Center – DeSoto County, near FPL’s existing 25 MW solar photovoltaic facility which opened in 2009.
  - Babcock Ranch Solar Energy Center – Charlotte County.
  - Manatee Solar Energy Center – Manatee County, on the site of FPL’s Manatee generating facilities.
- According to FPL, the three sites have sufficient transmission and substation infrastructure in place.
- FPL has not announced plans for the recovery of costs associated with the proposed facilities.
- As shown in the utility’s Ten Year Site Plan, the utility plans to add 3.88 MW of community solar in the 2014-2023 timeframe.
- On February 20, 2015, FPL announced its plans to construct a 1.7 MW grid-tied solar PV facility at Daytona International Speedway. Construction is to begin in the fall of 2015 with the goal that the system will be operational by the end of the year.

***Florida Power and Light Company’s Voluntary Solar Partnership Pilot Program<sup>1</sup>***

- Offers customers an opportunity to voluntarily contribute \$9.00 per month toward supply-side solar generation facilities owned by FPL in its service territory.
  - Available to all residential, commercial, and industrial customers.
- FPL will use the contributions to support the net revenue requirement of constructing and operating relatively small solar generating facilities.
- The electricity generated by the solar generation facilities will displace fuel that otherwise would have been used for generation, resulting in avoided fuel and emissions costs.
- The size of the solar projects will be determined based on the contributions received.
- Customers may enroll or cancel their enrollment at any time.

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<sup>1</sup> See Order No. PSC-14-0468-TRF-EI, issued August 29, 2014 in Docket No. 140070-EI, In re: Petition for approval of voluntary solar partnership pilot program and tariff, by Florida Power & Light Company.

***Tampa Electric Company - Tampa International Airport Project***

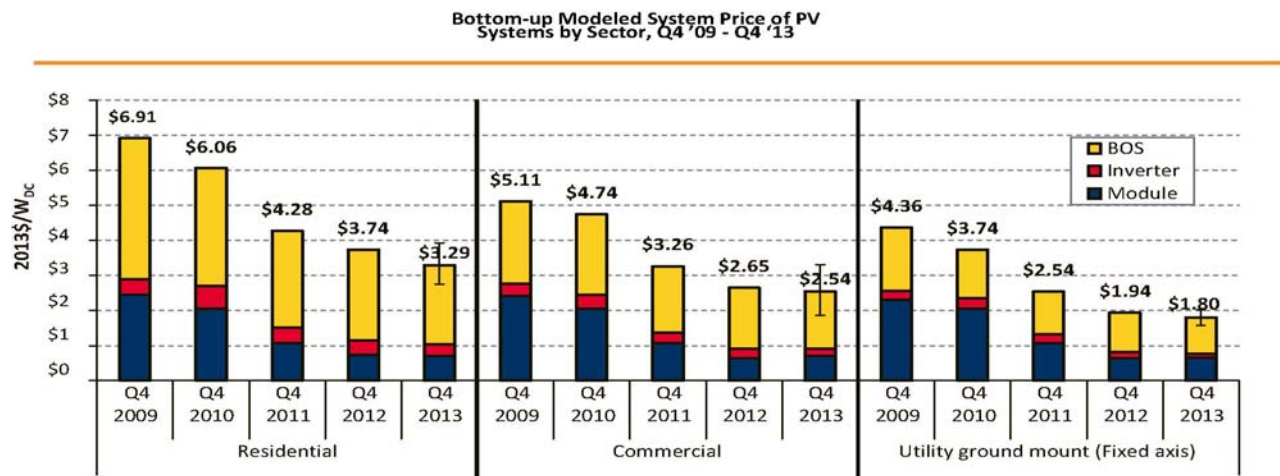
- On September 30, 2014, Tampa Electric Company (TECO) announced it will construct 2 MW of solar PV at the airport.
- The project is to be completed by the end of 2015.
- TECO will own the solar PV and will lease the airport garage roof on which the solar PV is to be located for \$15,000/year.
- TECO will receive the 30% federal tax credit.
- Energy from the solar PV will be fed into TECO’s grid and not be consumed directly by the airport.

***Gulf Power Company’s Solar Petition – Docket No. 150035-EI***

- On January 22, 2015, Gulf Power Company filed for approval of three purchased power agreements totaling 120 MW for solar photovoltaic projects to be located at military installations:
  - Eglin Air Force Base, Okaloosa County – 30 MW
  - Holley Naval Landing Field, Santa Rosa County – 40 MW
  - Saufley Naval Landing Field, Escambia County – 50 MW
- A recommendation on the petition is currently scheduled for the April 16, 2015 Agenda Conference.

