

# The Benefits of Distributed Resources to Local Governments

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# Background

## California Experience

- Background
  - Deregulation in California
  - High electricity prices in San Diego
- Three Executive Orders from Gov. Davis
  - Expedite approval process for new plants, especially clean projects
  - Institute energy conservation measures during stage II and stage III electrical emergencies
  - Implement sustainable building practices (including the use of energy efficiency) in government buildings; design should account for the life-cycle energy costs



# Benefits of Distributed Resources

- Provide direct benefits in government buildings
- Improve the environment
- Guide economic development
- Ensure electrical system reliability for constituents
- Protect constituents from high electricity prices
- Provide disaster relief support



# *Direct Benefits*

**Install the distributed resources in government buildings to get:**

- Reduced utility bills
- Cleaner, quieter operation with reduced environmental impacts
- Greater market independence and consumer choice
- Ability to produce green power
- Higher reliability and enhanced power quality
- Cogeneration capability (fossil fuel-based systems)
- Building materials replacement (building-integrated PV systems)
- Aesthetic improvements
- Economic incentives and/or tax savings
- Mitigation of energy price risks



# Example of Bundled Efficiency and PV City of Tucson's Southeast Service-Center

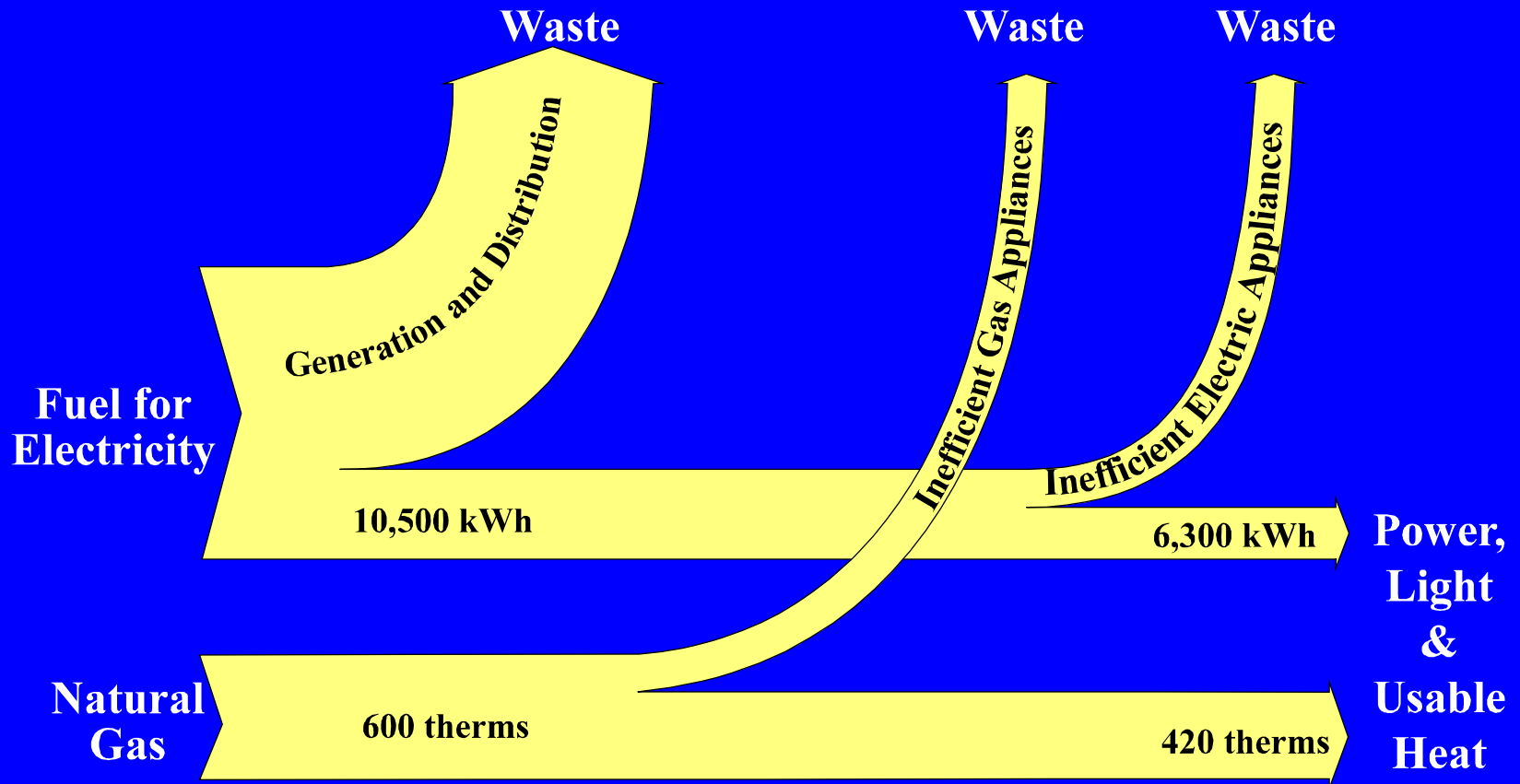
Bill savings: \$4,200/yr

Cost: \$4,750/yr (30-year, 5% loan on \$73K)



