THE VOTE SOLAR INITIATIVE

WWW.VOTESOLAR.ORG

BRINGING SOLAR INTO THE MAINSTREAM

EPA

May 16, 2006

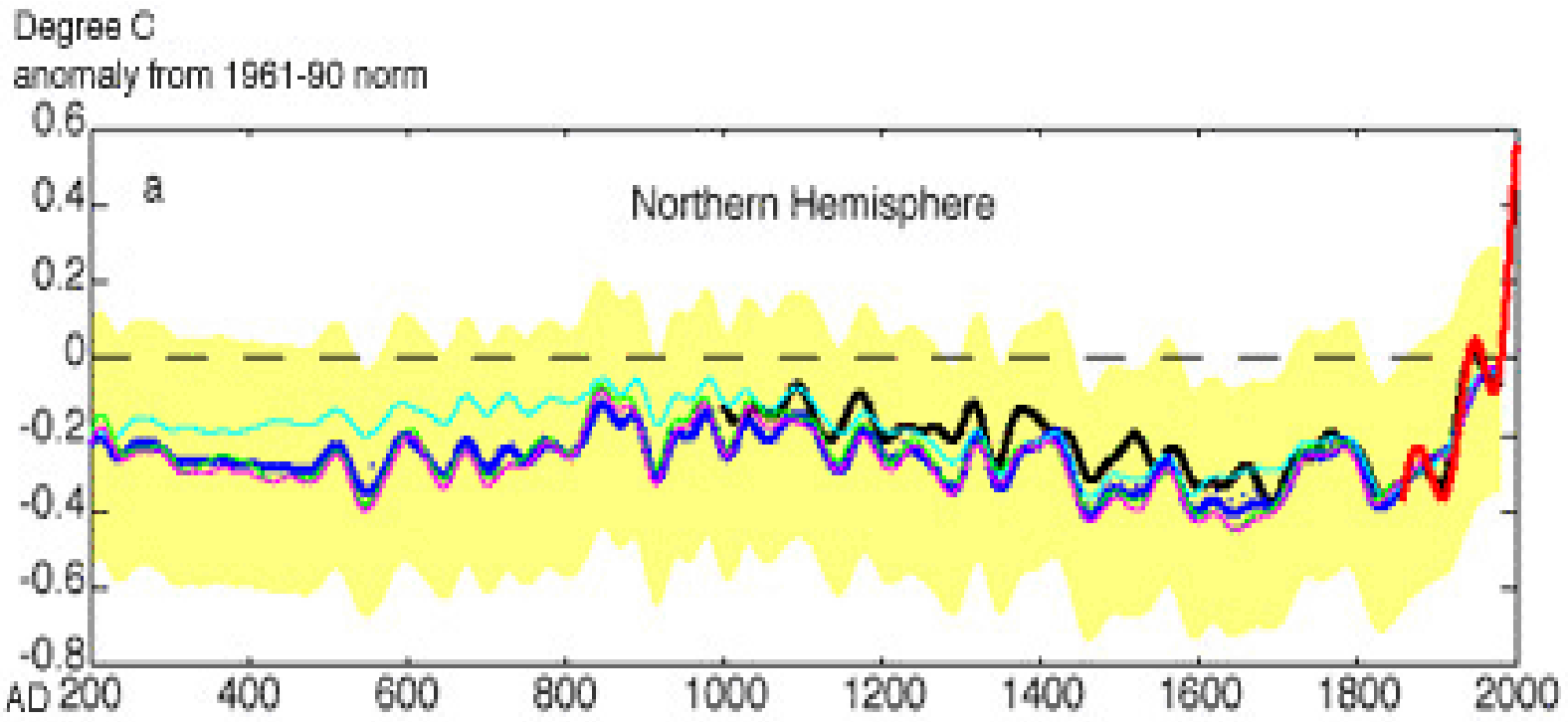
The Next 40 Minutes

- Why solar?
- Macro solutions.
- Micro solutions.