**Cost Trends**

The costs associated with the installation of solar PV have been steadily decreasing. The graph below shows that the declines have been seen in all three sectors -- residential, commercial, and utility scale installations. The graph shows that over the period 4<sup>th</sup> quarter 2009 – 4<sup>th</sup> quarter 2013, the bottom-up modeled system prices have declined by 52%, 50%, and 59% for residential, commercial, and utility scale installations, respectively.



Source: 2014 Edition of DOE’s Photovoltaic System Pricing Trends



Information provided by the investor-owned electric utilities in the 2014 goal setting proceeding also recognized the declining cost of solar PV for residential and commercial installations. For example, Duke Energy's witness testified that the cost of solar PV for residential installations declined from \$5.01/watt<sub>dc</sub> in 2011 to \$4.13/watt<sub>dc</sub> in 2013. Similarly, the cost of solar PV for commercial installations declined from \$5.33/watt<sub>dc</sub> in 2011 to \$3.89 in 2013. Gulf Power Company reported that the installed cost of solar PV systems (residential and commercial) dropped from an average of \$5.54/watt<sub>dc</sub> in 2011 to \$3.42/watt<sub>dc</sub> in 2014.

### **Demand Side Management Solar Pilot Programs**

Section 366.82, F.S., directs the Commission to adopt appropriate goals for increasing the development of demand-side renewable energy systems. In developing goals, the Commission is to take into consideration the benefits and costs to the consumer participating in the measure and the benefits and costs to the general body of ratepayers. In the 2009 goal setting proceeding, the Commission found that solar measures, including solar PV and solar thermal, did not pass the cost-effectiveness tests required by Rule 25-17.008, F.A.C. However, the Commission ordered the investor-owned electric utilities (IOUs) to develop solar pilot programs in order to address the intent of the Legislature to place added emphasis on demand-side renewable resources.<sup>2</sup> The Commission established a spending cap for the IOUs of approximately \$24.5 million per year total in order to protect ratepayers from undue rate increases. The approved solar pilot programs provide customer rebates to offset a portion of the installation costs for solar photovoltaic and solar hot water heating systems, and also provide solar energy equipment to low-income customers and to schools. The following data provides information on program participation, costs, and installed solar PV capacity.

### ***Solar Pilot Program Participation and Expenditures***

The table below shows that during the period 2011-2013, a total of nearly \$50 million was expended for the solar pilot programs and 5,845 customers participated in the programs.

<b>Solar Pilot Program Expenditures and Participation 2011-2013 (Includes both PV and Thermal)</b>		
	Expenditures	Participants
FPL	\$29,853,514	3,962
DEF	\$13,788,013	1,318
TECO	\$3,793,723	325
GULF	\$2,300,000	240
Total	\$49,735,250	5,845
Source: 2014 conservation goals proceeding.		

<sup>2</sup> See Order No. PSC-09-0855-FOF-EG, issued December 30, 2009, in Docket Nos. 080408-EG, 080409-EG, 080410-EG, 080412-EG, 080413-EG, In re: Commission Review of numeric Conservation Goals.

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The following tables provide more detailed information on solar pilot program participation and expenditures during 2011-2013.

<b>Florida Power and Light Company 2011-2013</b>	Number of Participants	Total Expenditures	Average Expenditure/Participant
Solar Water Heating - Residential & Low Income New Construction	2968	\$4,469,845	\$1,506
Solar Water Heating - Business	38	629,408	16,563
Photovoltaic (PV) - Residential	774	11,045,895	14,271
Photovoltaic (PV) - Business	153	5,488,461	35,872
Photovoltaic (PV) - Business PV for Schools	29	4,057,967	139,930
Research & Demonstration	n/a	1,158,841	
Non-program Specific	n/a	3,003,097	
<b>TOTAL</b>	<b>3962</b>	<b>\$29,853,514</b>	<b>\$7,535</b>

Source: 2014 Energy Conservation Goals Proceeding.

<b>Duke Energy Florida, Inc. 2011-2013</b>	Number of Participants	Total Expenditures	Average Expenditure/Participant
Solar Water Heating Low Income	63	\$321,874	\$5,109
Solar Water Heating - Residential	847	587,132	693
Photovoltaic (PV) - Residential	346	5,522,911	15,962
Photovoltaic (PV) - Commercial	39	2,755,173	70,645
Photovoltaic (PV) for Schools	23	4,097,400	178,148
Research and Demonstration	n/a	504,523	
<b>TOTAL</b>	<b>1318</b>	<b>\$13,788,013</b>	<b>\$10,461</b>

Source: 2014 Energy Conservation Goals Proceeding.

