

# Concentrating Solar Power: A Look at the Costs and Returns of CSP

*A Briefing Prepared for:*  
Environmental and Energy Study Institute  
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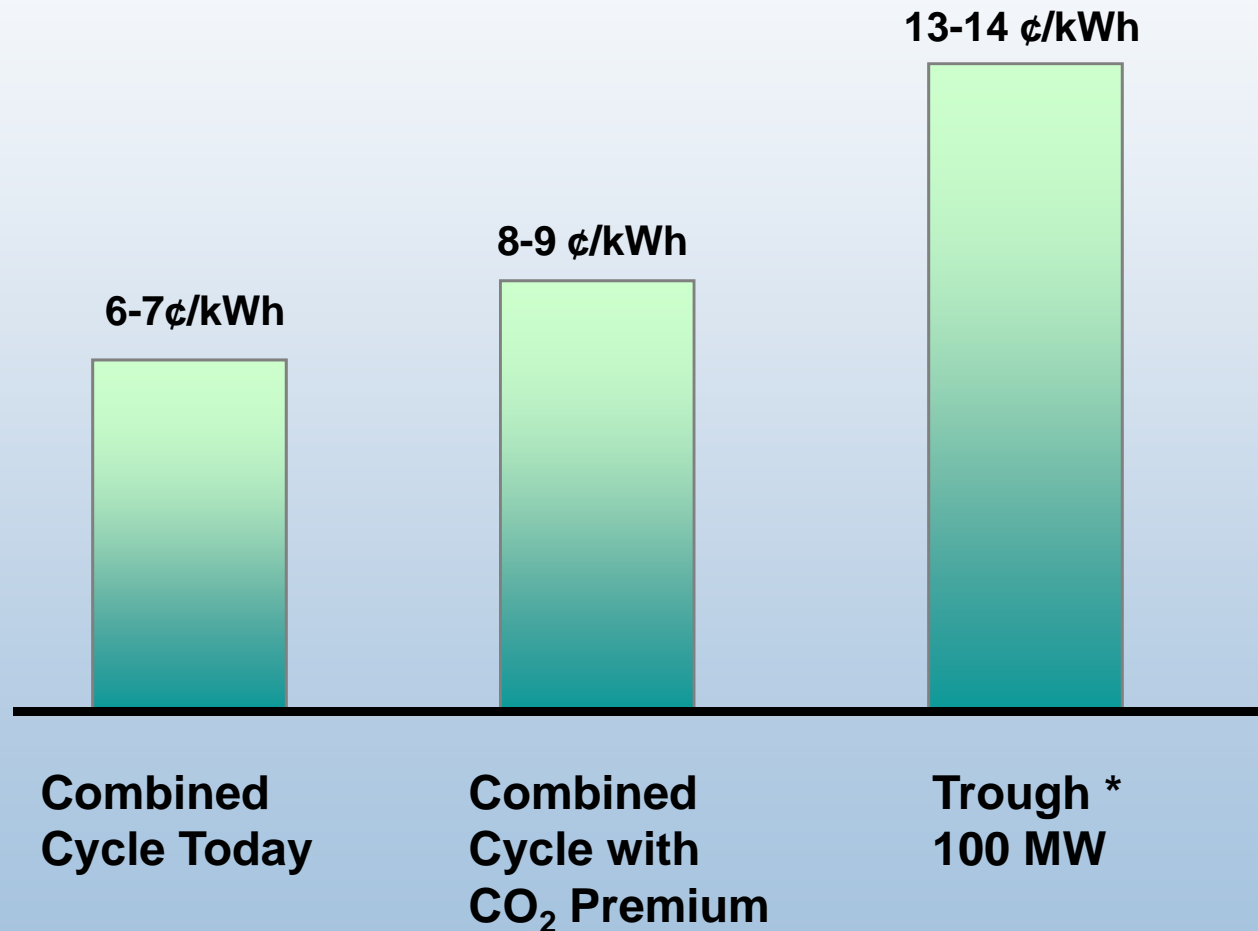
# Discussion Outline

- Background and Purpose
- CSP Costs – Today and Tomorrow
- Economic Impacts of CSP Deployments
- Conclusions

# Background & Purpose

- Information presented today draws from:
  - Western Governors' Association (WGA) Solar Task Force and WGA-sponsored work
  - Analysis conducted by U.S. Department of Energy and National Renewable Energy Laboratory
  - Contributions of the CSP industry
- Key Messages:
  - CSP derived electricity is becoming competitive and its costs will continue to decrease
  - Investment in CSP-friendly policies pays back in jobs, GSP/GDP, tax-base, and net treasury gains

# Current Costs for CSP (Parabolic Trough) are Higher than Fossil Plants



(\* NREL analysis, in high radiation areas with 30% ITC; Federal Loan Guarantee not included.

