CALIFORNIA SOLAR ENERGY INDUSTRIES ASSOCIATION

# Opportunities and Challenges
# Facts and Fiction

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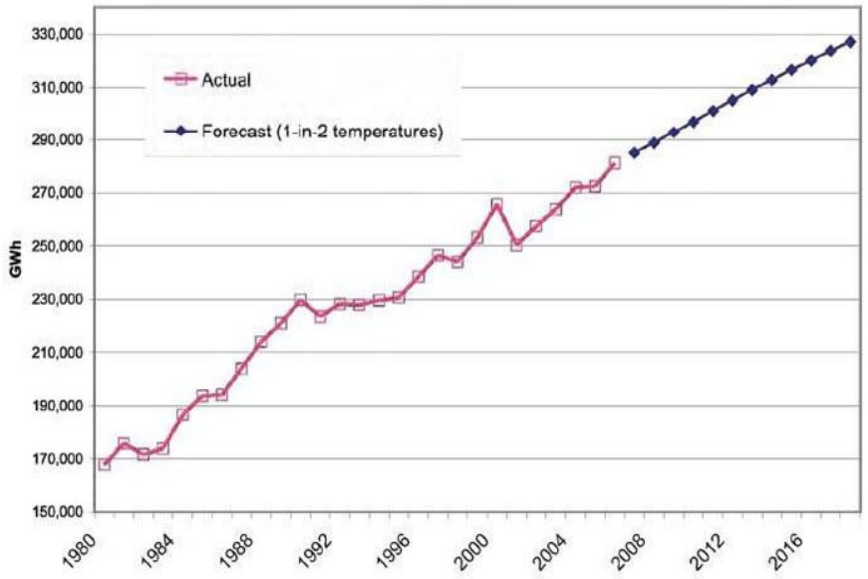
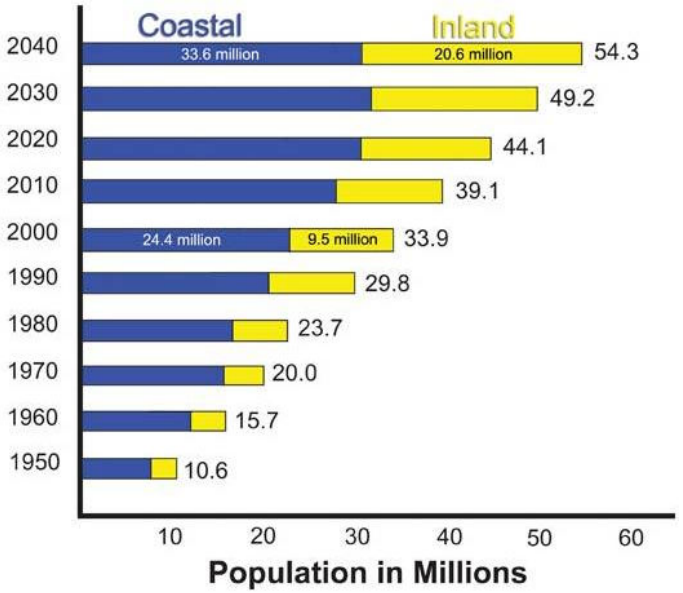
# What is CALSEIA?

- **CAL**ifornia **S**olar **E**nergy **I**ndustries **A**ssociation
- Founded in 1977
- Mission: to expand the use of all solar technologies in California and establish a sustainable industry for a clean energy future
- Membership comprised of solar companies: manufacturers, distributors, contractors, engineers, designers, utilities

# Energy Challenges Will Persist

- **Total demand will grow**
- **Population moving to locations where cooling is more important**
- **Climate change will force change in energy consumption**
- **Climate change will force change in generation choices**

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# The Big Picture Opportunities

- Lower energy bills for those who need it most
- Health: reducing heat-related deaths and natural gas emissions within the ‘pedestrian bubble:’ particulates
- Air quality: natural gas SOx, NOx, particulates
- Greenhouse Gas Emissions
- Jobs
- Community based energy
- Fairness

# Do it in the Right Order

- Energy Efficiency
- Solar Water Heating (SWH)
- Solar Electric (PV)
- Distributed Renewable Generation

# Solar Technologies
## (in order of cost per kWh or Btu)

- Energy Efficiency (not a solar technology but essential to lowering installed cost of solar technologies)
- Solar thermal (water heating, process energy, space heating, space cooling, pool heating)
- Solar thermal electric generation
- Solar electric Photovoltaic (grid connected/no storage)
  - Polymer (not available in large volume yet, currently lowest efficiency)
  - Thin Film (currently lower efficiency means greater surface area needed)
  - Silicon (highest efficiency means less surface area needed)

