Grid parity:
A potentially misleading concept?

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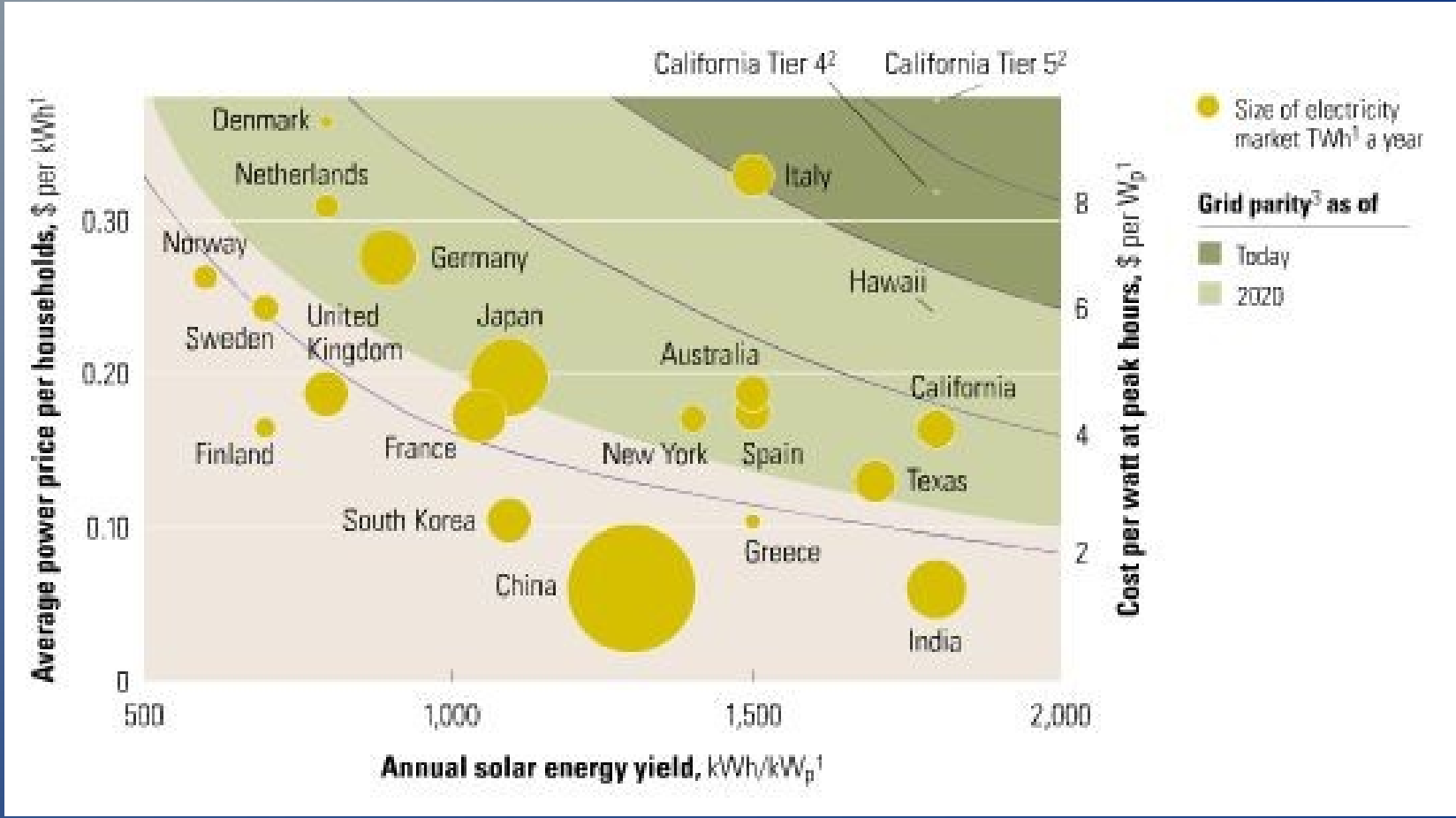
Outline

- What does “grid parity” mean?
- Shortcomings of the grid parity concept
- Retail electricity price structure (ACT example)
- Implications of PV deployment on flat tariffs
- ToU tariffs (Californian example)
- PV incentive programs
- Deployment beyond grid parity
- Conclusions

Some grid parity estimates



Source: McKinsey

What is meant by grid parity?

- “Coming of age moment” for PV
  - No longer need explicit policy support for environmental and other benefits?
- Definition for distributed, roof-top PV
  - LEC(PV) = retail electricity tariff
- What is the LEC of PV?
  - How could it be calculated?
- What is a flat retail tariff?
  - How well can future tariffs be predicted?