# Future CSP Costs

Future CSP-derived electricity will cost less due to:

## Scale

- Larger, more efficient power block
- Aggregated buying power
- Local manufacturing
- Lower O&M

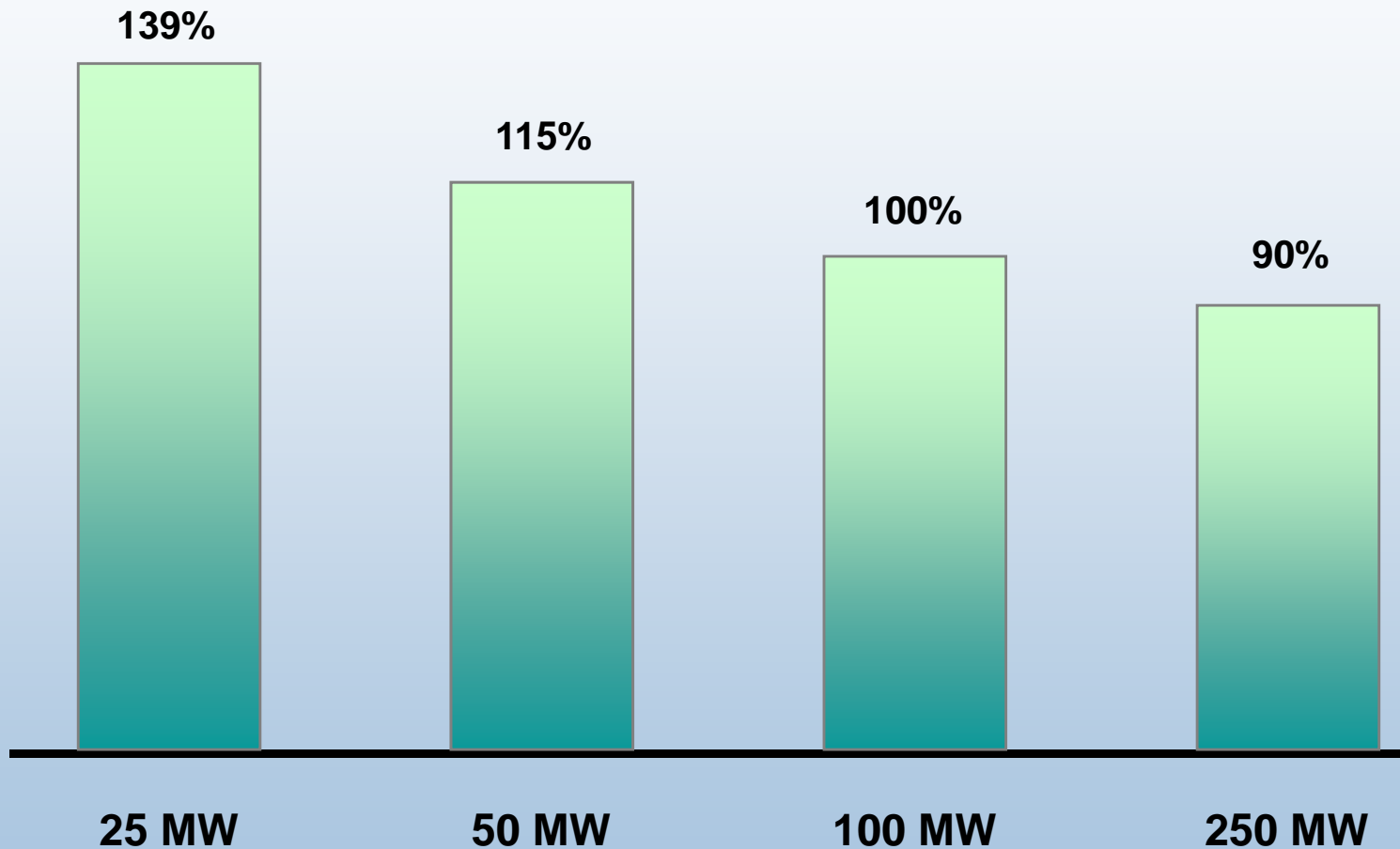
## Repetition

- Learning curve
- Design improvements
- Power Park economies

## Technology

- Higher efficiencies of key components
- New designs operating at higher temperature
- New thermal storage solutions

