



Here Comes the Sun Team Delta Eta

March 14th, 2014

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Presentation Overview

Meet Delta Eta

Project Scope

Rate Structure Reform

Strategy

Technical Analysis

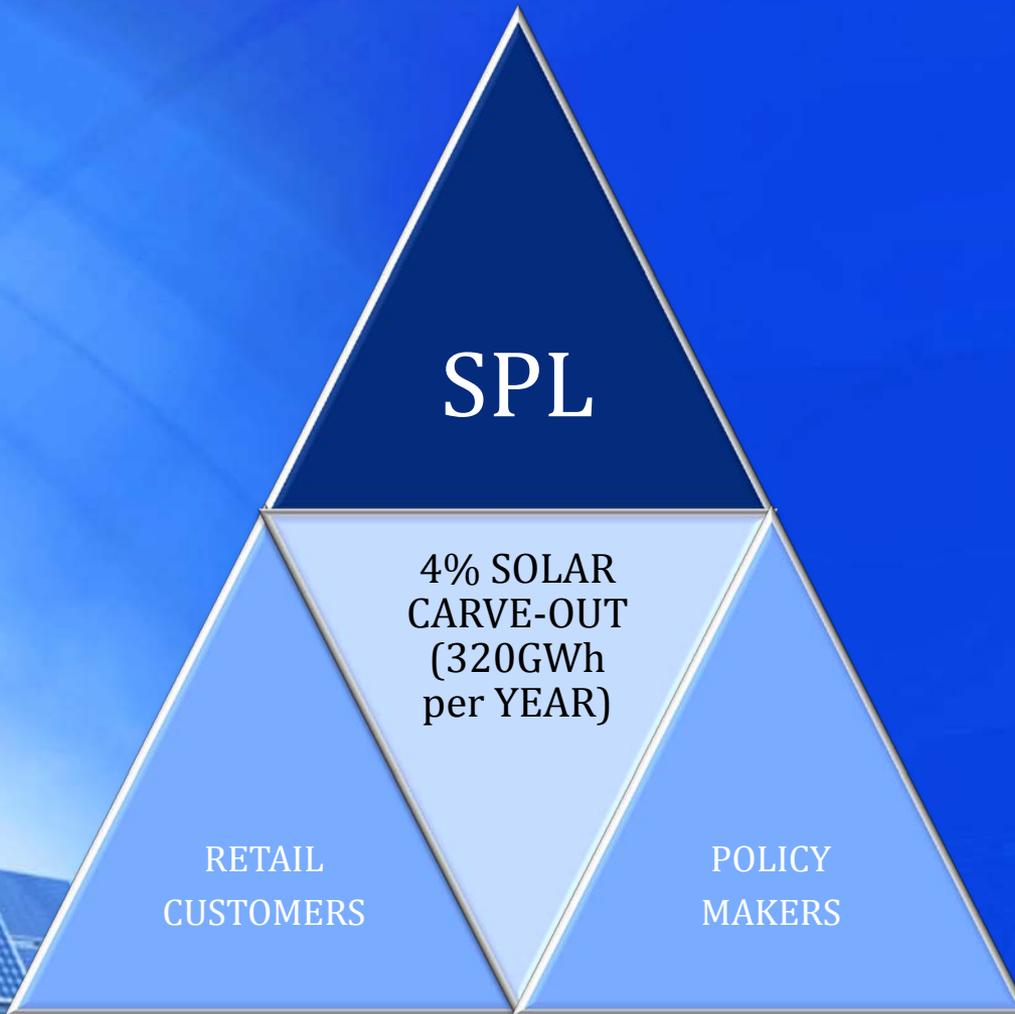
Financing

Recommendations

Q&A



Multilateral Stakeholders to Goal



❖ Expected commercial solar PV electricity generation of approx. 210GWh by 2023

❖ Largest build-up after 2016 when system costs have declined further and new rate structure is in place to further incentivize solar PV for commercial customers

Assumptions

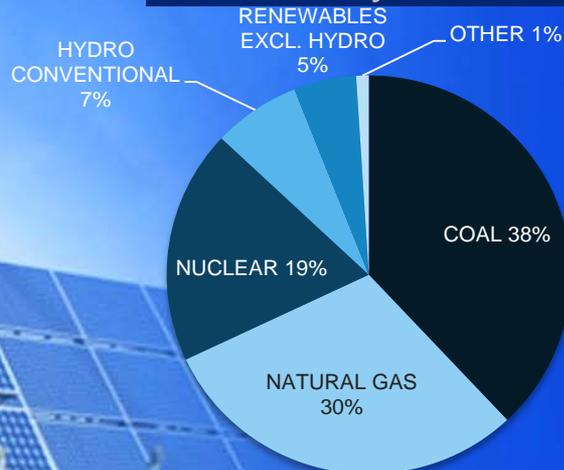
❖ 1 million people with a electricity consumption of 7,739GWh (based on information from Rhode Island)