<b>Tampa Electric Company 2011-2013</b>	Number of Participants	Total Expenditures	Average Expenditure/Participant
Photovoltaic (PV) - Residential	168		
Photovoltaic (PV) - Commercial	24		
PV Systems for Schools	3		
Solar Water Heating - Residential	120		
Solar Water Heating - Low Income	10		
<b>Total</b>	<b>325</b>	<b>\$3,793,723</b>	<b>\$11,673</b>

Source: 2014 Energy Conservation Goals Proceeding.

<b>Gulf Power Company 2011-2013</b>	Number of Participants	Total Expenditures	Average Expenditure/Participant
Photovoltaic (PV) - Residential & Commercial	132	\$1,289,000	\$9,765
PV Systems for Schools	2	209,000	104,500
Solar Water Heating - Residential	76	88,000	1,158
Solar Water Heating - Low Income	30	145,000	4,833
Administrative Expenses	n/a	569,000	
<b>TOTAL</b>	<b>240</b>	<b>\$2,300,000</b>	<b>\$9,583</b>

Source: 2014 Energy Conservation Goals Proceeding.

**Solar Pilot Program Costs – Incentives & Other Expenses**

The following tables provide data on program expenses divided between incentives and all other expenses. Incentives refer to the monetary rebates provided to qualifying customers who installed a solar PV or water heating system. Other expenses include payroll, marketing and other overhead.

<b>Solar Pilot Program Costs 2011-2013</b>					
<b>Duke Energy Florida, Inc.</b>					
<b>Program</b>	<b>Other Expenses</b>	<b>% of Total</b>	<b>Incentives</b>	<b>% of Total</b>	<b>Total</b>
Solar Water Heating with EM	\$153,187	26.1%	\$433,945	73.9%	\$587,132
Research and Demonstration	\$504,523	100.0%	\$0	0.0%	\$504,523
Solar Water Heating Low Income	\$78,970	24.5%	\$242,905	75.5%	\$321,875
Photovoltaic for Schools Pilot	\$161,299	3.8%	\$4,133,050	96.2%	\$4,294,349
Residential Solar Photovoltaic	\$370,971	7.0%	\$4,954,991	93.0%	\$5,325,962
Commercial Solar Photovoltaic	\$155,848	5.7%	\$2,599,325	94.3%	\$2,755,173
Total	\$1,424,798	10.3%	\$12,364,216	89.7%	\$13,789,014
<b>Florida Power and Light Company</b>					
<b>Program</b>	<b>Other Expenses</b>	<b>% of Total</b>	<b>Incentives</b>	<b>% of Total</b>	<b>Total</b>
Res. Solar H2O Heating Pilot	\$796,850	22.5%	\$2,752,000	77.5%	\$3,548,850
Res. Solar H2O Heating (Low Inc.) Pilot	\$131,990	14.3%	\$789,005	85.7%	\$920,995
Residential Photovoltaic Pilot	\$415,216	3.8%	\$10,630,678	96.2%	\$11,045,894
Business Solar H2O Heating Pilot	\$249,463	39.6%	\$379,945	60.4%	\$629,408
Business Photovoltaic Pilot	\$317,603	5.8%	\$5,170,859	94.2%	\$5,488,462
Business Photovoltaic for Schools Pilot	\$570,856	100.0%	\$0	0.0%	\$570,856
Renewable Research and Demo. Project	\$1,158,841	100.0%	\$0	0.0%	\$1,158,841
Solar Pilot Projects Common Expenses	\$2,075,160	100.0%	\$0	0.0%	\$2,075,160
Total	\$5,715,979	22.5%	\$19,722,487	77.5%	\$25,438,466
<b>Gulf Power Company</b>					
<b>Program</b>	<b>Other Expenses</b>	<b>% of Total</b>	<b>Incentives</b>	<b>% of Total</b>	<b>Total</b>
Renewable Energy Plan Common	\$569,452	100.0%	\$0	0.0%	\$569,452
Solar for Schools	\$139,906	100.0%	\$0	0.0%	\$139,906
Solar Thermal Water Heating	\$12,187	13.8%	\$76,000	86.2%	\$88,187
Solar PV	\$11,835	0.9%	\$1,277,330	99.1%	\$1,289,165
Solar Thermal Water Heating - Low Income	\$0	0.0%	\$144,776	100.0%	\$144,776
Total	\$733,380	32.9%	\$1,498,106	67.1%	\$2,231,486
<b>Tampa Electric Company</b>					
<b>Program</b>	<b>Other Expenses</b>	<b>% of Total</b>	<b>Incentives</b>	<b>% of Total</b>	<b>Total</b>
Renewable Energy Systems Initiative	\$598,495	15.8%	\$3,195,228	84.2%	\$3,793,723
Total	\$598,495	15.8%	\$3,195,228	84.2%	\$3,793,723

Source: Energy Conservation Cost Recovery Clause Schedules.