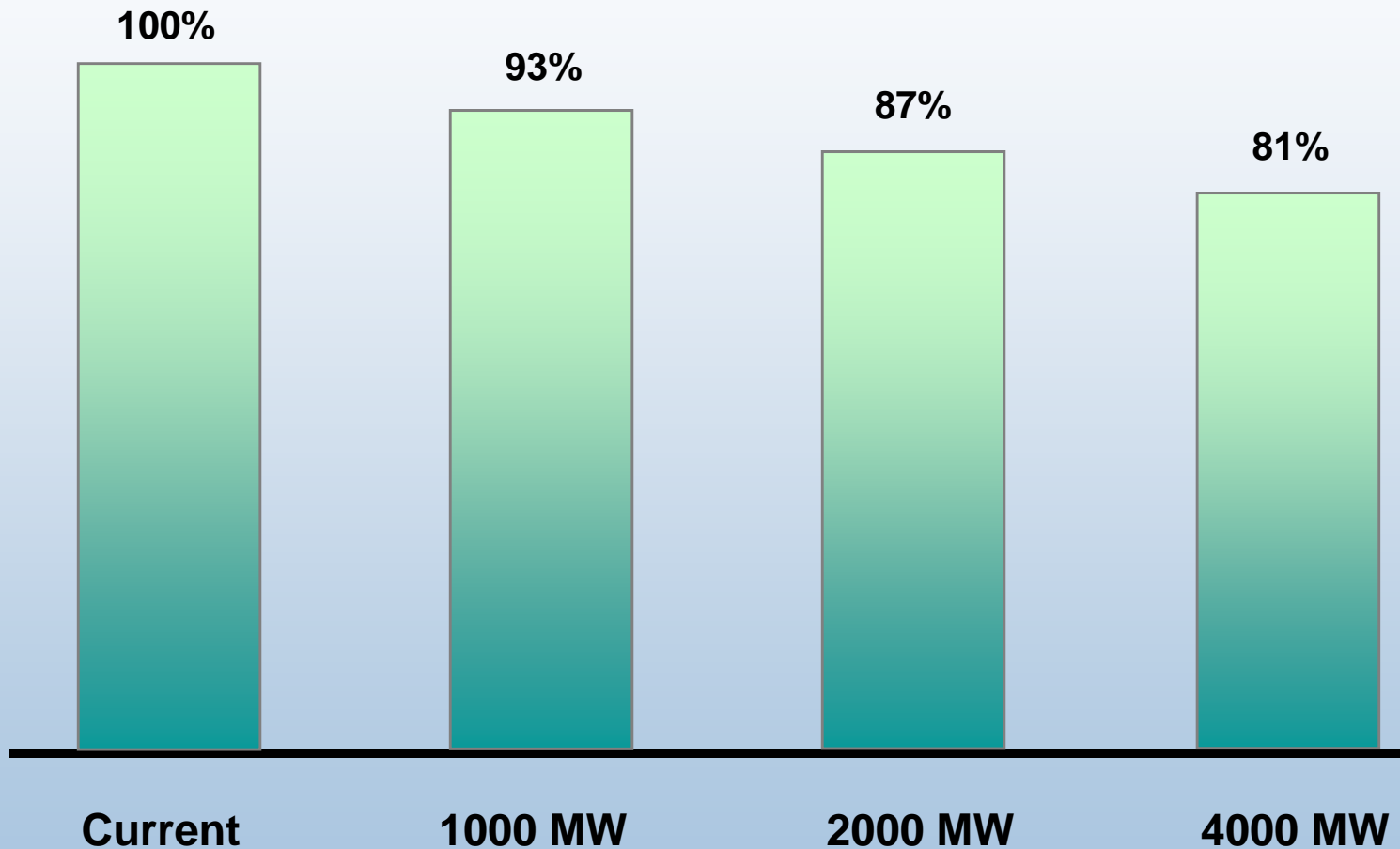
# CSP Cost: Effect of Plant Scale



Source: Nexant study, 2006

