A Utility's Perspective

Procuring Renewable Energy

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Presentation Outline

- CA Renewable Portfolio Standard
- Market Price referent (MPR)
- Bid Prices and Time Of Day Factors (TOD)
- PG&E's renewable resource RFO's
  - CSP Generating Profile
  - Portfolio Fit
- Conclusions

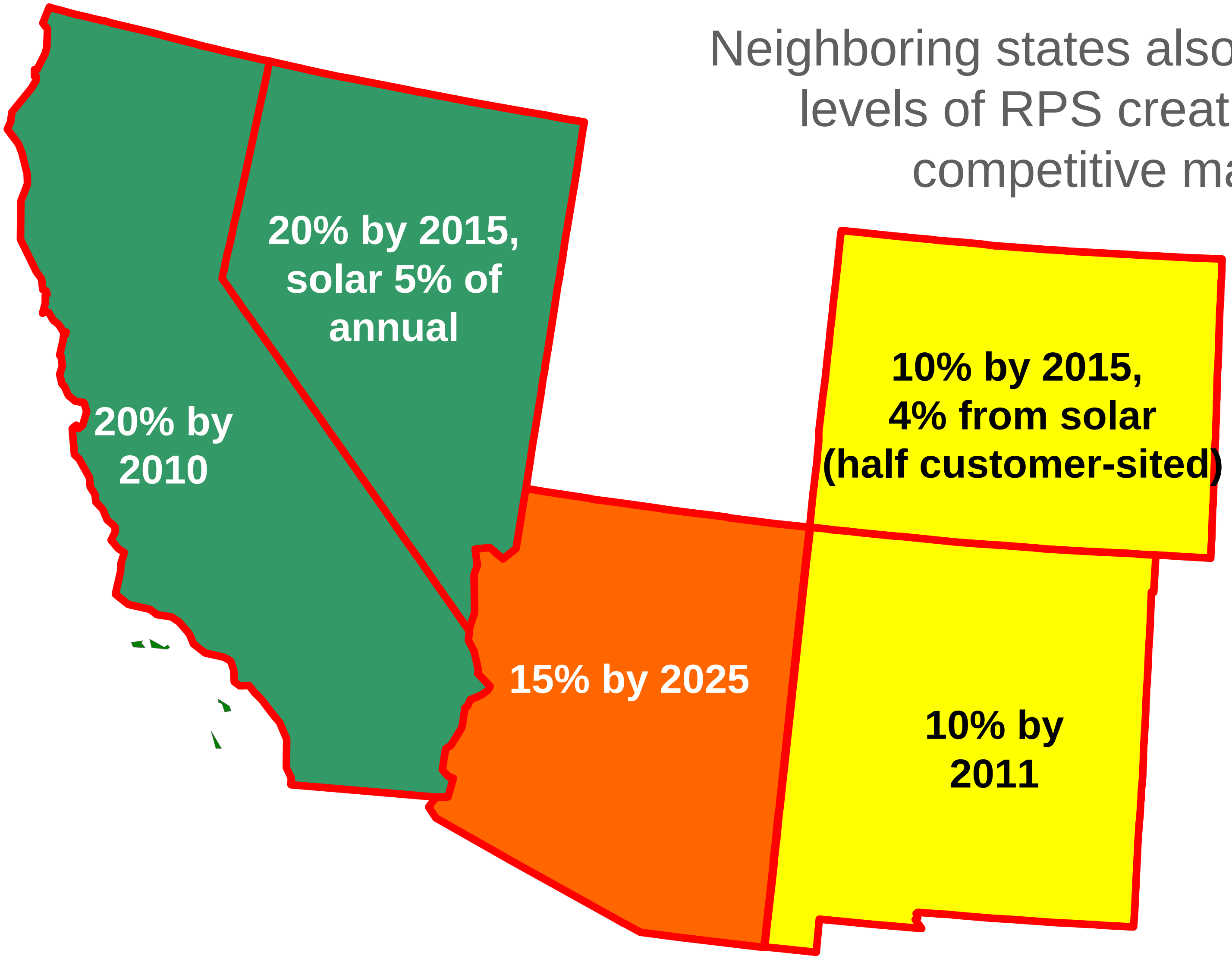
California Renewable Portfolio Standard

- **Target (Starting from year 2003):**
  - increase Eligible Renewable Resources (delivered energy) by > 1% /year;
  - By at least 20% by 2010;
  - & may be {policy goal of 33% by end of 2020}

