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# Creating a Sustainable Residential Solar Thermal Market in California

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# Presentation Roadmap

- Policy related to SWH in CA
- Current SWH market in CA
- Cost-effectiveness model methodology
- Cost-effectiveness model results
- Conclusions

# Evangelical Message on SWH

- CA AB32 and beyond:  
***80% below 1990 emissions by 2050***
- As goes California.... Dozens of cities and states looking at SWH incentive programs
- ZEH for new construction; importance of retrofit
- NG price only going up over time
  - Globalization of the market for NG means:
    - More imports, more external price risk
    - Larger C footprint
  - **We must offload non-essential uses of NG**
  - ***Solar Water Heating can save us!***

# SWHPP Policy Context

- Approved by CPUC Ruling on Feb. 15, 2007
- Part of the California Solar Initiative; Allocated \$3M from the overall \$2.1B CSI IOU budget
- Funded by SDG&E electric ratepayers
- Conceived and designed to gather information to enable the CPUC to evaluate the potential for a statewide program

# Policy Context - Future

- AB 1470 authorizes the CPUC to begin a statewide program based on data from the Pilot Program.
- Solar Water Heating and Efficiency Act of 2007, Signed on October 12, 2007
- \$250 million to install 200,000 systems over 10 years.
- To be funded by natural gas ratepayers

# Water Heating in California

- 85+% of domestic water heaters (DWH) in California are gas-fired
- 50-80% of WH NG usage could be avoided with SWH – 5% of residential sector's overall CO2 emissions
- Avoided NG usage could affect marginal prices
- The domestic Solar WH market has been stagnant in California: ~1500 installs per year statewide
- Focus groups: quality assurance is huge concern for customers—at least as much as cost-effectiveness.

# Market Barriers

- Initial Installation Cost: \$6,500
- Lack of knowledge about the technology
- Difficulty and expense associated with building permits
- Lack of a well-developed SWH workforce

# Addressing the Barriers

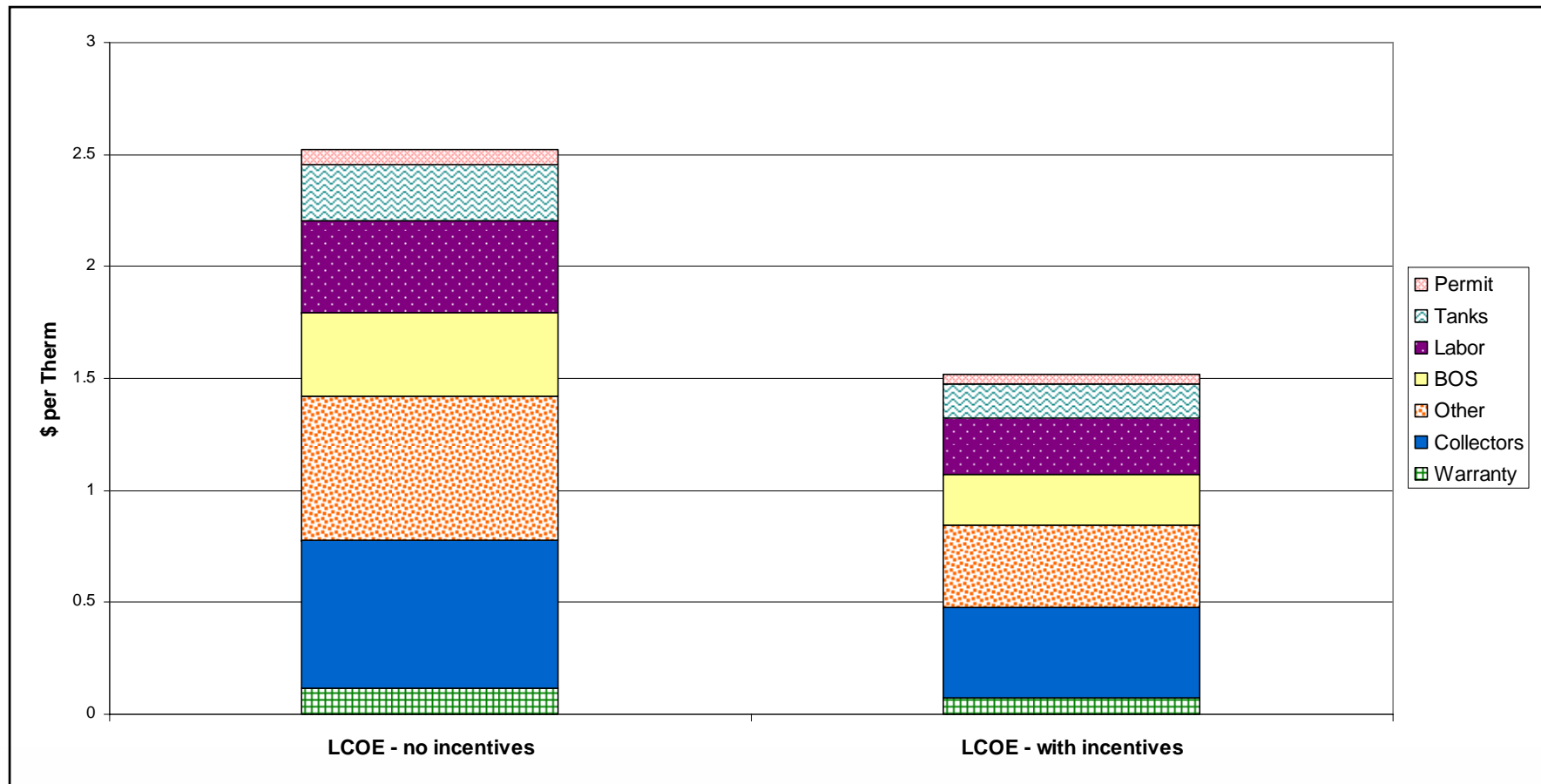
- Cost
  - Explore lower cost SWH systems
  - Financing options
  - Incentive program
- Increasing awareness
  - Statewide marketing campaign
  - Highlight benefits of combining SWH with PV and energy efficiency
- Improving Permit Process
  - Training for building permit inspectors
  - Standardize requirements
- Workforce
  - Training for new installers