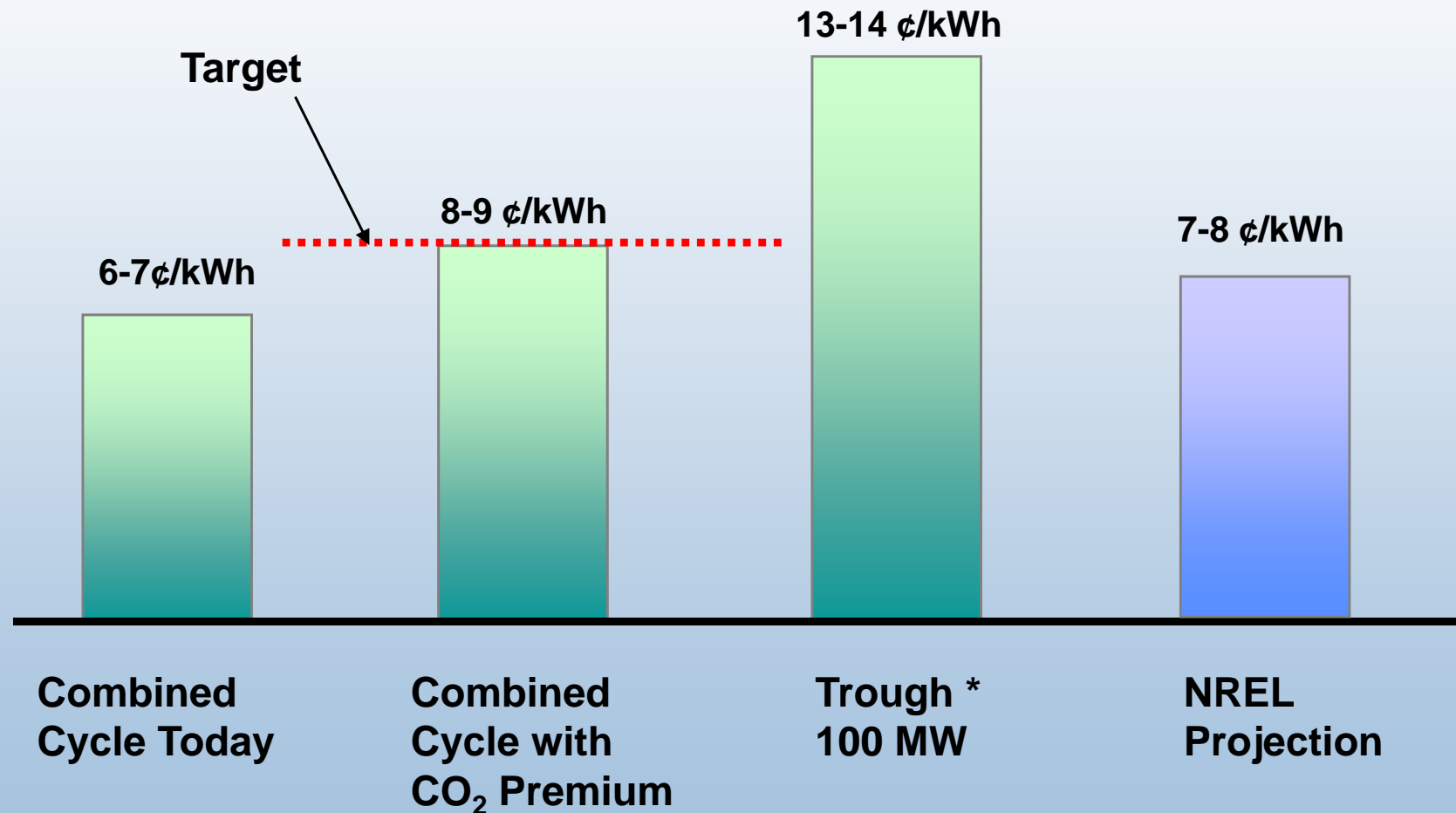
Assumes parabolic trough plant, 6 hours thermal energy storage, IPP financed, 10% ITC