❖ Retail electricity prices of

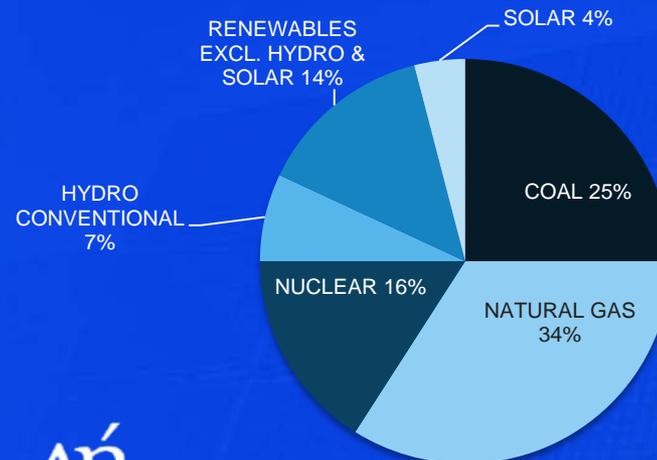
- ❖ 12.45 ¢ /KWh for the residential sector
- ❖ 10.57 ¢ /Kwh for the commercial sector
- ❖ 7.01 ¢ /KWh for the industrial sector

❖ Horizontal surface solar radiation of 4.65KWh/m²/day

2012 Electricity Generation



2023 Forecasted Electricity Generation



Objective: 4% Solar PV Carve-out

2014: Restructure Rates to Real Time Pricing

2014: Strategy A

Commercial/Industrial Incentive Program

- **Incentive 1**
On-Bill Financing
- **Incentive 2**
Bundled Pricing for Scale
- **Incentive 3**
Net Metering Aggregation

2020: Strategy B

Utility-scale Buildup

2023: Strategy C

SREC Purchases

Market Reform

Policy and Regulatory Proposals

- ❖ Decoupling
- ❖ Rate Reform

Decoupling

- ❖ Incentivizes Efficiency
- ❖ Removes profit motive barrier for utilities and encourages their investment in renewables