- **Requirement:** ERR include solar, wind, geothermal, biomass, landfill gas, municipal solid waste (non-combusted), small hydro and fuel cells that use renewable fuels.
  - **CEC** must **certify** each new project for ERR status
  - Project location can be **out of state** as long as the power can be delivered to CA-ISO interconnection points

- **Major New Solar Projects:**
  - Southern California Edison: SES, 500-850 MW
  - San Diego Gas & Electric: SES, 300-900 MW; Bethel Energy ~100 MW
  - Pacific Gas & Electric: Luz II, 500 MW (MOU)

In the WECC area, CA has the most ambitious RPS target, however, no set asides for solar power.



Neighboring states also have varying levels of RPS creating a very competitive market

Since 2003, CA IOU's have signed up ~3000 MW's in new ERR projects

CA RPS Solicitation and Evaluation Process

- Utility submits RPS Procurement Plan and initiates an RPS solicitation. Annual cycle at least until 2010.
- Utility uses "least-cost, best-fit" evaluation criteria to develop ranking and "short-list" of bidders
  - "Least–cost" is not just lowest price, but lowest cost **relative** to **market value of energy** and cost of transmission
  - "Best-fit" with particular utility resource needs (e.g., curtailability, dispatchability, and local reliability are evaluated)
- Utility engages in extensive negotiations with short-list bidders to develop final contracts for pre-approval
- Utility consults with a "Procurement Review Group" made up of non-market participants that represent the public interest

Market Price Referent & Supplemental Energy Payments

- Market Price Referent (MPR) is the levelized avoided cost based on a long term (10/15/20 year), fixed-price, in-state CC power plant
  - MPR is established by CPUC based on proxy costs and performance of new base load gas-fired generation facilities
  - Other assumptions: LT forward price curve for gas, financing data and tax rates.
  - Proxy project is assumed to be paid MPR adjusted by the TOD factors
  - For 2006, the MPR ranges from $80.14 to $85.19/MWH for 2008 COD

- Utilities are not required to pay above the MPR for renewable generation procured through CPUC approved RPS solicitation

- **CEC** must **approve** such payment – may be all or only a portion

RPS Regulatory Process

SEP is Supplemental Energy Payment

RFO Process/ Contract Execution

No SEPs → PG&E files Contracts for PUC approval

→ PG&E files Contracts for PUC approval

SEPs → *Project applies to CEC for SEPs

Approved (60 days+) → PG&E files Contracts for PUC approval

Disapproved → Renegotiate

* Not Applicable for bi-lateral negotiations

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Only one project from PG&E's RFO has applied to CEC so far.

Time of Delivery (TOD) Factors

2007 PG&E TOD's	1. Super-Peak	2. Shoulder	3. Night
Jun – Sep	2.037	0.921	0.700
Oct.- Dec., Jan. & Feb.	1.203	1.049	0.841
Mar. – May	1.030	0.855	0.656
Period Average Factor	1.438	0.958	0.748

Time of Day Period Definitions

The Time of Day Periods are defined as follows:

1. **Super-Peak** (5x8) = HE (Hours Ending) 13 – 20 Pacific Prevailing Time (PPT), Monday – Friday (*except* NERC holidays)

2. **Shoulder** = HE 7 – 12, 21 and 22 PPT, Monday – Friday (*except* NERC holidays); and HE 7 – 22 PPT Saturday, Sunday and all NERC holidays

3. **Night** (7x8) = HE 1 - 6, 23 and 24 PPT all days (*including* NERC holidays)