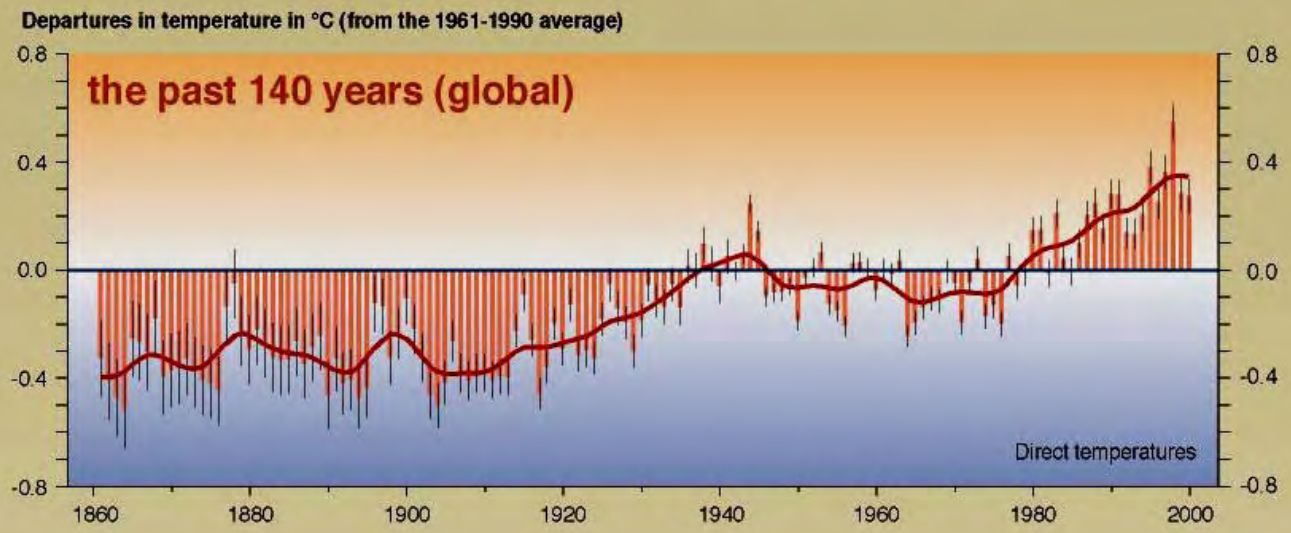
WHY SOLAR

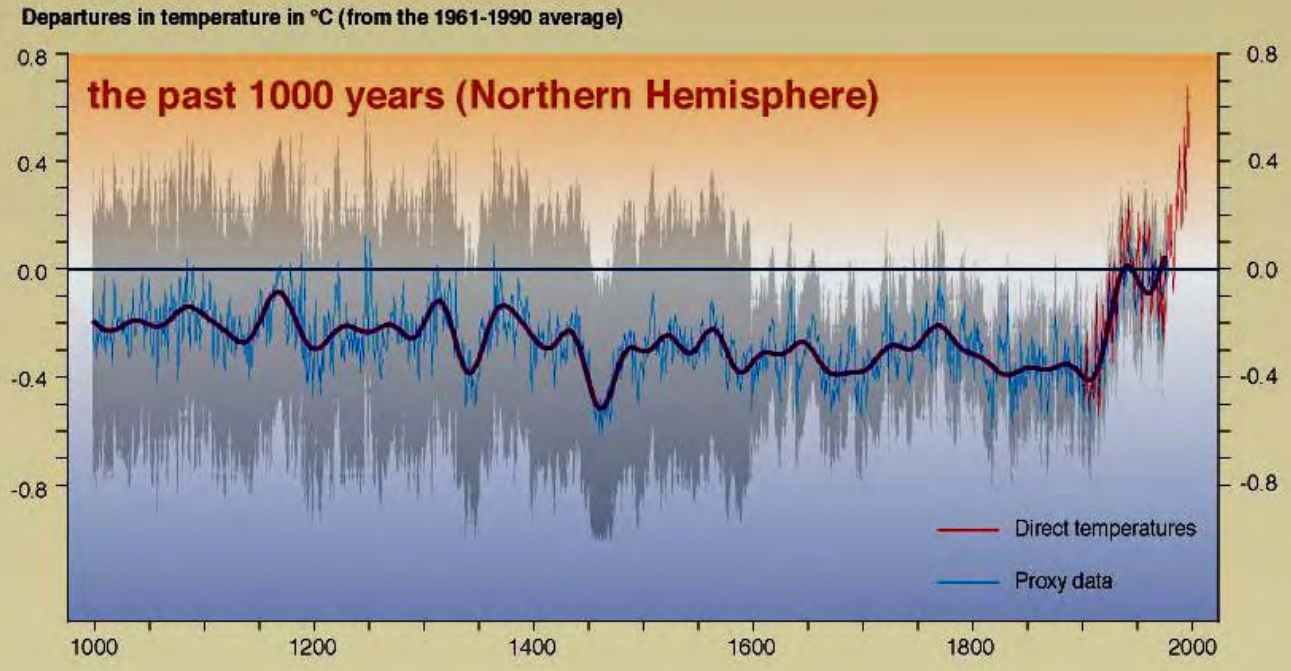
- Environment and Public Health
  - Electricity generation single largest cause of global warming
  - Public health benefits—fossil fuel emissions kill
- Adds Value for all Ratepayers
  - Resource diversification
  - Transmission capacity
  - Peak demand reduction

Temperature AD 200-2000



Temperatures AD 200-2000, from proxy temperature indicators and direct measurement (red), showing rise from from long-term cooling trend. Mann & Jones, Geophys. Research Letters, 2003.