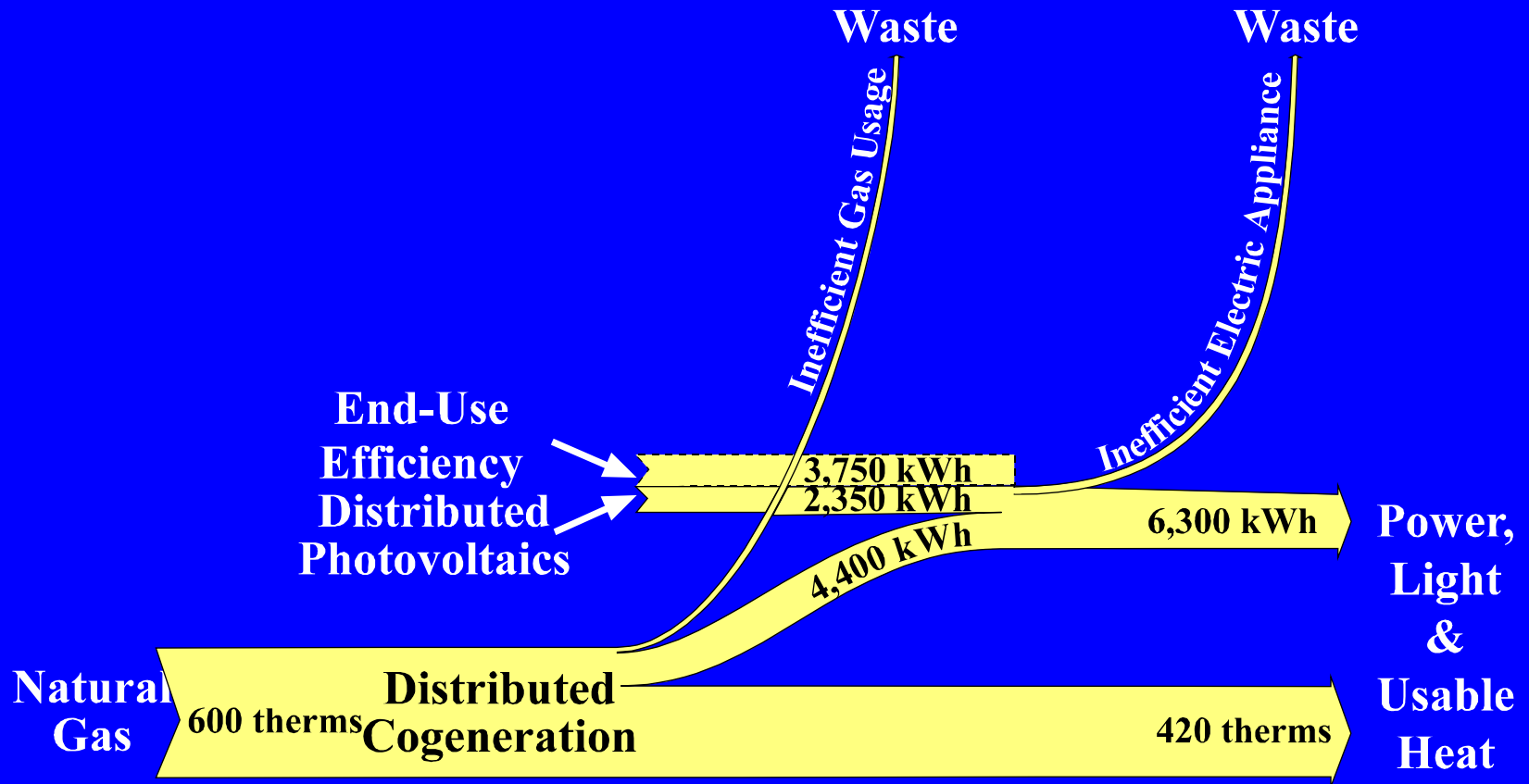
# *Improve Environment*

## 1995 Residential Customer Consumption



# Improve Environment

## Clean Distributed Resources Consumption



# *Guide Economic Development*

## Goal: Attract Information Industries

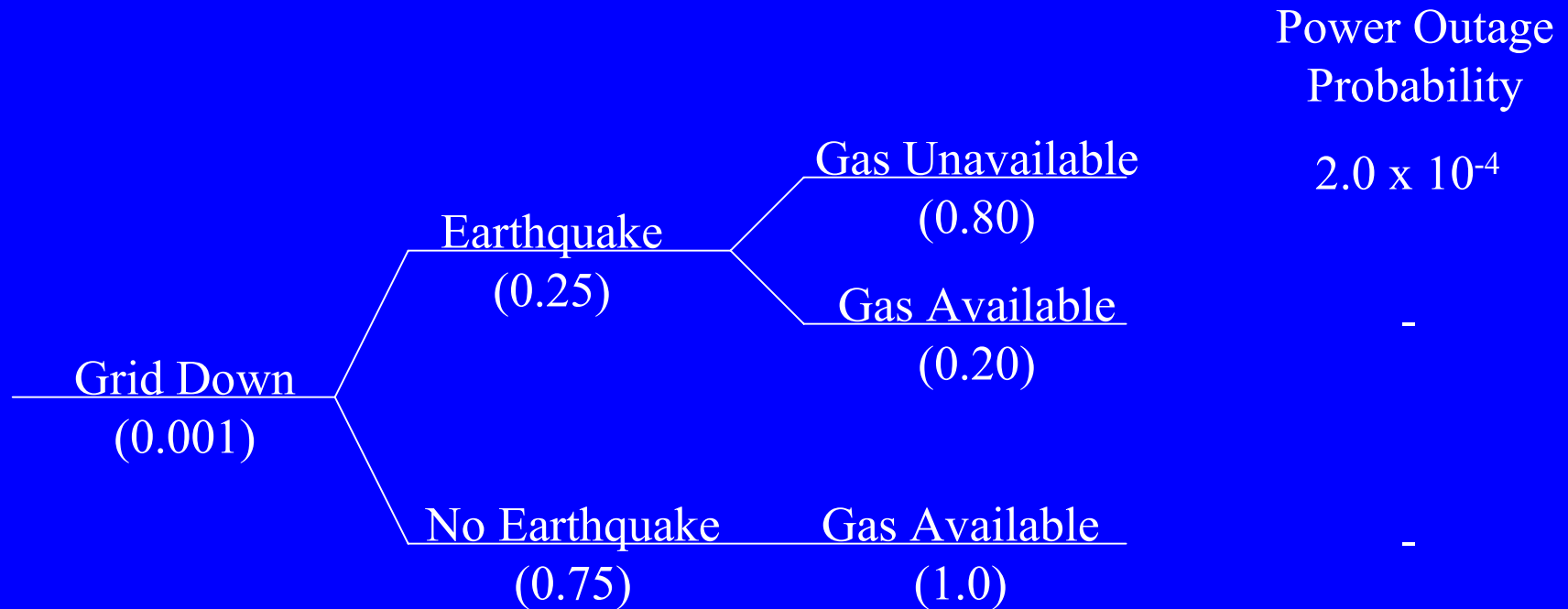
- Can tolerate expected outages of 15 min. per year
- Electric grid has an expected 8 hours of outages per year (6 hours from T&D problems, 2 hours from earthquakes)
- Choose either fuel cell or PV/battery system
- Fuel cell manufacturer gives 100% operation guarantee; natural gas supply has to be shut off four out of every five times that there is an earthquake for safety reasons
- PV/battery system supplier gives 99.9% operation guarantee under normal conditions; during earthquakes, it has a 10 percent chance of failure