Shortcomings of grid parity concept

- For simplicity, compares LEC with flat tariffs
- Flat tariffs do not reflect the true economics of electricity supply
  - Example: Cross-subsidies to air cond users
  - Main components of electricity supply:
    - Network
    - Energy
  - Both have complex fixed and variable costs
- Underlying electricity supply cost varies with time, location, uncertainty

ACT retail tariff structure

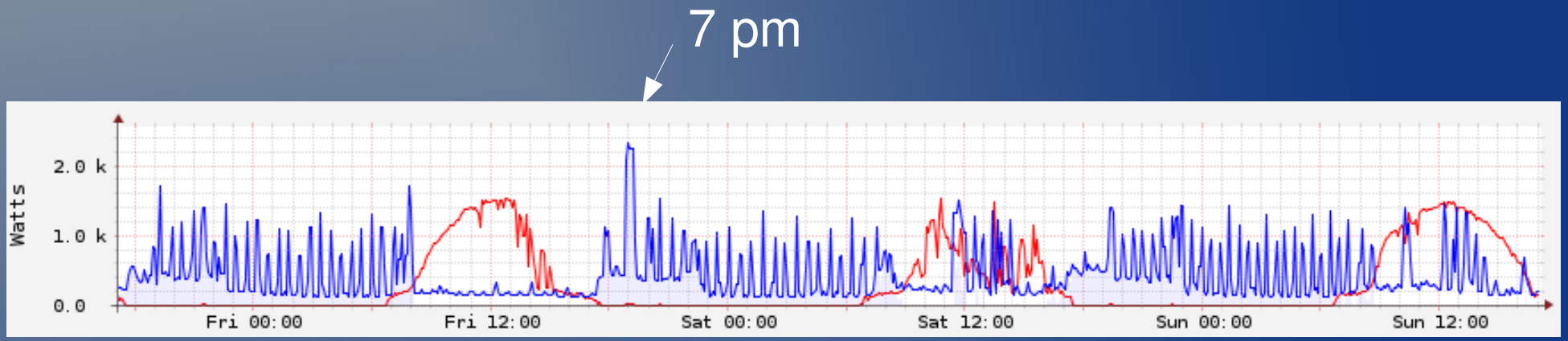
- Complex set of fixed and variable costs

Electricity purchase cost ($/MWh)	58.57
Energy trading desk operation ($/MWh)	0.76
Environmental compliance costs, eg. MRET ($/MWh)	5.15
NEM fees ($/MWh)	0.76
Energy losses (%)	5.92
Total energy purchase cost ($/MWh)	**69.01**
Retail operating costs ($/MWh)	10.56
Network costs ($/MWh)	71.44
Total retail + energy + network cost ($/MWh)	**151.01**
Retail margin (% of sales)	5.40
Total retail price	**159.16**

Source: ICRC

Analysis of higher PV deployment

- PV does not always reduce peak demand



PV power (red), consumed power (blue)