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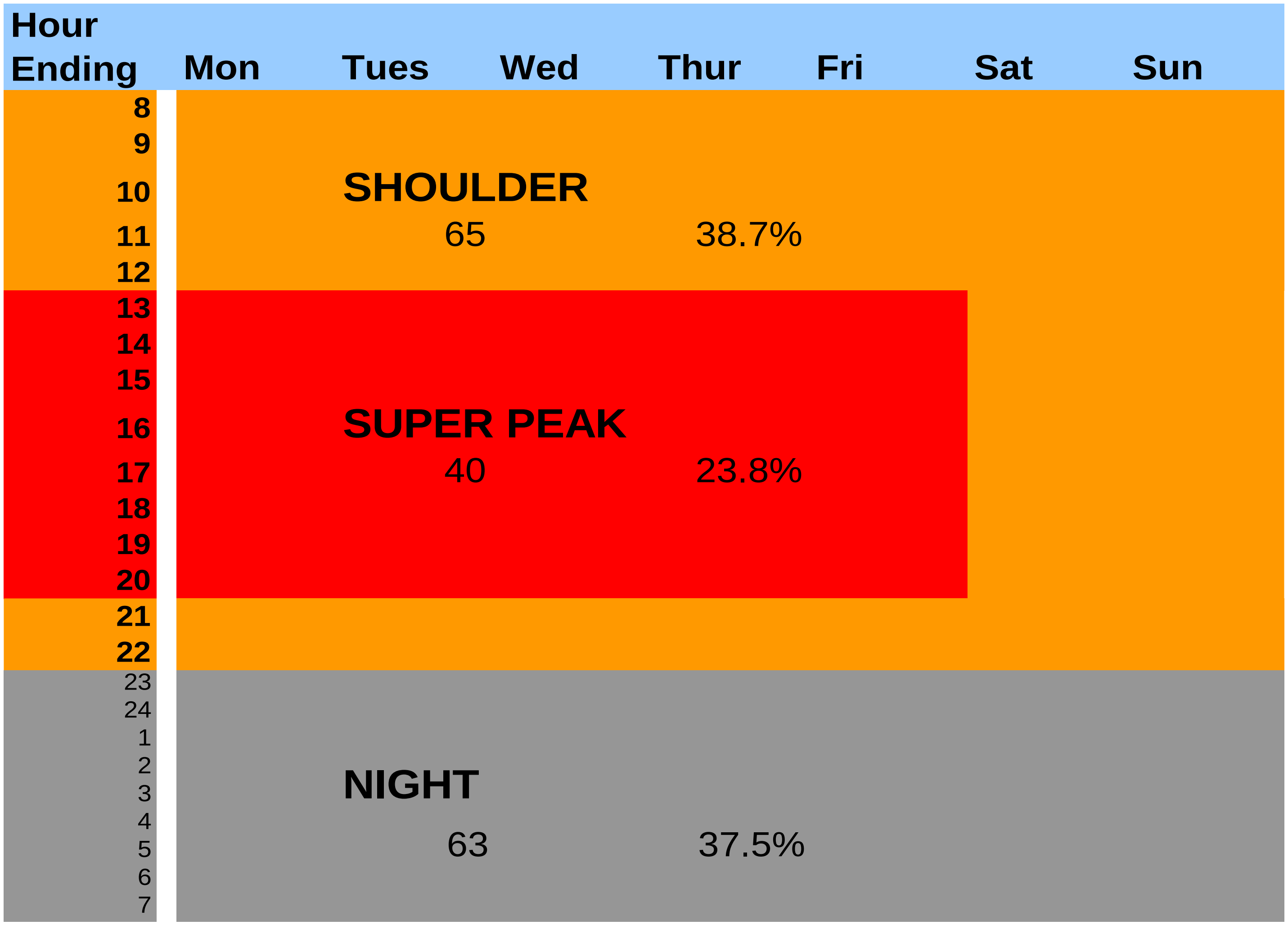