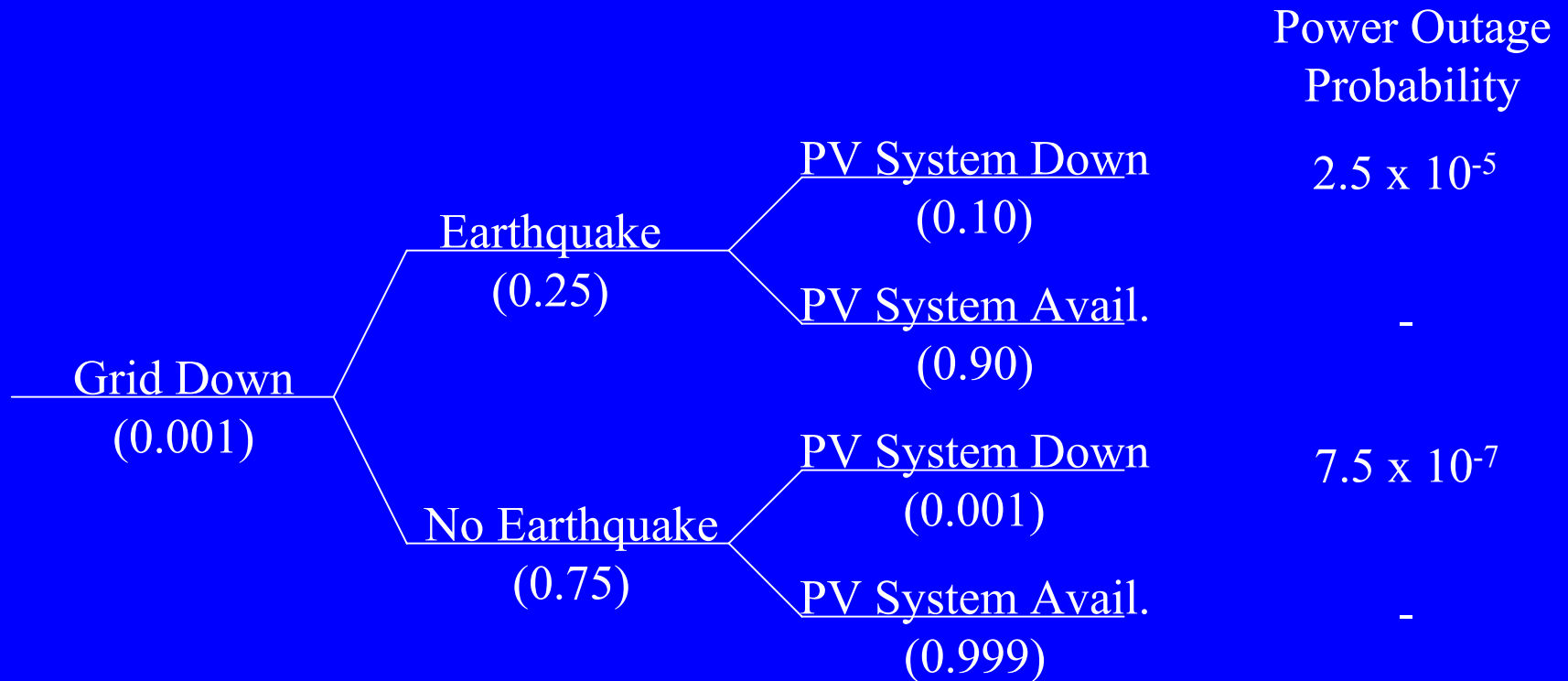
# Natural Gas Fired Fuel Cell

Expected Outage = 1 hour 45 minutes/year



# PV System With Batteries

Expected Outage = 14 minutes/year



# Electrical System Reliability

- Short-term outages
- Sustained outages. Communities need to assess their vulnerability to a sustained power outage
  - Do they rely on a single source of power?
  - Is their power supplied by a long transmission line that, if damaged, would take a long time to repair?