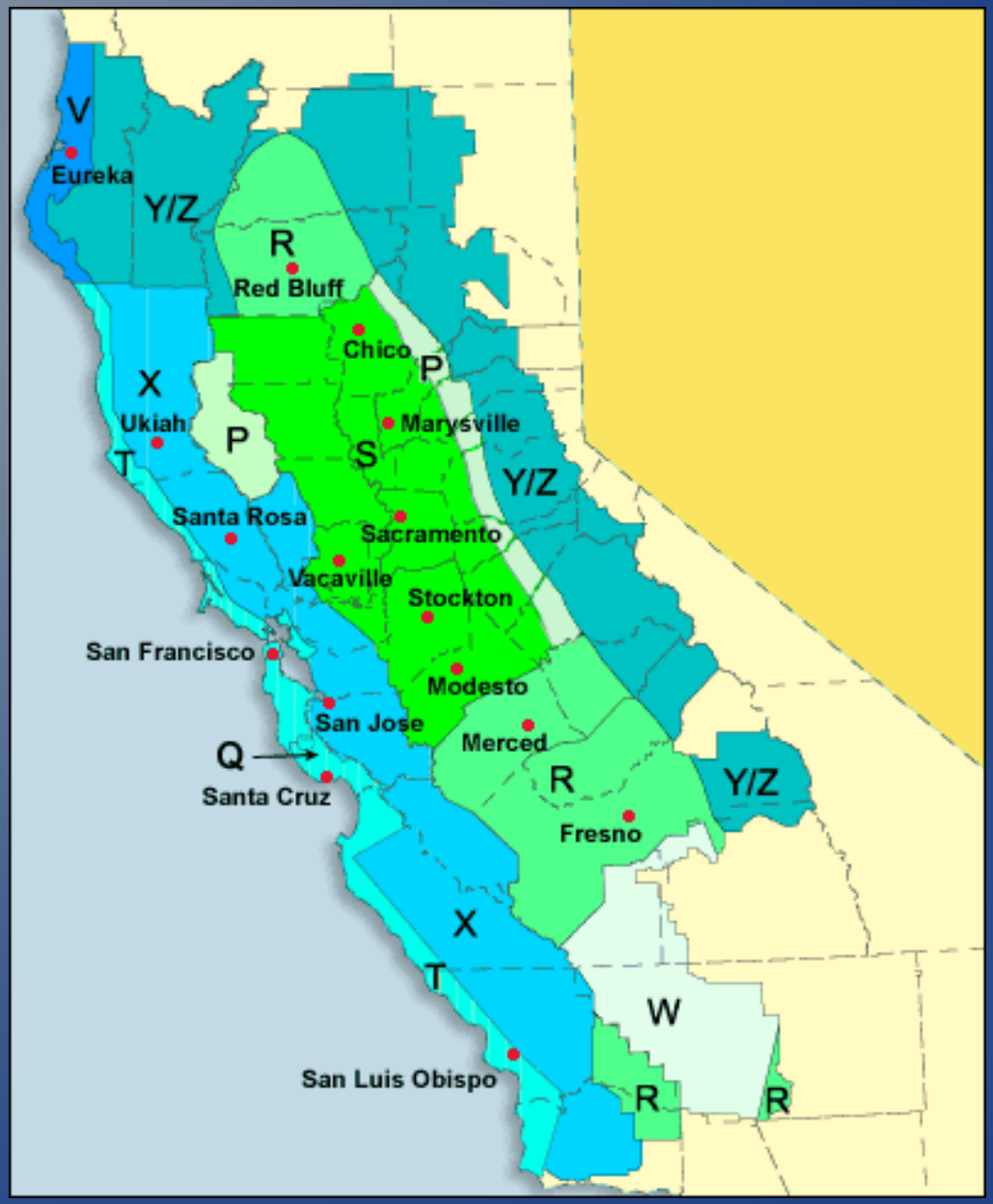
- PV on commercial feeders may better reduce network costs
- PV value is time and location dependent

Time of Use (ToU) tariffs in CA

Season	ToU period	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
Summer	Peak	30.631	30.631	46.218	57.158	57.158
	Off-peak	9.003	9.003	24.59	35.53	35.53
Winter	Peak	11.936	11.936	27.523	38.463	38.463
	Off-peak	9.318	9.318	24.905	35.845	35.845

Summer	Sun	Mon	Tue	Wed	Thu	Fri	Sat
12am-6am				Off-peak			
6am-10am				Off-peak			
10am-1pm	Off-peak	Shoulder	Shoulder	Shoulder	Shoulder	Shoulder	Off-peak
1pm-7pm	Shoulder	Peak	Peak	Peak	Peak	Peak	Shoulder
7pm-9pm	Shoulder	Shoulder	Shoulder	Shoulder	Shoulder	Shoulder	Shoulder
9pm-12am				Off-peak			

Source: PG&E



Baseline Quantities by Territory for Single Family Dwellings. Source: PG&E

Implications for flat tariffs

(on sales of 2,831GWh in ACT in 2007-08)

Demand Reduction (%)	Network Revenue ($M/yr)	Cost Shortfall ($M/yr)	Tariff Increase ($/MWh)	Tariff Increase (%)
0	202	0	0.00	0.00
2	198	4	1.46	0.92
4	194	8	2.98	1.87
6	190	12	4.56	2.86
8	186	16	6.21	3.90
10	182	20	7.94	4.99

PV incentive programs

- FiTs are main mechanism in states/territories
- Encourages maximum *energy* generation
  - ACT: 45.7c/kWh gross
- Propose time-varying FiT to pay for PV **value**
  - eg. 0c off-peak, 25c shoulder, 80c peak
  - Offer similar return to current schemes
  - Reduces return for systems pointing North
- More market orientation without investor risk
- German self-consumption FiT

PV deployment beyond grid parity

- Experience with other technologies: Solar hot water cheaper than electric in Hawaii ($/MJ).

Source: greenpacks.org

PV deployment beyond grid parity

- Barriers remain even once financially viable:
  - Consumer information
  - Energy prices still may not capture full costs
  - Investment risk
  - High capital costs
  - High hurdle rates
  - Difficulty accessing finance
  - Uncertain solar access laws
  - Local council regulations (eg. heritage listing)

Conclusions

- Grid parity is a complicated concept
  - Use term with caution!
- Good policy support requires *valuing* PV, not necessarily *costing* it
  - eg. “How does this PV system save on network expenditure?”
- Policy support will be needed for some time
- PV industry must address factors that will inhibit future deployment

Questions?

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