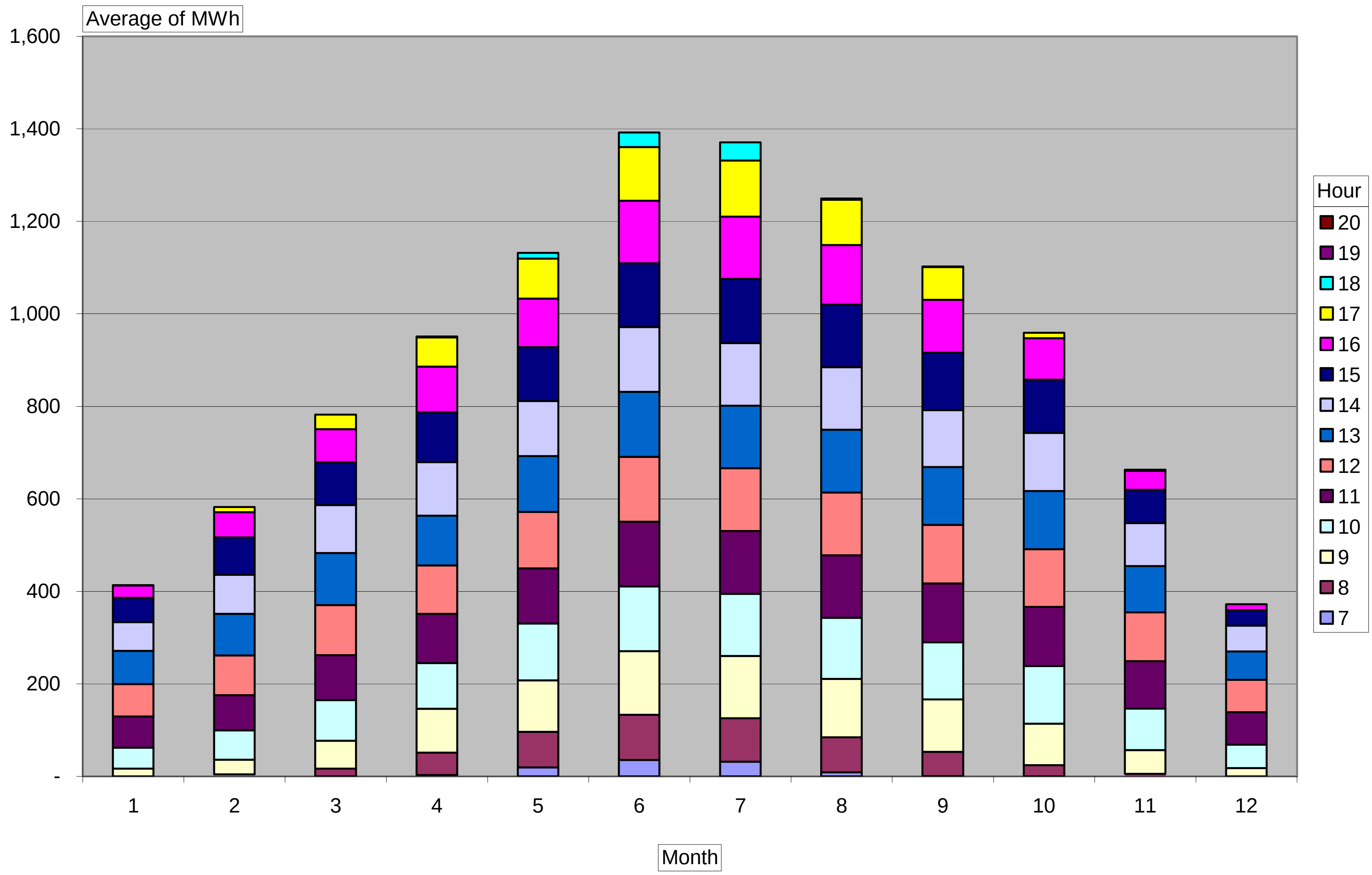
Another view of TOD Factors & Periods