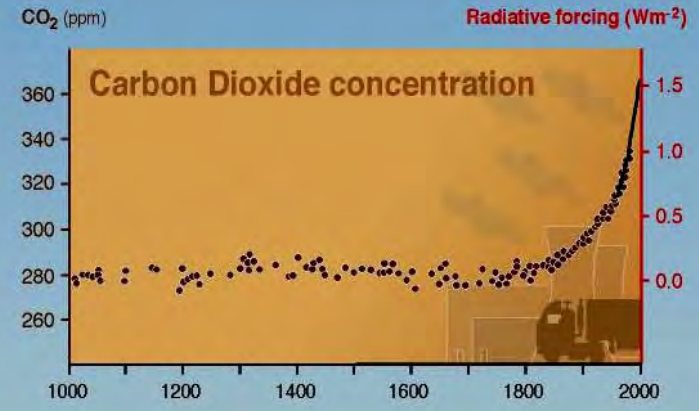


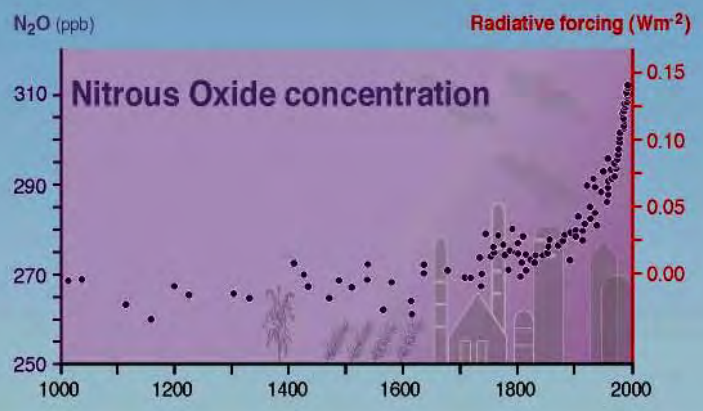


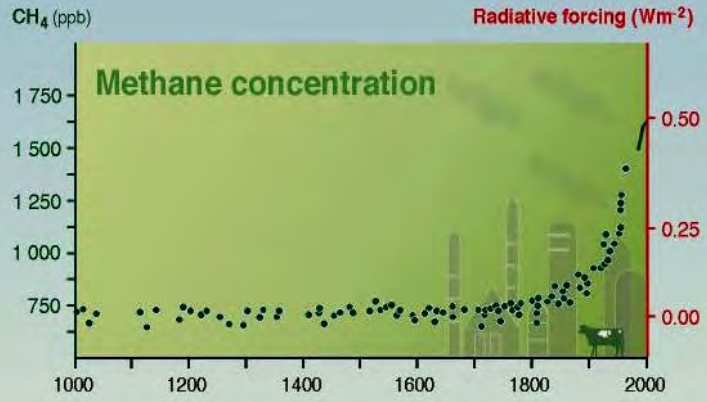
SYR - FIGURE 2-

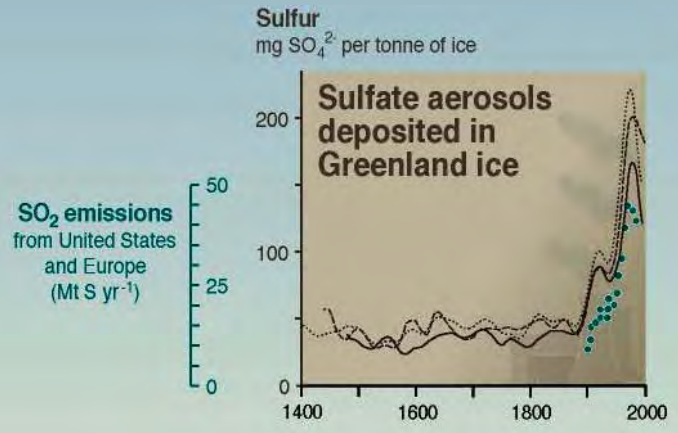
WMO

Indicators of the human influence on the atmosphere during the Industrial era



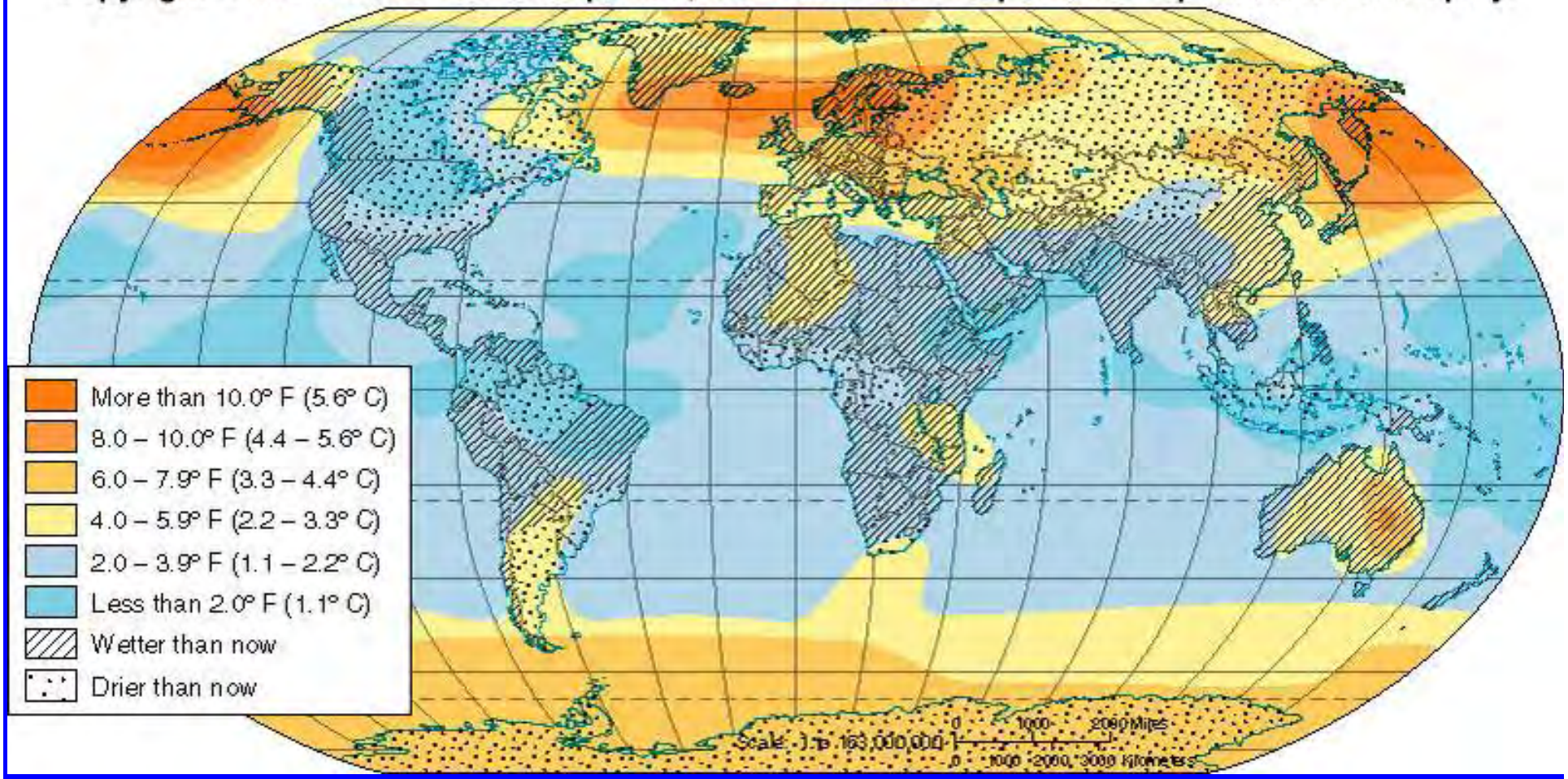