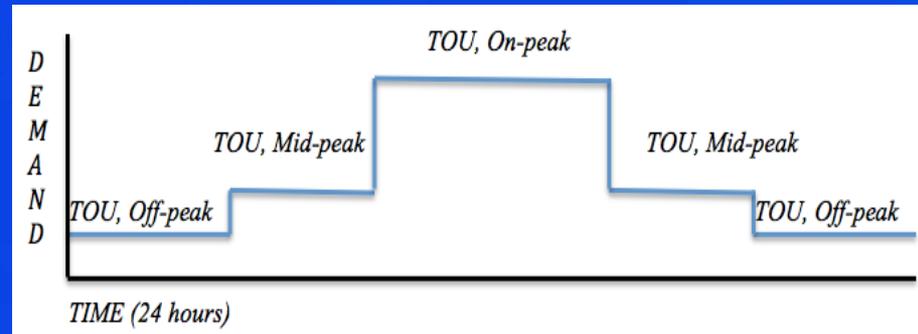
Rate Reform

- ❖ Time of use pricing
- ❖ Real time pricing
- ❖ Hybrid model

Retail Rate Structure Reform

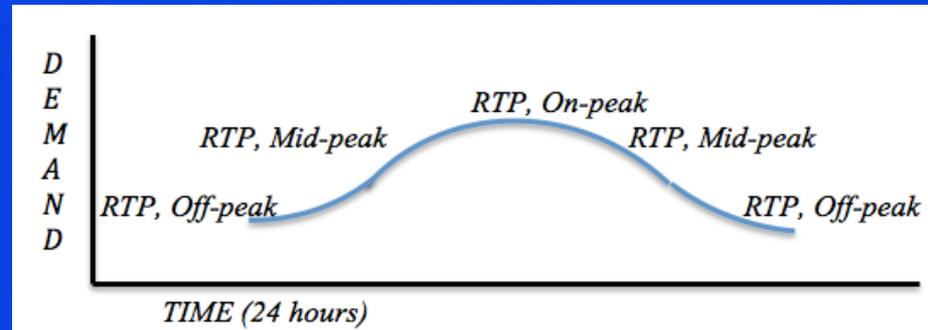
Time of Use Pricing

❖ Proactive



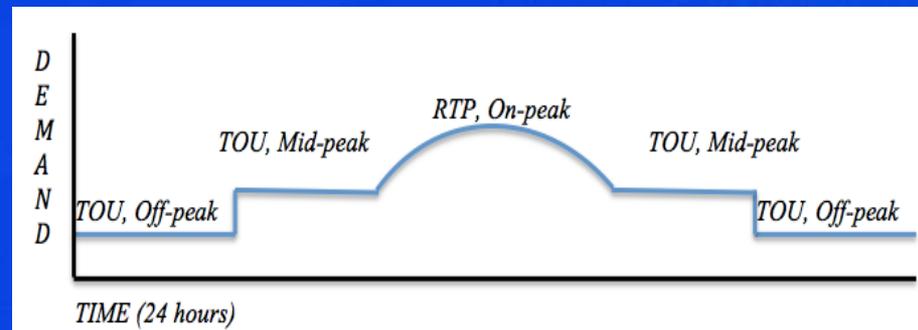
Real Time Pricing

❖ Reactive



Hybrid Model

❖ Value Added



Strategy A: Incentivize Commercial/Industrial PV

Advise SPL to cost-effectively meet the goal of a 4% solar carve-out (320 GWh per year)

On-Bill Financing

- ❖ Solving the Owner Renter Problem
- ❖ SPL pays PV-system upfront, customer pays back through utility bill charge

Bundled Pricing for Scale

- ❖ SPL bundles customer orders to negotiate lower system cost rates with solar supplier

Net Metering Aggregation

- ❖ Commercial customers can aggregate PV generation against electricity consumption of multiple customers through one meter

Strategy B: 2020 Utility-owned Solar Buildup

Strategy C: 2023 SREC Purchases

2020:
Internalize control of
carveout goal

2023:
Any shortfalls
are filled by
SRECS at
\$200/MWh



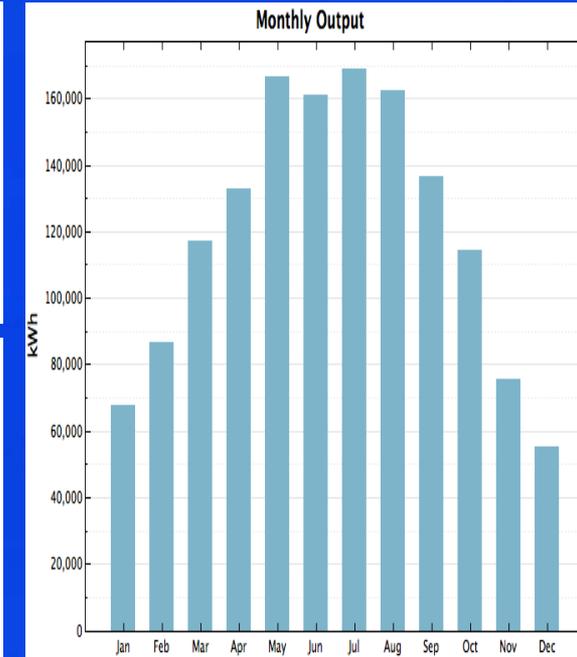
Technical Analysis For PV Systems

Performance Characteristics of Designed PV Arrays

	50 kW Non-Track.	1 MW Non-track.	1 MW Track.
Power (kWdc)	50.688	1,000.25	1,000.25
Annual Energy (kWh)	73,573	1,444,888	1,877,056
First Year kWh/kW	1,451.48	1,444.53	1,876.59
Installments Needed	4,132	211	162

Assumptions for Modeling

- ❖ 95% of annual output is taken as the actual output
- ❖ The reduction in year-to-year output is taken to be 0.5%
- ❖ Reference conditions are taken as 1000W/m² total irradiance and 25°C cell temperature for the calculation of module characteristics
- ❖ For the proper PV installation, packing factor is taken to be 2.5 when calculating the land area



System Advisor
Model by NREL
for Three South
Facing Systems

- 50 kW Non-Tracking System with 16° Tilt
- 1 MW Non-Tracking System with 16° Tilt
- 1 MW East-West Axis Tracking System

PV System Costs

Direct Cost

- ❖ Module
- ❖ Inverter
- ❖ Equipment
- ❖ Installation Labor
- ❖ Installer Margin & Overhead