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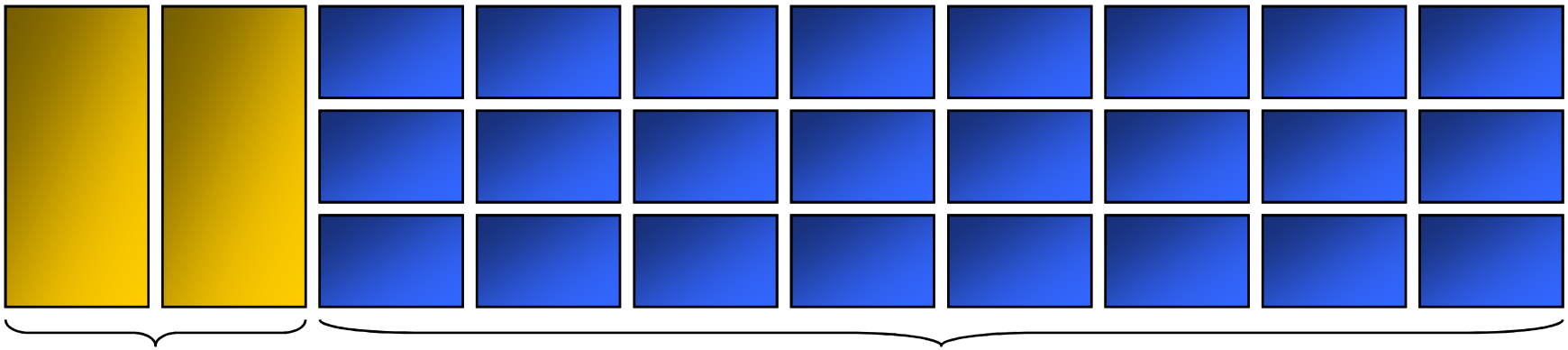
# Comparing PV and Solar Thermal

## Right Technology For The Job

Hot water needs: shower, laundry, dishwashing, etc.

Electricity needs: refrigerator, lighting, plug in devices



**SHW (HELIODYNE GOBI 410)**

| | |
|---|---|
| Output/day[1]: | 22.7 $kWh_{th}$ |
| Area: | 80 $ft^2$ |
| Installed cost: | $7,000 |

= 1 to 7

**PV (Shell SQ 165-PC)**

| | |
|---|---|
| Output/day[2]: | 22.3 kWh |
| Area: | 456 ft2 |
| Installed cost: | $51,480 |

1: Peak output based on SRCC Category C Clear Sky for SHW (Equivalent kWh derived using 3,414 Btu/kWh)
2: Manufacturers spec sheet for PV at standard test conditions (5.28 kW array rating x 5.8 peak sun-hrs/day)

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# Customer Site Assessment

- Low Income Apartment dwellers….
  - Multiple residents per unit (children, teens, elderly)
  - Occupants at home during the day
  - Central hot water boiler
  - Separately metered units for electricity
  - No central air conditioning if at all
  - No central heat
  - Building footprint small relative to conditioned square footage
  - Potentially high hot water use
  - Swimming pool?

# Customer Site Assessment

- Low Income Private residence…
  - Owns or rents?
  - Number and type of occupants (children, teens, elderly)
  - Occupants at home during the day
  - Typically smaller home means smaller available roof area
  - On site laundry or dishwasher?
  - Air conditioner: any, central, window?
  - Heating: wall or central?
  - Condition of structure, age of roof, code compliance, utility service level
  - Trees and tree maintenance