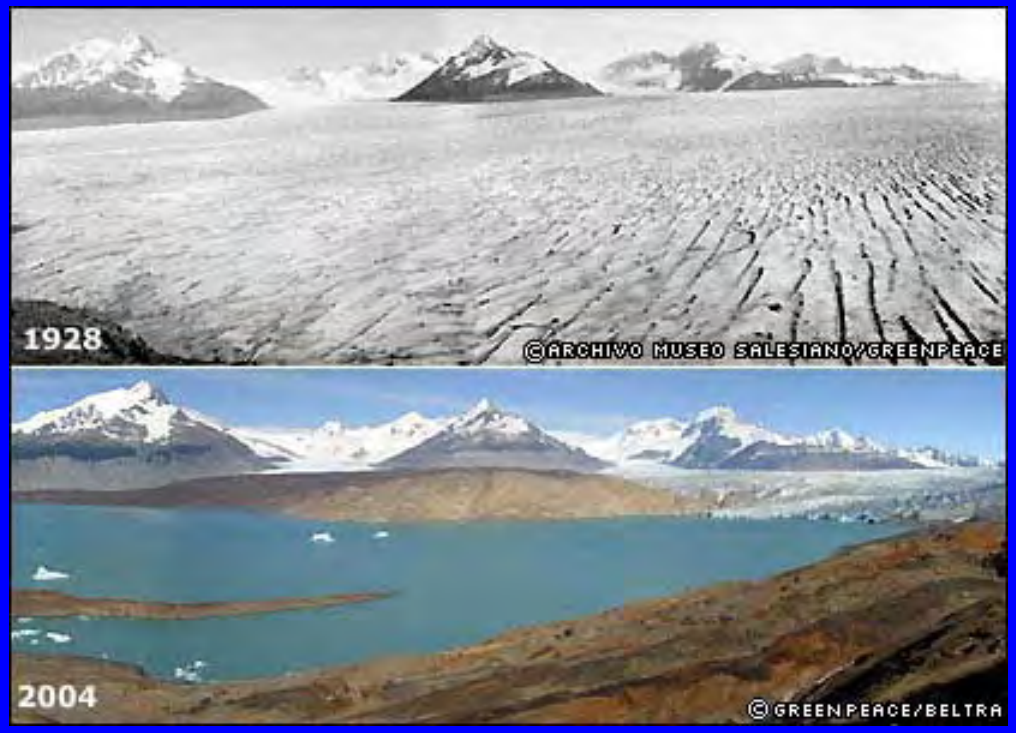
SYR - WG1 F

Predicted Changes in Climate by 2050



Upsala Glacier

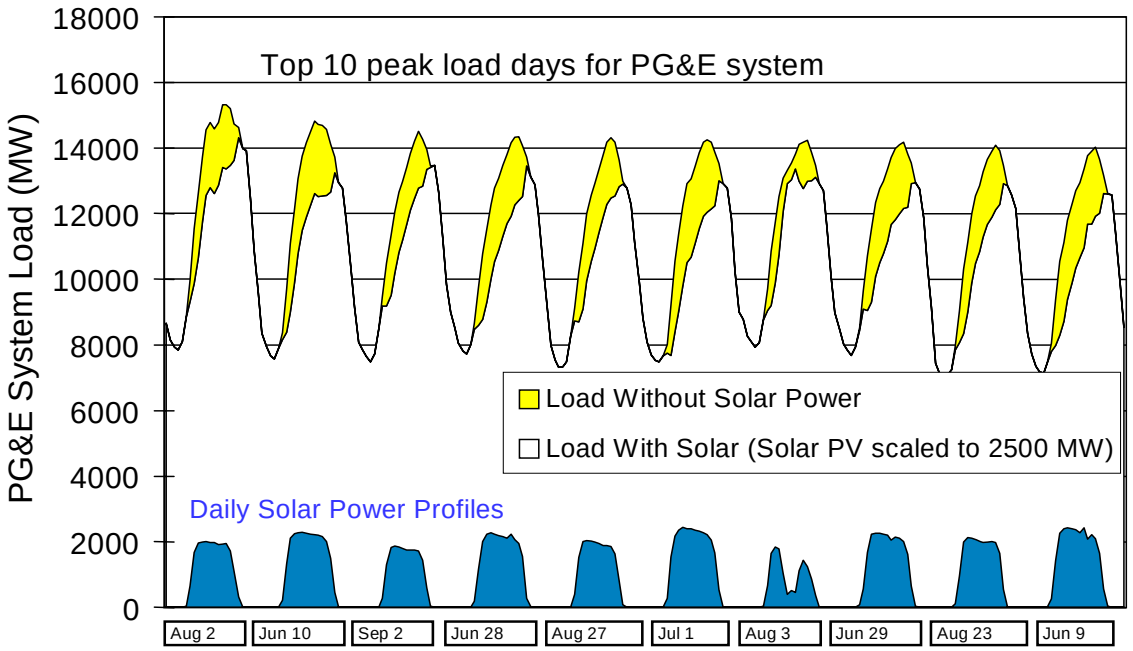
Argentina's Upsala Glacier was once the biggest in South America, but it is now disappearing at a rate of 200 m per year.