Indirect Cost

- ❖ Land
- ❖ Permitting & Environmental Studies
- ❖ Engineering

Assumptions for Cost Analysis

- ❖ **Module and Inverter costs for the 1MW system is taken as half of the cost used for 50kW system**
- ❖ **Grid interconnection cost is assumed to be zero**
- ❖ **Land cost of 1MW system is estimated to be 11,800\$/acre**

	50-kW System	1-MW System
Total Cost		
Total Installed Cost	\$189,168	\$3,194,267
Total Installed Cost per kW	\$3.73	\$3.19

Financing Options

Option 1 : Incremental Roll Out of Capacity 2014 - 2023

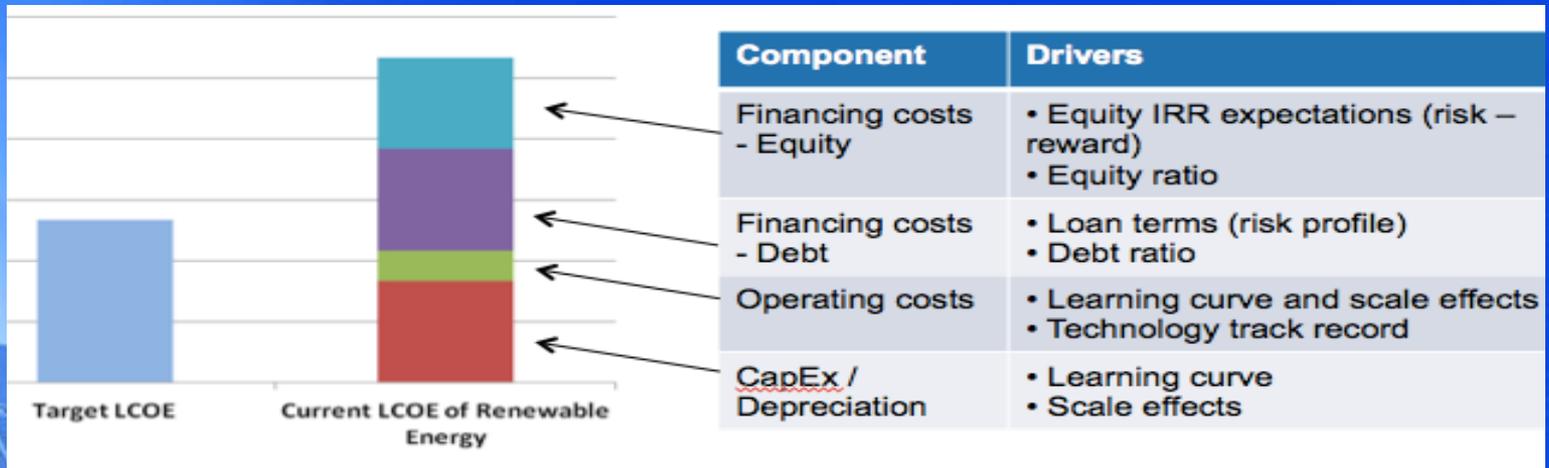
- ❖ Estimated project cost of \$780m.
- ❖ Funding via bank debt, drawn down in line with capacity expansion.

Option 2 : Utility Scale Solar Facility

- ❖ Estimated project cost of \$620m to \$670m.
- ❖ Funding opportunities include,
 - ❖ Project Finance
 - ❖ Department of Energy Loan Guarantee Program
 - ❖ International Financial Corp. "Green Bonds" program.

