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## Why are Utilities in USA Going into Large-scale Solar Photovoltaic Power Projects?

2<sup>nd</sup> National Photovoltaic Conference  
Kuala Lumpur, Malaysia  
17 November, 2009  
Christy Herig  
Solar Electric Power Association

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### About SEPA

- Mission is to facilitate **utility** use & integration of solar electric power
- Non-profit membership organization
- Reliable source of unbiased information about solar technologies, policies, and programs
- Bridge between utility & solar industries

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### SEPA Program Areas



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    graph LR
      SEPA[SEPA] --- Research[Research]
      SEPA --- Education[Education]
      SEPA --- Outreach[Direct Utility Outreach]
  
```

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### About SEPA


Ongoing Activities

- One-on-One Utility Support
- Solar Power International Conference and Expo w/Utility and Regulator Travel Scholarships
- Utility Solar Conference
- Online Resource Library
- Monthly Phone Seminars
- Bi-Weekly Electronic Newsletter and Email Alerts
- Membership Directory
- Fact finding missions to Germany, Spain, and.....

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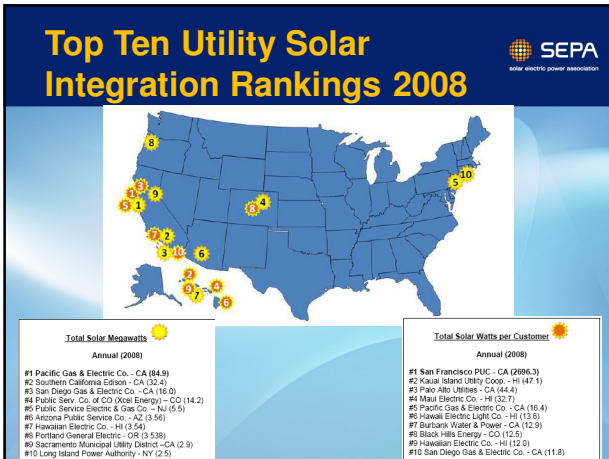
### Research Projects 2008

- Electric Utilities and Solar, A Market Review
- 2007 Top Ten Utility Solar Integration Rankings
- Fact Finding Mission to Germany for Utility Decision Makers
- Utility Solar Business Models
- Photovoltaic Capacity Valuation Methods
- Residential Photovoltaic Metering and Interconnection Study

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### Research Projects 2009

- Utility Solar Procurement Study - Jan 2009
- Utility Solar Tax Manual - Jan 2009
- Decoupling Utility Profits from Sales: Issues for the Photovoltaic Industry – March 2009
- Distributed Photovoltaic Generation for Regulated Utilities
- Top Ten Utility Solar Integration Rankings



### Examples of Recent PV Announcements ~ 3 GW

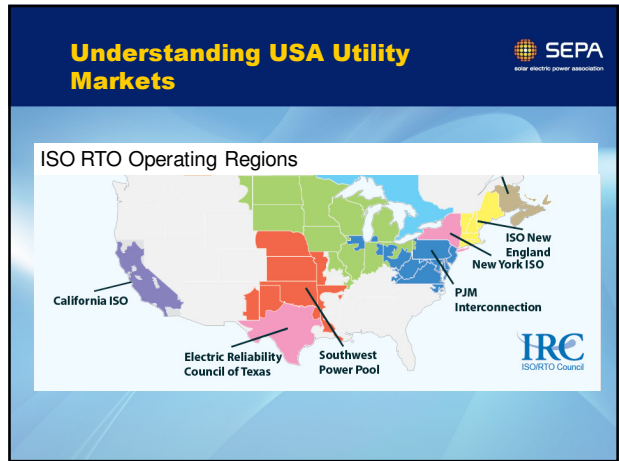
Project/Program	MW	Purchasing Utility	State	Anticipated Completion
SCE DG PV Program	250	Southern California Edison	CA	2008-2012
Topaz Solar Farm	550	Pacific Gas & Electric	CA	2011-2013
PG&E PV DG Program	500	Pacific Gas & Electric	CA	2015
California Valley Solar Ranch	250	Pacific Gas & Electric	CA	2010-2012
APS DG Program	125	Arizona Public Service	AZ	2009-2013
SolarAll DG PV Program	120	PSEG	NJ	2009-2013
CPS Energy Solar Project	100	CPS Energy	TX	2010
SDG&E DG PV Program	77	San Diego Gas & Electric	CA	TBA
Babcock Ranch Project	75	Florida Power & Light	FL	2010
JCP&L DG PV Program	42	Jersey Central P&L	NJ	2012
LIPA PPA (2 plants)	50	Long Island Power Authority	NY	2011
PSEG Loan Program	30	PSEG	NJ	2008
Cimarron Solar Project	30	Tri-State Generation	NM	2010
Austin Energy PV Project	30	Austin Energy	TX	2010
DeSoto NextGen Solar Center	25	Florida Power & Light	FL	2009
Florida Solar One	25	Tampa Electric	FL	2011

### Understanding USA Utility "Charter"

Provide power that is

- Safe
- Reliable
- Affordable

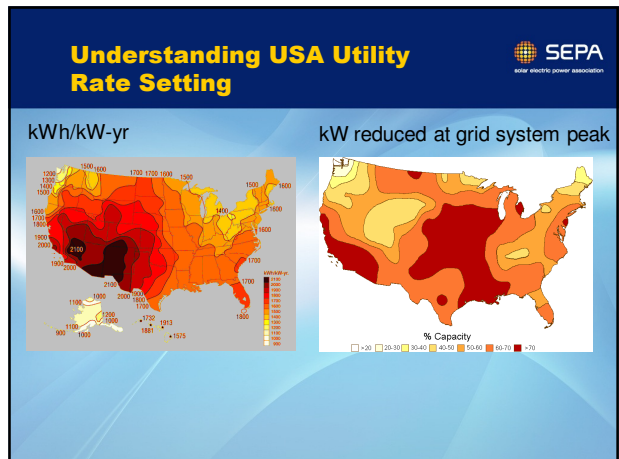
And responsible for all planning




### Understanding USA Utility Rate Setting

Rates include

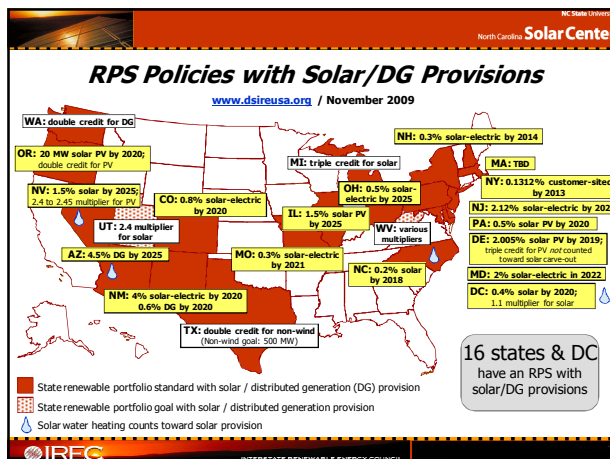
- ▢ Fixed charges – monthly customer charges
- ▢ Demand Charges - \$/ kW-month
- ▢ Energy Charges – cents/kWh