Maximum average TOD multiplier for 'Super Peak' hours: ~1.30

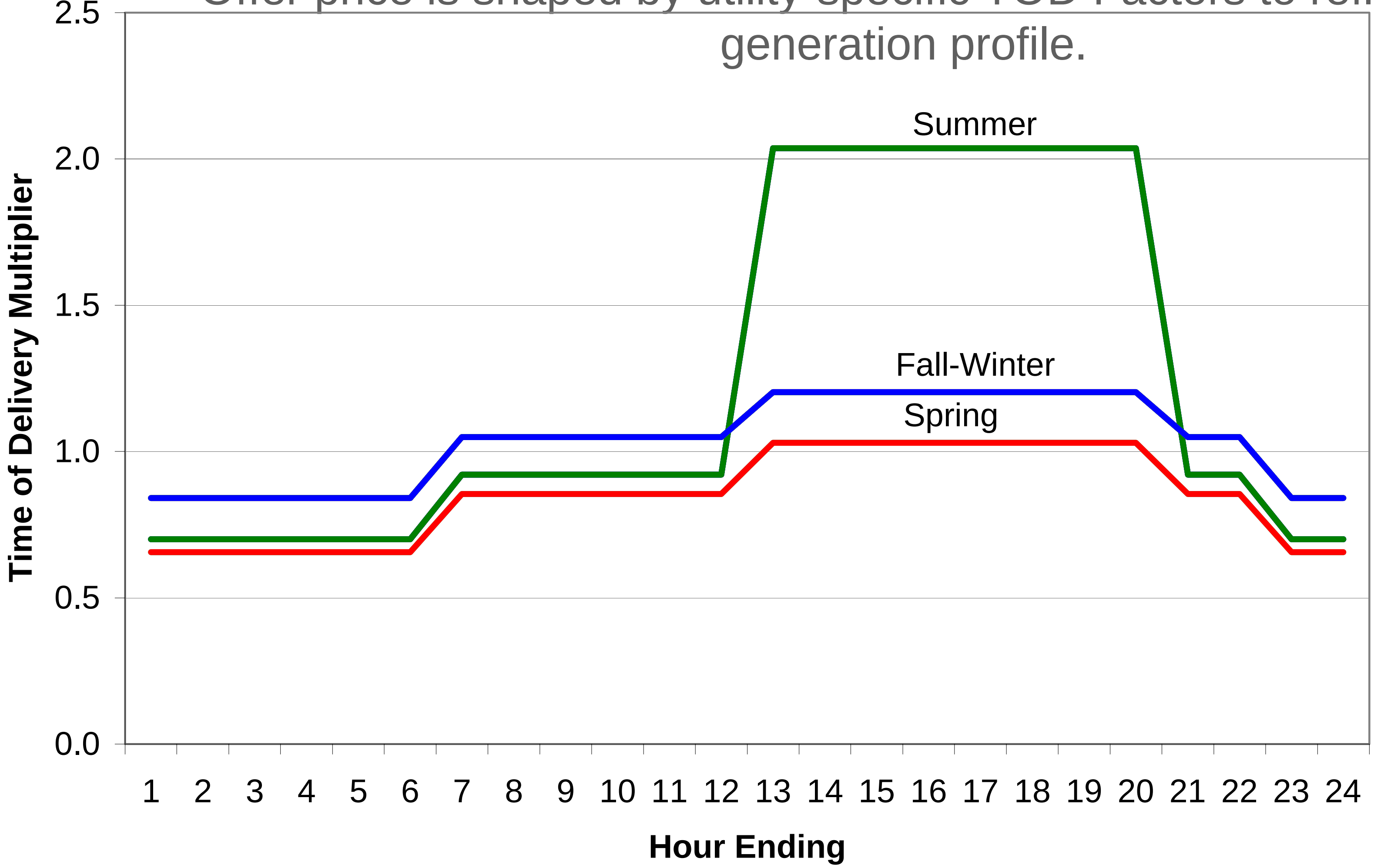
Illustrative CSP Generation Profile



On an annual basis, the average TOD factor is likely to be ~1.20

Illustrative: Market Value of Energy versusTOD Factors 2007 PG&E System only

Offer price is shaped by utility-specific TOD Factors to reflect value of generation profile.



=> approx. $170/MWH during the summer peak hours @ contract price of $85/MWh

PPA Key Commercial Terms

- For as available, bid price is $/MWh (all-in) for energy
  - Long Term: 20 years
  - All deliveries SC-to-SC trades or equivalent
- Minimum performance criteria (e.g. annual energy generation)
  - Due consideration given to technology and “cloudy” days
  - Post COD, ramp up period with relaxed performance standards
- Form of PPA available