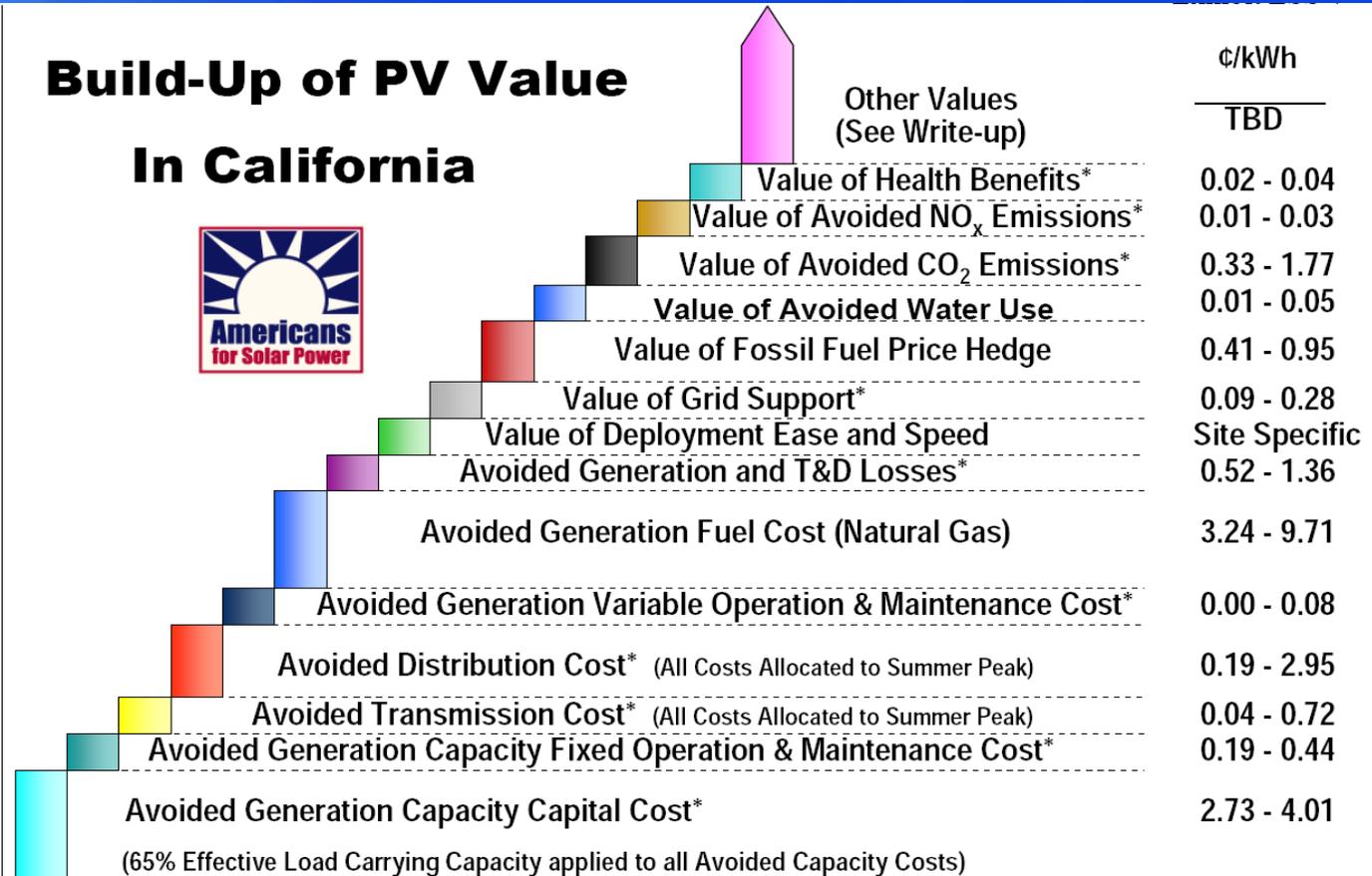
Option 3: External Specialist Investors

- ❖ Appreciate intrinsic value of solar power and long tail nature of infrastructure.
- ❖ JV entity, designed to invest directly in operational capacity.
- ❖ Alternative sources of funding, alleviates investment risk.
- ❖ JV entity may consider IPO, to tap additional equity for expansion



Distributed Gen Implicit Value-added

Build-Up of PV Value In California



CPUC R1 4/13/05

RANGE OF TOTAL VALUE OF PV:

7.8 – 22.4 c/kWh

Marketing

WHO

- ❖ Commercial/Industrial Consumers
- ❖ >50kw Projects

WHY

- ❖ Added-value Brand Capture
- ❖ Enables Proactive Consumption
- ❖ Reduces Electricity Price Risk
- ❖ Parking Overhead Coverage
- ❖ Save \$

HOW

- ❖ Tie-in with Rate Restructure Plan
- ❖ Direct Outreach
- ❖ DR Clients
- ❖ Public Meetings
- ❖ Media Coverage

Ancillary Services: Value-Added Revenue Streams



EV Charging Stations



Smart Thermostats



Demand Response



Data Driven Solutions

The SPL Solar Acquisition Team Recommends To

Deploy the Delta Eta Pricing Model: mixed real time and time of use pricing

Strategy A: Roll out PV capacity from 2014-2023 to commercial customers

Complementary Strategy B (utility solar) and Strategy C (SRECs)

Marketing campaign together with greater transparency on rate regimes

Thank You!



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