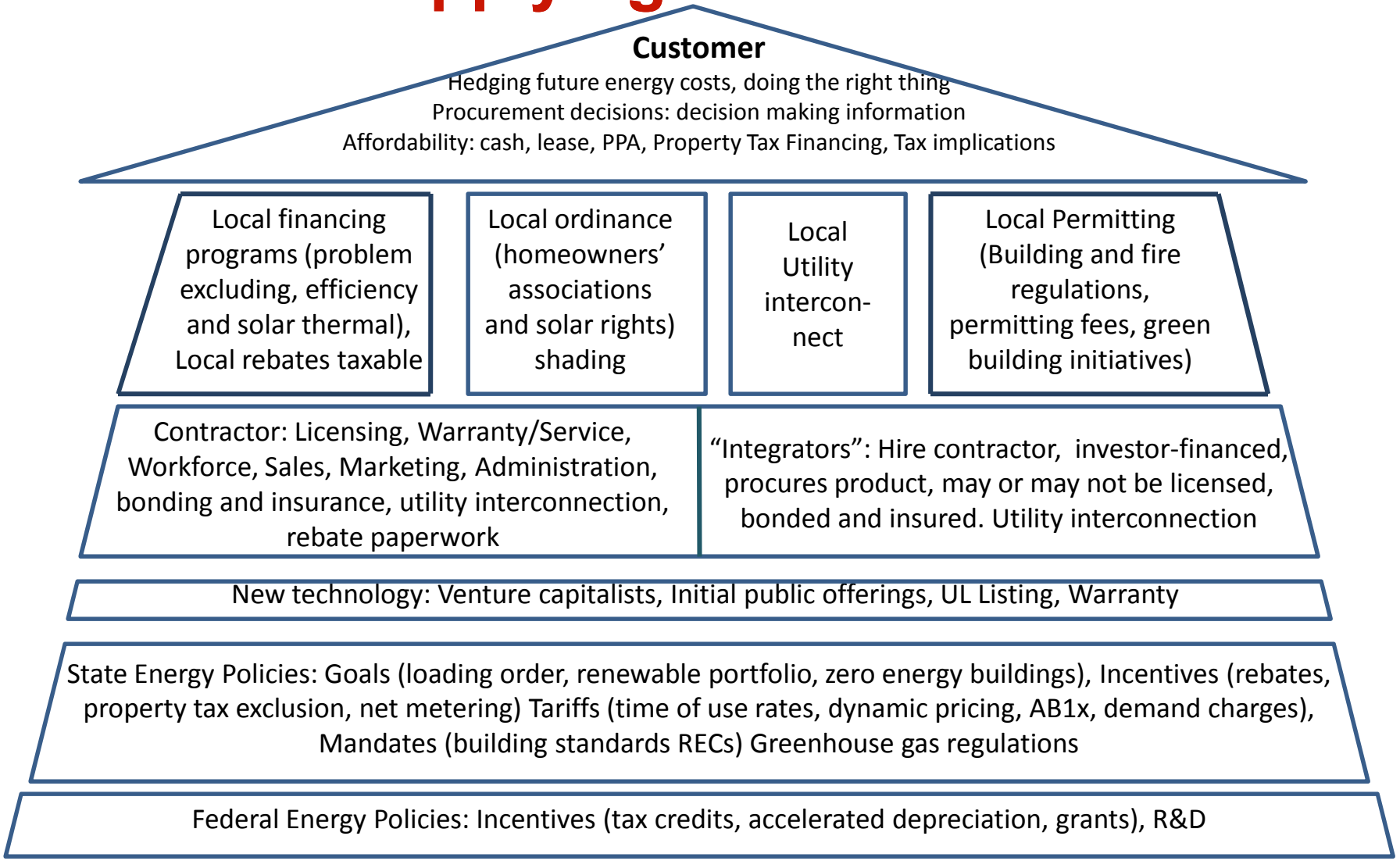
# Challenges

- Apartments
  - Available space constraints for PV
- Single family
  - Available space constraints for PV
  - Non-solar costs (structure and/or utility service upgrade) higher relative to total installed system cost
- Both:
  - Potential victims of the unscrupulous
  - Affordability: high up front cost
  - Financing: credit worthiness
  - Tariff structure: Net metered CARE rates?
  - Net metering to individual units
  - Security (applies regardless of income)
  - Locating the qualified low income sites

# Energy Policies Applicable to Solar Many Moving Parts

- Federal Energy Policies
  - Incentives (tax credits recently renewed through 2016)
  - Accelerated depreciation (bonus depreciation expired but may be reinstituted
- State Energy Policies
  - California Solar Initiative: 3,000 MW by 2016, ratepayer funded rebates
  - California Solar Water Heating Efficiency Act (not yet implemented: 200,000 SWH by 2017)
  - Goals (loading order, zero energy buildings)
  - Tariffs (time of use rates, dynamic pricing, AB1x, demand charges)
  - Mandates (building efficiency standards, Renewable Portfolio Standard, RECs)
  - Other Incentives (property tax exclusion, net metering)
  - Distributed generation – Feed in Tariff Policy
- State Climate Change Policies (AB 32, GHG regulations)
- Local Policies
  - Financing programs (fixing problem with federal tax credit, not including energy efficiency and solar thermal
  - Green Building Initiatives
  - Local rebate programs
- Utility Programs (Education, Wholesale PPA, Utility ownership, Interconnection)

# Applying the Policies

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# Ideas to Overcome Challenges

- Both Apartment and Single Family
  - Efficiency first: fund permanent improvements
  - Affordability: **Grants (existing and new)**, Long term low interest financing (municipal loan programs), HUD adjustments
  - Tariff structure: Net metered CARE rates?
  - Fix Broken SWH policy
  - Virtual net metering
  - Preventing the unscrupulous: networking, inspections
  - Security: no ideas yet
- Apartments
  - Solar water heating typically no brainer
- Single family
  - Package systems (1.5 or 2.0kW systems, small SWH systems)
  - Database of low-income homeowners (beware of privacy issues, zip codes are adequate)
  - Fund some portion of building repairs and re-roofing

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# Beware the Hype about those Jobs

- Not as many as the news would lead you to believe
- Solar curriculums vary widely: some useful, some less useful for preparing workers
- Solar companies will train you – for now, courses are nice but not necessary

# Really Important Job Info

- <u>Major qualifications for installers and helpers</u>: Shows up on time, has valid driver's license, not afraid of heights, can climb up and down a ladder safely, follows instructions accurately and safely, polite to customers, likes to work in 140$^{o}$ with no shade in the summer or on a cold, wet day in the winter on a steep roof, knowledge of technology
- <u>Other jobs seldom discussed</u>: Sales, administration, inventory, data processing, panel cleaning

# Job Training On Its Way

- Homeboy Industries: Brian Hurd
- Community Colleges starting to standardize but the majority are focusing on PV installer training right now (but if I can help it, they will add SWH, sales, estimating, administration)

# Thank you!

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