# *Protect From High Electricity Prices*

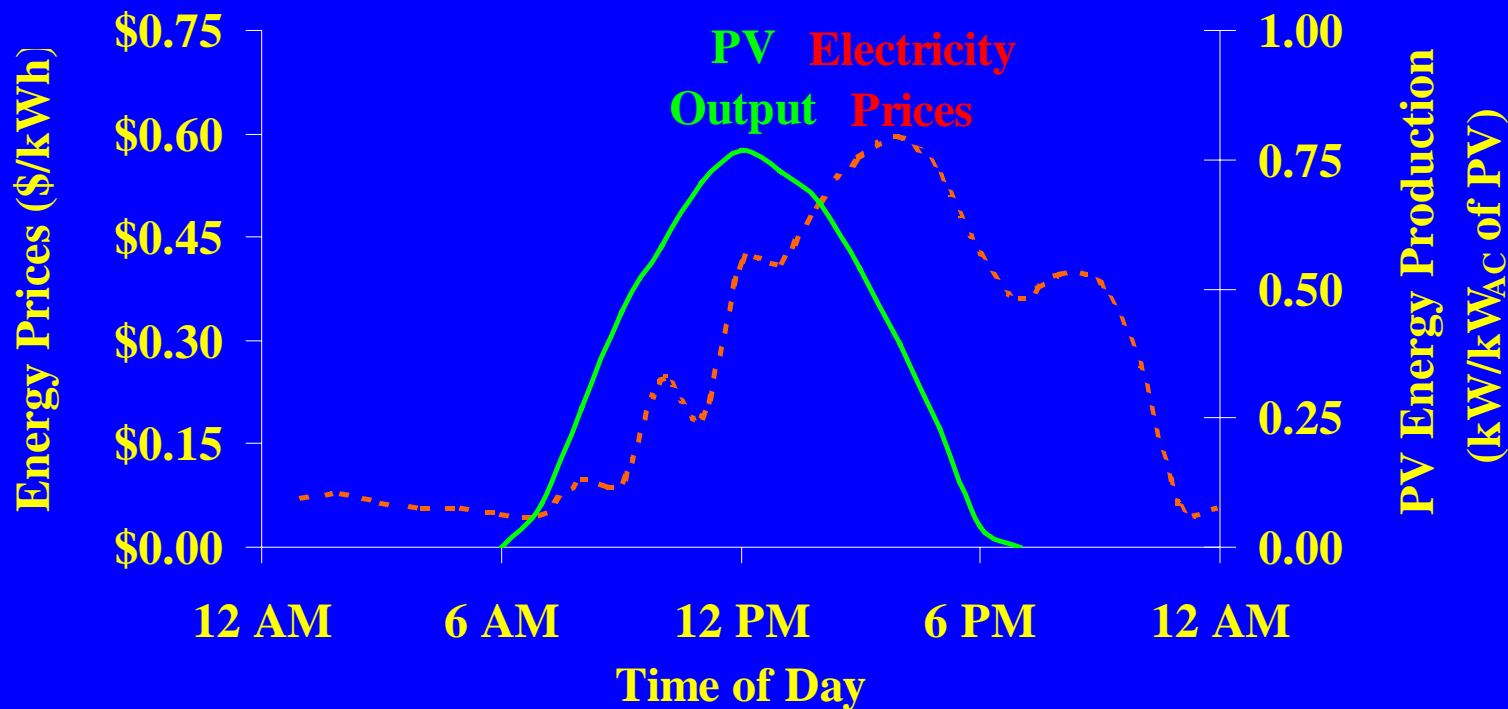
## Experience from San Diego, California

- SDG&E customers first to experience the full effect of deregulation
- Theoretically, electricity supply costs should no longer be a concern to SDG&E
- Assembly Bill 265 (passed legislature 8/30/00)
  - establishes a retroactive \$0.065/kWh cap on the cost of energy for ratepayers, when market price is \$0.20/kWh
  - SDG&E pays difference between the rate cap and the market price and recoups shortfall later