http://www.worldviewofglobalwarming.org/index.html

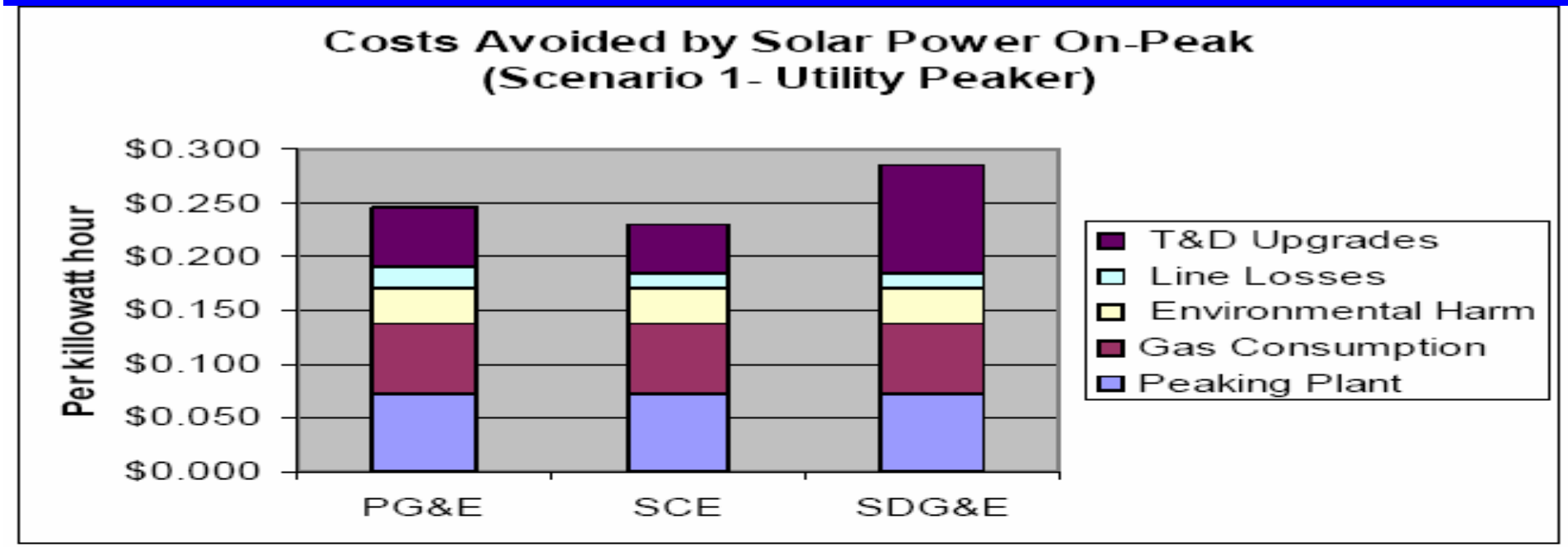
Peak Demand Reduction

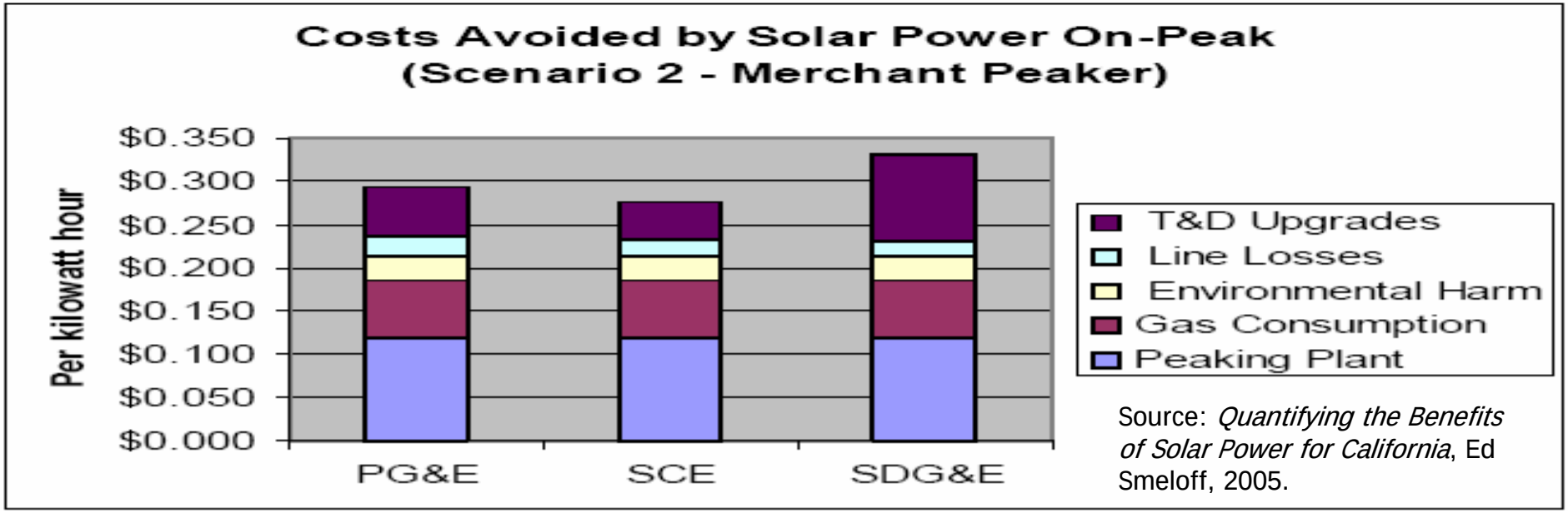
Solar Provides Peak Demand Reduction



Source: PG&E Report "The Value of Photovoltaics in the Distribution System" 1995. This figure uses actual PG&E system-wide demand data and actual output from PG&E's 500-kW solar power plant in Kerman, CA.