***Solar Photovoltaic Capacity Installed – 2011-2013***

The table below provides the capacity of solar PV systems installed by customers. Duke Energy Florida, Inc. and Gulf Power Company reported that some customers installed solar PV systems with capacity in excess of the capacity provided by the maximum rebate. Data is provided for the incentivized capacity and the total capacity installed.

<b>Solar PV Installed Capacity Funded by Solar Pilot Programs</b>				
<b>kW DC Rating 2011-2013</b>				
	2011	2012	2013	Total
<b>Duke Energy Florida, Inc.</b>				
	2011	2012	2013	Total
Residential Solar PV - Incentivized	557	733	1,205	2,495
Residential Solar PV - Total Installed	567	753	1,239	2,559
Commercial Solar PV - Incentivized	632	593	609	1,834
Commercial Solar PV - Total Installed	1,667	1,996	631	4,294
Solar for Schools - Incentivized	190	200	190	580
Solar for Schools - Total Installed	197	200	190	587
Total Incentivized	1,379	1,526	2,004	4,909
Total Installed	2,431	2,949	2,060	7,440
<b>Florida Power and Light Company</b>				
	2011	2012	2013	Total
Residential Solar PV	1,690	1,650	2,272	5,612
Business Solar PV	598	1,526	2,534	4,658
Solar for Schools	0	0	190	190
Total	2,288	3,176	4,996	10,460
<b>Gulf Power Company</b>				
	2011	2012	2013	Total
Solar PV - Incentivized	204	218	218	639
Solar PV - Total Installed	267	273	288	828
Solar for Schools	0	10	10	20
Total Incentivized	204	228	228	659
Total Installed	267	283	298	848
<b>Tampa Electric Company</b>				
	2011	2012	2013	Total
Residential Solar PV	311	495	479	1,285
Commercial Solar PV	74	61	90	225
Solar for Schools	10	10	10	30
Total	395	566	579	1,540
Source: FPSC staff data request.				

**2014 Goal Setting Proceeding - Cost-Effectiveness Analysis Results**

As part of the 2014 goal setting proceeding, the Commission evaluated the cost-effectiveness of the Solar Pilot Programs, solar PV and solar hot water heating measures. The tables below provide the results of the cost-effectiveness tests required by Rule 25-17.008, F.A.C. The Commission found that the programs are not cost-effective and experience gained since the 2009 goals proceeding indicates that consumers have continued to install systems without any rebates. The Commission noted that the rebates associated with the solar pilot programs represent a large subsidy from the general body of ratepayers to a very small segment of each utility's customers.

Florida Power and Light Company Solar Pilot Programs	Benefit Cost Ratio		
	RIM	TRC	Participant
Solar Water Heating - Residential	0.51	0.18	0.50
Solar Water Heating - Low Income New Construction	0.21	0.28	1.52
Solar Water Heating - Business	0.34	0.19	0.58
Photovoltaic (PV) - Residential	0.46	0.27	0.74
Photovoltaic (PV) - Business	0.64	0.33	0.67
Photovoltaic (PV) - Business PV for Schools	0.13	0.15	1.19

Source: 2014 Energy Conservation Goals Proceeding

Duke Energy Florida, Inc. Solar Pilot Programs	Benefit Cost Ratio		
	RIM	TRC	Participant
Solar Water Heating for Low-income Residential	0.274	0.454	1.83
Solar Water Heating with Energy Management	0.596	0.580	0.79
Photovoltaic - Residential	0.376	0.547	1.23
Photovoltaic - Commercial	0.422	0.628	1.35
Photovoltaic for Schools	0.141	0.163	1.18

Source: 2014 Energy Conservation Goals Proceeding

Tampa Electric Company Solar Measures	Benefit Cost Ratio		
	RIM	TRC	Participant
Residential PV	0.38	0.41	1.20
Commercial PV	0.40	0.39	1.10
Residential Solar Water Heating	0.56	0.28	0.71

Source: 2014 Energy Conservation Goals Proceeding

Gulf Power Company Solar Measures	Benefit Cost Ratio		
	RIM	TRC	Participant
Solar PV (combined residential and commercial)	0.88	0.67	1.005 – 1.05
Solar Thermal Water Heating (Single Family)	0.74	0.56	0.98

Source: 2014 Energy Conservation Goals Proceeding

cc: Lisa Harvey, Charlie Beck

## II. Outside Persons Who Wish to Address the Commission at Internal Affairs

Note: The records reflect that no outside persons addressed the Commission at this Internal Affairs meeting.

# III. Supplemental Materials for Internal Affairs

Note: The following material pertains to Item 1  
of this agenda.

# IV. Transcript

Note: Transcript Pending