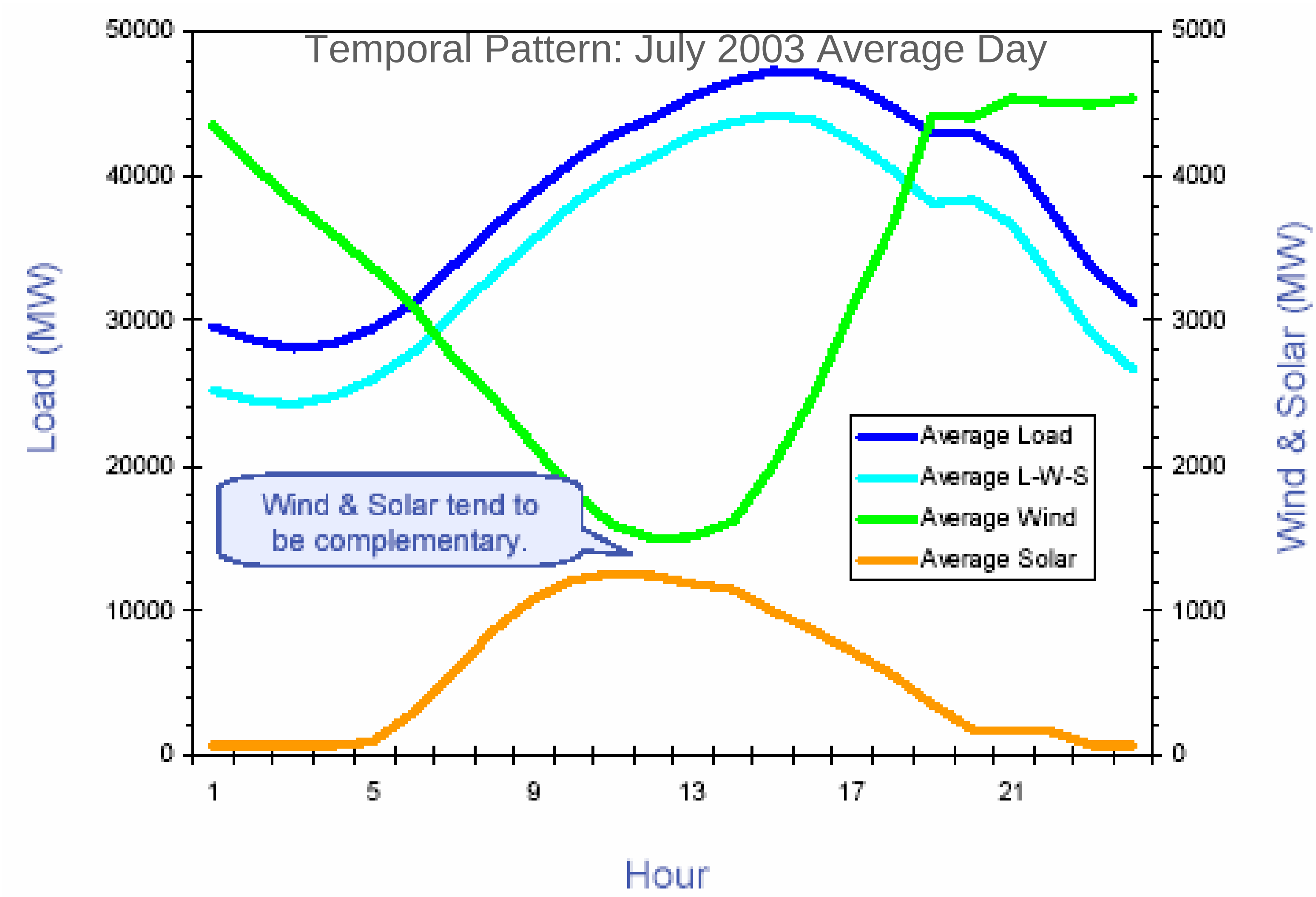
All contracts are subject to CPUC approval – a non modifiable term

Evaluation Criteria

- Market Valuation
- Portfolio Fit
- Transmission Adders/Integration Costs

- Financial strength / Credit
- Status of Project
- Technology Viability
- Consistency with RPS Goals
- Modifications to Form Agreements

Portfolio Fit : Higher capacity factors increase project attractiveness up to a certain extent only.



Utilities have more options available to balance the net short positions, usually, at a lower cost.