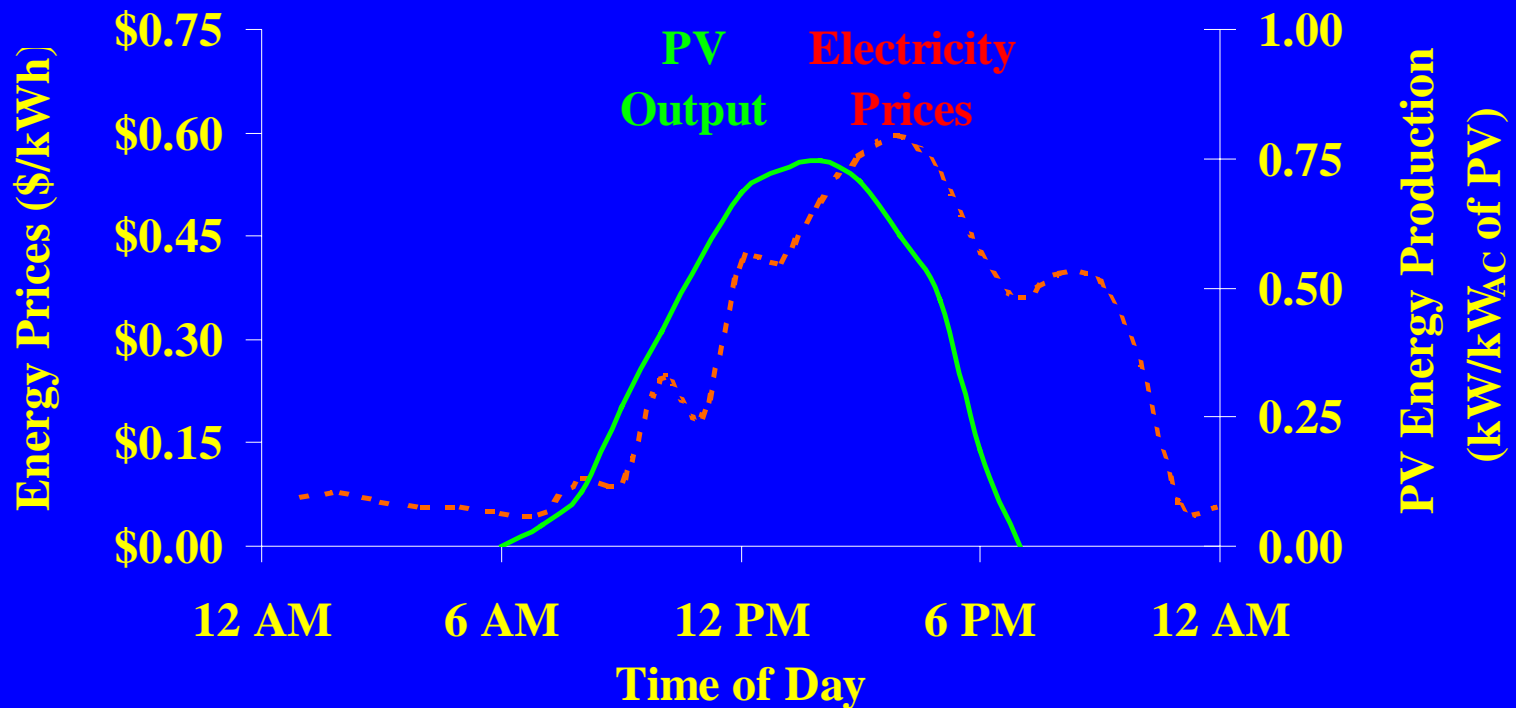
# *Protect From High Electricity Prices*

## South-Facing PV Systems



# *Protect From High Electricity Prices*

## West-Facing PV Systems



# *Protect From High Electricity Prices*

- Widespread implementation of PV would benefit all electricity consumers in California because it would increase supply during high price periods and thus reduce prices for everyone (externality benefit)
- Government may want to encourage west-facing PV systems even though they are not necessarily optimal for individual customers



# *Disaster Relief Support*

- Hurricanes, tornadoes, fires, floods, earthquakes, ice storms, become disasters when they disrupt people's lives and damage property
- PV systems have proven to be very valuable during disasters; have powered refrigerators, microscopes, medical equipment, lighting, radios, fans, traffic control devices, communications and other general electrical equipment (Florida Solar Energy Center)
- Small amount of PV on every business and residence could be very valuable during disasters (part of disaster preparedness kit)





# Conclusions and Actions

- Incorporate into governmental buildings where feasible (obtain cost-savings and distributed benefits)
- Eliminate biases in the tax system that favor traditional electricity supply over distributed resources (California example of tax of 0.02% on electricity purchased compared to 22% tax on PV system until laws were changed)
- Use distributed resources to accomplish goals (e.g., disaster preparedness and economic development)