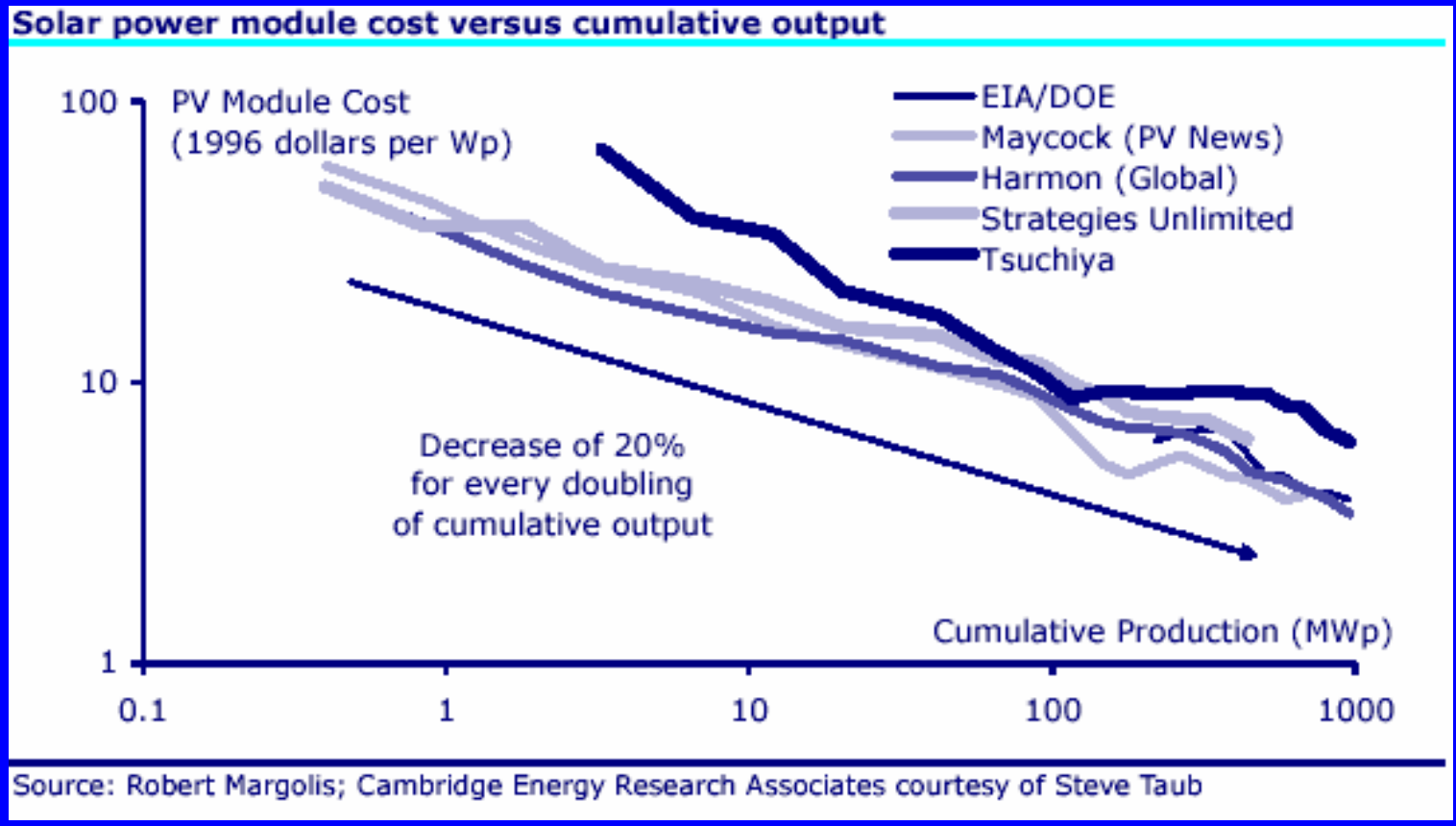
Value of Solar—Avoided Costs





Source: *Quantifying the Benefits of Solar Power for California*, Ed Smeloff, 2005.

Every time cumulative demand for solar doubles, the cost goes down by about 20%

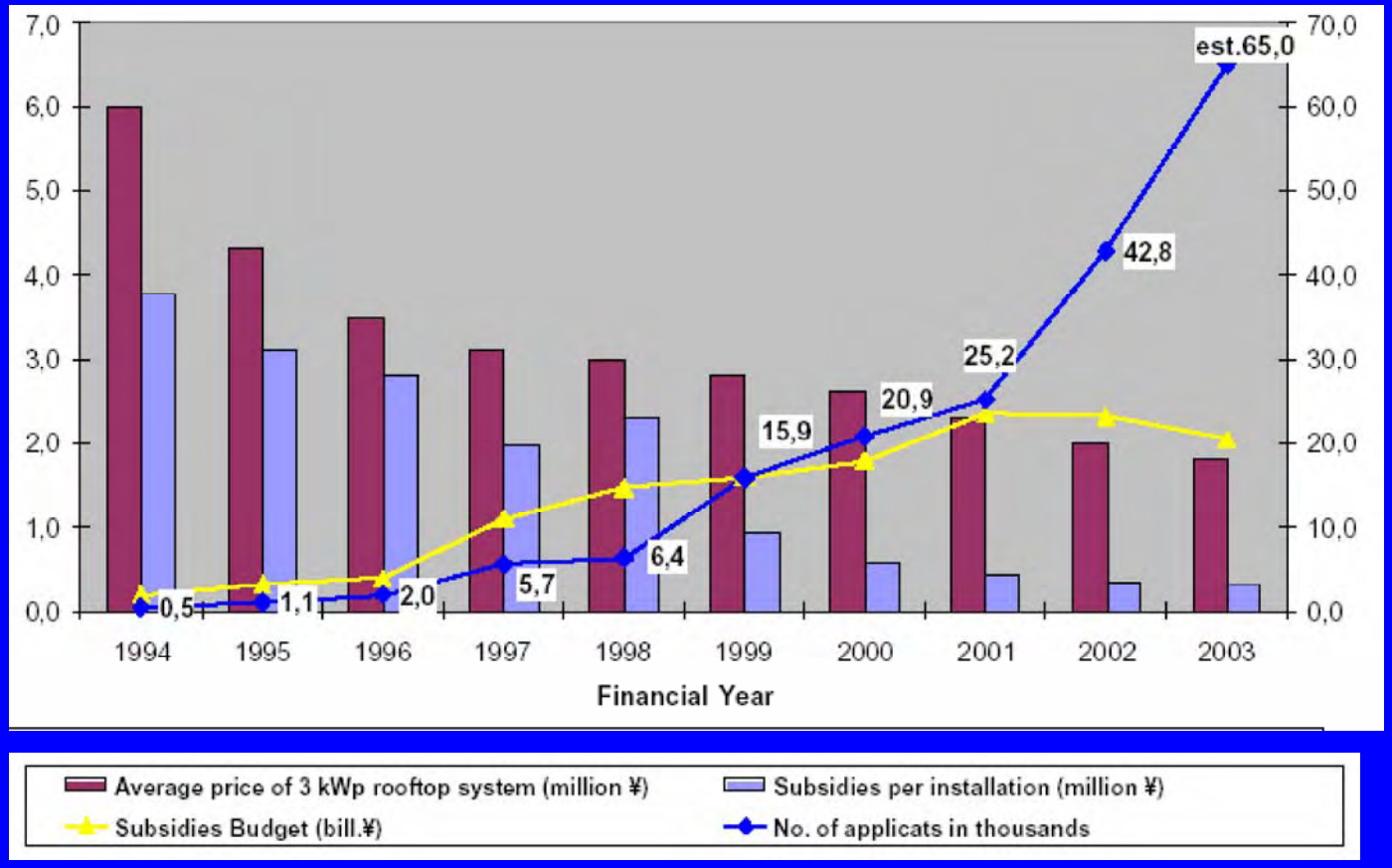


Sales of Integrated Circuits

YEAR	UNIT PRICE	MILITARY PERCENTAGE
1962	$50.00	100%
1963	$31.30	94%
1964	$18.50	85%
1965	$8.33	72%
1966	$5.05	53%
1967	$3.32	43%
1968	$2.33	37%