# Benefit/Cost Ratio Methodology

- Utilizing a modified version of the SPM methodology
  - Participant
  - Societal
  - Ratepayer
- Evaluate cost-effectiveness in 2017 under a BAU scenario and a market transformation scenario for each test perspective
- Check the reasonableness of market transformation scenarios with an LCOE calculation

# LCOE Results for a Statewide Incentive Program



# Participant Test

- Benefits
  - Reduced Energy Bill
  - Incentives
  - Tax Credits
  - Energy Efficiency Certificates
  - Carbon Credits
  - Hedging
  - Increased Home Value
- Costs
  - Installation Cost
  - O&M Costs

# Ratepayer Test

- Benefits
  - Avoided Energy Costs
  - Price Elasticity Benefits
- Costs
  - Revenue Loss from Reduced Energy Bill
  - Incentives
  - Program Administration Costs

# Societal Test

- Benefits
  - Hedging
  - Avoided Energy Costs
  - Health Benefits
  - Job Retention and Creation
  - Energy Efficiency Certificates
  - Carbon Credits
- Costs
  - Installation Costs
  - O&M Costs

# Scenarios

- BAU
  - Little change in cost, performance, or market conditions
  - No statewide incentive program
  - Natural gas prices increase at an annual rate of 7.2%
- Market Transformation
  - Improvements are made that reduce installation costs
  - Carbon credit and energy efficiency certificate values are higher than for BAU
  - There is a statewide incentive program
  - Natural gas prices increase at an annual rate of 10%

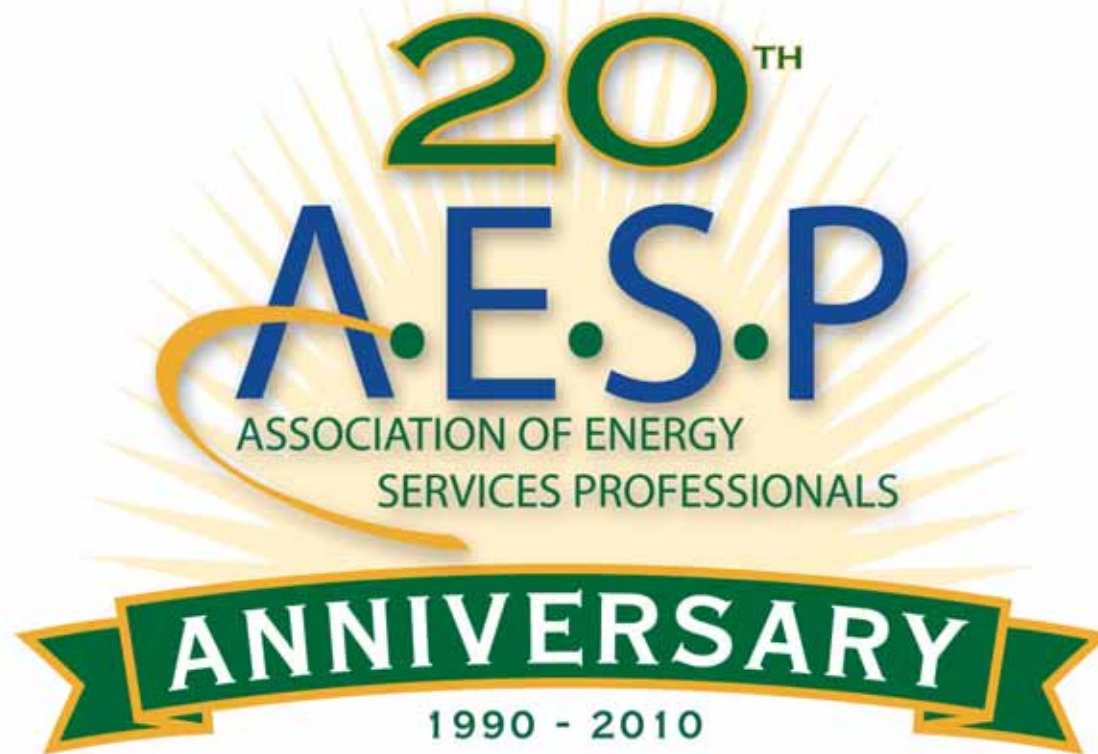
# Results

	Participant	Ratepayer	Societal
BAU	> 1.0	n/a	< 1.0
Market Transformation	>> 1.0	>=1.0	>=1.0

# Conclusions

- Creating a sustainable SWH market in California by 2017 is a feasible goal
- The four main market barriers must be addressed in order to reach this goal





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