Source: CEC PIER-funded study by GE Energy, July 2006

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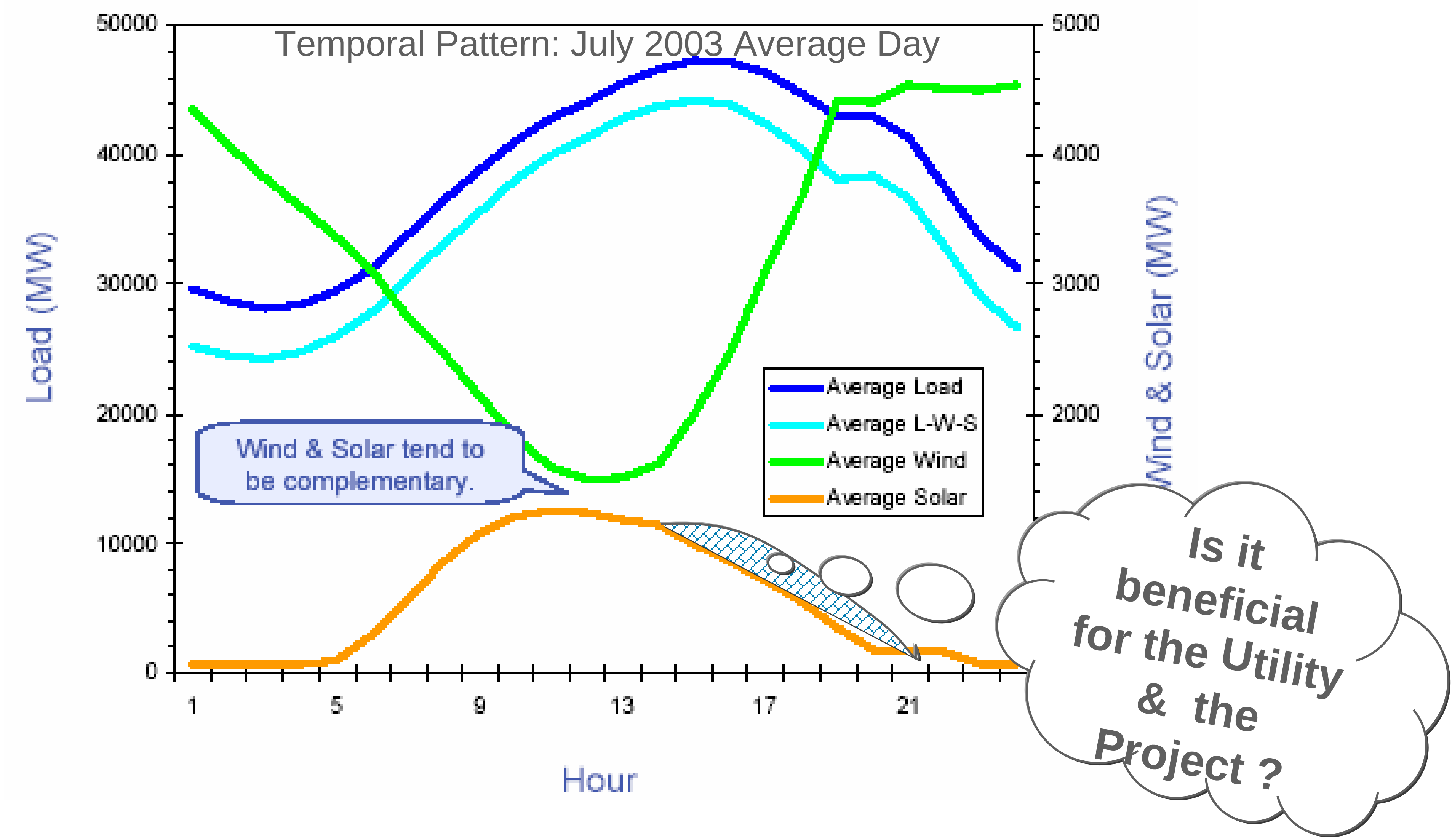

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PG&E is open for business:

- 2007 RFO – March 12, 2007
  - Bidders Conference: 4/3/07; Bid Due Dates: 5/31/07; www.pge.com/renewableRFO
  - ‘www.pge.com/suppliers_purchasing’

Participants may propose to sell energy under a LT PPA and/or:

- a **Buyout Option** (After 6+ years; ITC and MACRS issues)
- to develop, permit, and construct a facility for purchase by PG&E upon COD (**BOT model**); or
- to sell a suitable site or partially developed project for further development by PG&E (**JD model**)

We must utilize all tax credits & find ways to keep financing costs reasonable. Together, we can meet the RPS targets at an affordable cost!!!

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