Source: Denis Hayes

Japan: $1B, 10 years= Self-Sustaining Industry

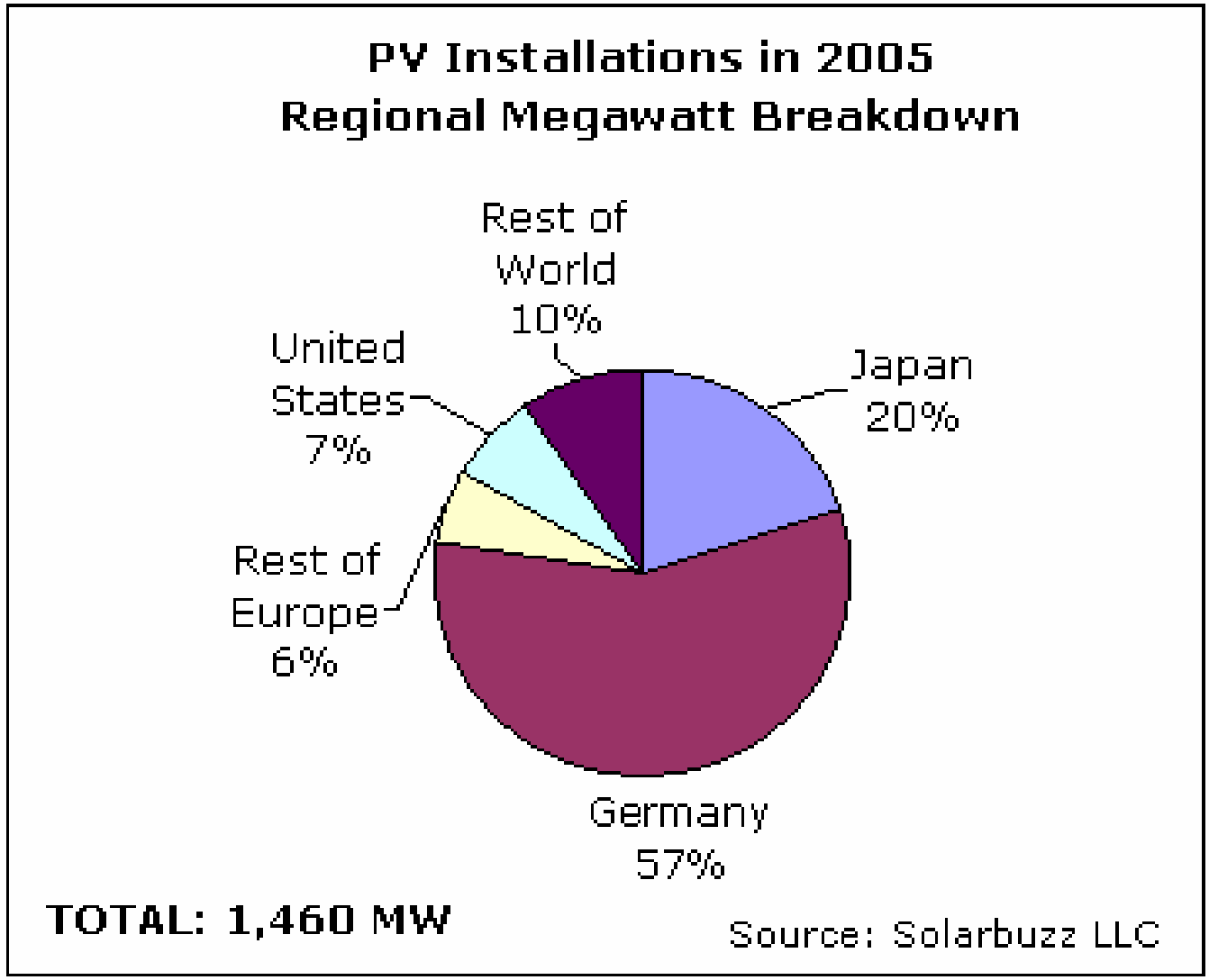


Source: PV Status Report

2005 Growth in Solar Market

- World total: 1460 MW, 34% increase
- Germany: 837 MW, 53% increase
- Japan: 292 MW, 14% increase
- US: 110 MW, 32% increase

Source: Solarbuzz


PV Installations in 2005
Regional Megawatt Breakdown
Rest of World 10%
United States 7%
Japan 20%
Rest of Europe 6%
Germany 57%
TOTAL: 1,460 MW
Source: Solarbuzz LLC

Key Elements for Solar Success

- Financial Incentives—The Engine
  - Public Benefit Funds
  - Tax Incentives
  - RPS with solar carve-out
  - Building local demand
- Regulatory Infrastructure—The Road
  - Access to the grid (interconnection standards)
  - Net Metering
  - Rate Design

Public Benefit Fund

- Established in 19 states
- Funded by surcharge
- Funds energy efficiency and renewable energy

Tax Incentives

- 14 states have some form
- Can apply to personal or corporate
- Advantage: no need to appropriate $
- Fed ITC—push for extension.

RPS with Solar Carve-Out

- Renewable Portfolio Standard most popular policy to incentivize renewable energy
- Regular RPS does not help solar
- 6 states and Washington DC

Interconnection Standards

- Remove arbitrariness
- Make transparent
- Allows for standardized equipment
- Lowers costs by eliminating unnecessary interconnection studies, metering requirements, standby charges, or fees

Net Metering

- Allows system owners to get credit for excess generation fed into grid
- Rationalizes relationship between grid's needs and DG's attributes
- Makes solar systems effectively 25% cheaper
- Adds value to ratepayers
    - Peak shaving
    - Lower energy costs