- ▢ Consumption, Time and Seasonal Variations
  - > Time-of-use
  - > Real Time
  - > Declining and Inclining tiers




## Understanding USA Utility Financial Structures

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- Investor Owned Utilities – 293
  - 82% of Sales
  - Responsible to shareholders and regulators
- Public Utilities – 2808  
( 937 Cooperatives, 26 Federal, 1845 Municipal)
  - 18% of Sales
  - Responsible to citizens ( some regulation)



## BUSINESS MODEL DEFINITION

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*- a focusing device that mediates between technology development and economic value creation.*  
*Harvard Business School scholars Henry Chesbrough and Richard S. Rosenbloom*

Technology Inputs

- ✓ resource characteristics
- ✓ technology characteristics
- ✓ environmental attributes
- ✓ performance
- ✓ applications
- ✓ feasibility

Business Model

- target market(s)
- value proposition
- value chain
- cost & earnings
- value network
- competitive strategy

Economic Outputs

- ✓ pricing & revenues
- ✓ value to utility owners
- ✓ value to utility customers
- ✓ environmental impacts
- ✓ regulatory overlay
- ✓ value to society


## Drivers

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- Favorable demand-side policies (eg, decoupling)
- Renewable portfolio standards (state and possible federal)
- Climate change / future cost of carbon
- Volatile fuel prices
- Decreasing solar costs, combined with utility buying power
- Customer demands for “green”
- Availability of 30% federal incentive to investor owned utilities (previously excluded)

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## EMERGING\* MODELS CATEGORISED

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- Utility ownership of solar assets
- Utility purchasing solar output
- Utility financing solar assets

\*The report also describes existing state, regional and utility solar programs, and how these differ from the business models considered here.


## Infinite number of utility business models

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- 2008 SEPA study identified 13 solar business models under consideration by various utilities
  - others have since emerged
- A promising utility solar business model:
  - creates value in the energy marketplace
  - enables the utility to capture part of that value
  - will sustain itself over time
- “Utility Solar Business Models: Emerging Utility Strategies & Innovations” available for free download at [www.solarelectricpower.org](http://www.solarelectricpower.org)
- Phase II of the study is now beginning – cost allocations

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### UTILITY OWNERSHIP OF SOLAR ASSETS



**Ratebasing Solar on Customer Sites**  
 San Diego Gas and Electric (2004)  
 Southern California Edison (2008)  
 Duke – North Carolina (2008)

**Ratebasing Solar at Utility Facilities**  
 Potomac Electric Power Company  
 Delmarva Power & Light Company

**Owning Community Solar Equipment**  
 City of Ellensburg, WA

**Owning Inverters on Customer Sites**  
 Chelan Public Utility District

### UTILITY OWNERSHIP OF SOLAR ASSETS




**Acquiring Solar Projects from Developers**  
**turnkey acquisition, or purchase and sale agreement**  
 PG&E (2008)

**power purchase agreement with buy-out option, acquisition of sites for development,**  
 Land is easily rate based

**‘flip’ transactions that could take various forms**  
 Like wind