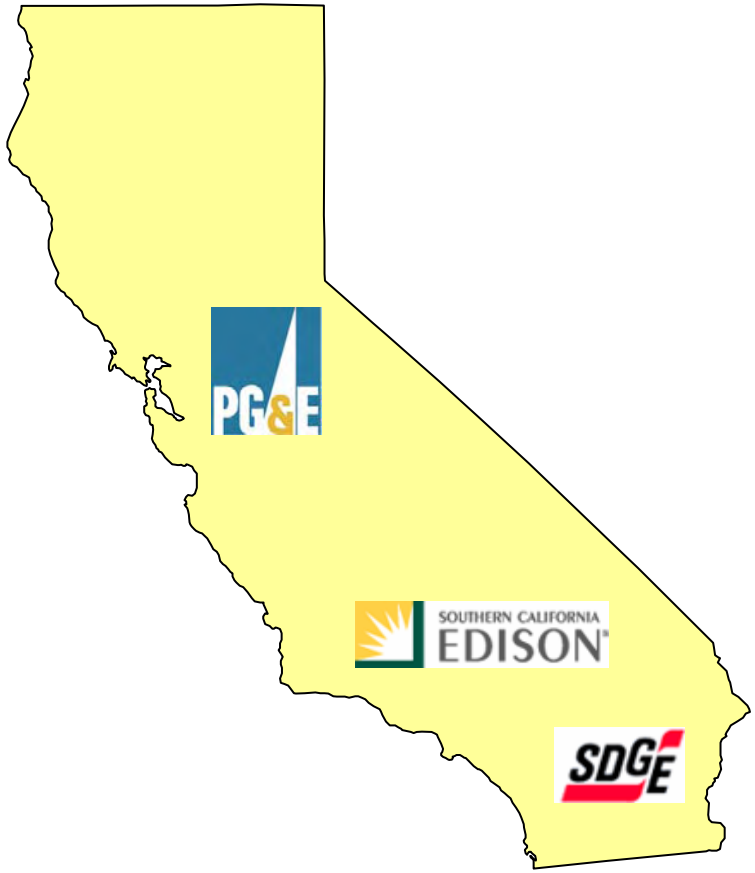
Rate Design

- Time-of-Use tariffs with no demand charges
  - Appropriately rewards solar for contributions during peak
  - Allows system owners to enjoy economic benefit of production

Rate Design

In 2004, 51% of solar capacity installed in the United States was in Pacific Gas & Electric (PG&E) territory, while Southern California Edison (SCE), a utility with comparable load size and number of customers, comprised only 18%. Why the difference?

Same building, three locations



Assumptions	
Installed costs	$7.50/W
Self-Gen Rebate	$3.50/W
Federal tax rate	34%
State tax rate	9%
Federal tax credit	10%
State tax credit	7.5%

Utility Rates	SCE (GS-2)	SDG&E (AL-TOU)	PG&E (A6)
Daily Service Charge	$ 11.00	$ 2.66	$ 0.49
DEMAND (per kW)			
Summer Peak Demand	$ 8.39	$ 11.58	$ -
Summer Part Peak Demand	$ 2.08	$ -	$ -
Summer Other Demand	$ 5.78	$ 4.80	$ -
Winter Peak Demand	$ -	$ 3.83	$ -
Winter Part Peak Demand	$ -	$ -	$ -
Winter Other Demand	$ 5.78	$ 4.80	$ -
ENERGY (per kWh)			
Summer Peak Energy	$ 0.233	$ 0.108	$ 0.298
Summer Part-Peak Energy	$ 0.088	$ 0.081	$ 0.138
Summer Off-Peak Energy	$ 0.075	$ 0.081	$ 0.086
Winter Peak Energy	$ 0.095	$ 0.107	$ 0.151
Winter Part-Peak Energy	$ 0.095	$ 0.081	$ 0.151
Winter Off-Peak Energy	$ 0.075	$ 0.081	$ 0.101
Payback	8.5 years	10.8 years	6.6 years
IRR	9.6%	6.8%	13.2%

Result can be the difference between making the capital investment "cut" or not

Building Local Demand

- Incentivize solar locally
  - Financial Incentives
  - Requirements—New construction
  - Permitting process
    - San Diego's Expedite Program
- Municipal projects

Why Municipal Buildings?

- Large scale means cheaper installations
- Long-term, cheap capital
- High visibility
- Popular with elected officials

Key selling points

- Cost-effective/revenue positive
- Price hedge
- Smart fiscal policy
- Tangible stand for the environment

Strategies

- Bundle With Energy Efficiency
- Third Party Solar Services

GETTING TO VICTORY:

A BROAD COALITION

- Chamber of Commerce
- San Francisco Labor Council
- American Lung Association
- Senior Action Network
- Environmental community
- African-American community
- Church groups
- 90% of SF elected officials

Moscone Center--675 kW

Source: PowerLight Corp

AFTER AND BEFORE

New T-5's (left) Old incandescents (right)

Project Savings

- Solar energy generated: 825,000 kWh
- EE savings: 4,500,000 kWh
- Total energy savings: 5,425,000 kWh

- Annual utility bill savings: $639,000*

* 12 cents kWh average

Revenue Positive

- Total project cost: $7.4 million

- Annual utility bill savings: $639,000
- Annual debt service*: -$429,000
- TOTAL ANNUAL SAVINGS: $210,000

* Assumes 20 yrs at 5.5%

EE Opportunity Key

- Most important part of pro-forma is determining the potential savings from energy efficiency.
- Plug that into a cash-flow model to determine how much solar can be subsidized.
- Need political will to aggregate across account.

FINANCING

- Bond
- Development Authority
- Private
- 3rd party solar services

Third Party Solar Services

- California Power Authority
- San Diego Unified School District
- Whole Foods
- Staples


BOARD OF EDUCATION

How This Works

- A third party designs, installs, and owns a solar system on your roof
- You sign a 15-25 year contract to buy the metered output

Why This Works

- Model takes advantage of federal and state tax benefits not available to municipalities (non-taxpaying entities)
- Ultimate owner is someone with a tax burden to shed

Benefits

- Eliminates financing concern
- Shifts performance risk from customer to provider
- Ensures maximum production

What's Hot?

- CA-Million Solar Roofs Program
  - 10 yr, ~$3 billion, 3,000 MW
- NJ-RPS expansion
  - -1,500 MW
- AZ-EPS expansion
  - 2,000 MW potential
- NM, TX, NJ, CO, PA, NV
- Federal Investment Tax Credit.

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