### UTILITY FINANCING SOLAR ASSETS




**Ratebasing Solar Loans and Recovering ‘Lost Revenues’**  
**Public Service Gas and Electric, (approved 2008)**

**Supporting Turnkey Installations and Ratebasing shareholder Loans**  
 Potomac Electric Power Company  
 Delmarva Power & Light Company

**Supporting a Feed-in Tariff with Solar Revenue Streams and Ratebased Shareholder Loans**

### UTILITY PURCHASE OF SOLAR OUTPUT



Valuing Solar Purchases to Avoid RPS Noncompliance  
 Recommended for further investigation

Equalizing Buying and Building  
 Open regulatory docket in Oregon -

Achieving Economies and Expanding Solar Access through Community-Scale Systems  
 SMUD 20 year PPA – resale to customers as “SolarShares”

### THE ALL-IN-ONE



\$100 million for solar loans to residential & commercial customers


- ☐ Paid back by customers in form of RECs to help utility meet RPS

120 MW program over next 5 years

- ☐ 40 MW of utility owned pole mounted AC systems  
 (200 W panels on 200,000 poles)
- ☐ 43 MW of utility owned distributed generation on government facilities
- ☐ 35 MW of centralized PV (brownfields, underdeveloped real estate)
- ☐ 2 MW of on affordable housing



### Business Models Phase 2



**Utility:** FLORIDA POWER & LIGHT **Type:** investor-owned  
**Program Name:** *FPL Next Generation Solar Energy Centers*


**Program Type(s):** Central – 3 separate facilities totaling 110 MW, at 3 different locations,

**Technologies:** Two PV, one solar thermal (trough)

**Asset Ownership:** Utility  
**Side of Meter:** Utility

**Siting:** Two on utility property, including solar thermal connected to existing combined cycle; third on federal property at Kennedy Space Center

## Business Models Phase 2





**Program Overview:**

- Petition filed with Florida Public Service Commission 5/16/08; granted 8/4/08; docket closed 9/2/08.
- FP&L will build, own & operate three discrete central solar projects totaling 110 MW throughout Florida.
  - 25 MW DeSoto Energy Center is expected to be the nation's largest PV facility when completed in late 2009; will use SunPower PV tracking technology.
  - 75 MW Martin Energy Center will be the world's first hybrid solar thermal / combined cycle plant supplying thermal energy for existing steam turbine; will be nation's 2d largest solar thermal plant when built in 2010.
  - 10 MW Space Coast Energy Center at Kennedy Space Center; public/private partnership expected to allow FP&L & NASA to leverage engineering, design & operational expertise, & develop & refine solar technology.
- Plants proposed & approved by Florida Public Service Commission under Florida Statutes §366.92 [House Bill 7135], effective 7/1/08, providing for full cost recovery of all reasonable & prudent costs of up to 110 MW for zero-GHG emissions renewable projects with all land, zoning & transmission rights secured.
  - costs to be deemed reasonable & prudent if provider used reasonable & customary industry practices in design, procurement & construction in a cost-effective manner appropriate to the facility location.

## The largest PV system in the US – Arcadia, FL 25 MW








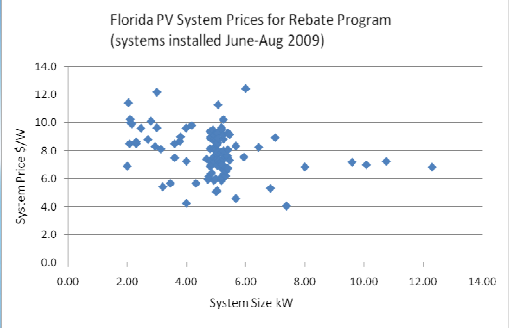
733.520.888  
www.sunpower.com

Desoto Next Generation Solar Energy Center

Image # 90726 1072  
Date: 07.24.09

## Prices are Dropping – but.....





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## Thank you!



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