# CSP Cost: Effect of Repetition



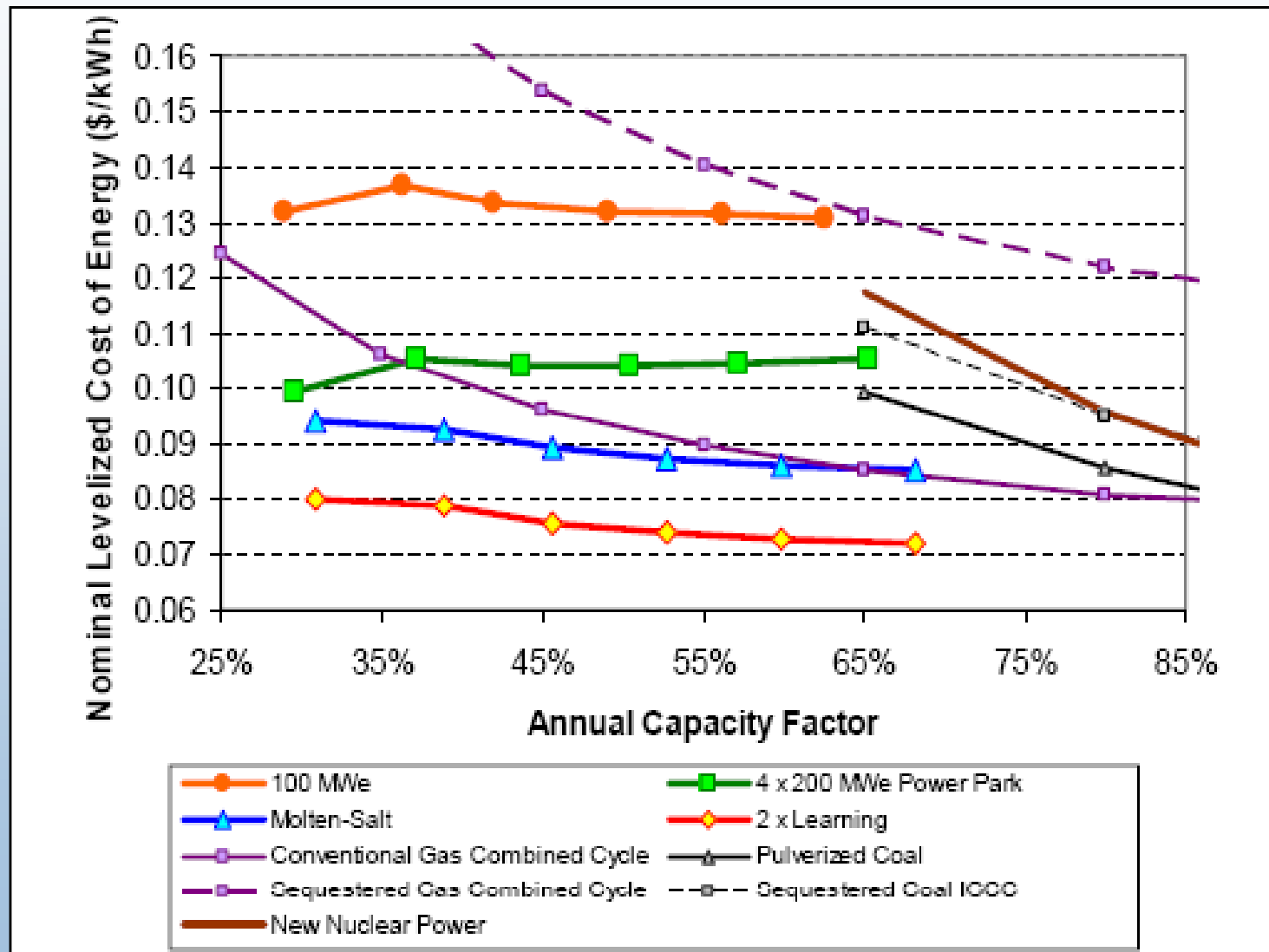
Based on experience from existing SEGS plants (354 MW in California)

# Technology and Learning Curve Improvements Will Further Reduce Costs



(\* NREL analysis, in high radiation areas with 30% ITC; Federal Loan Guarantee not included.

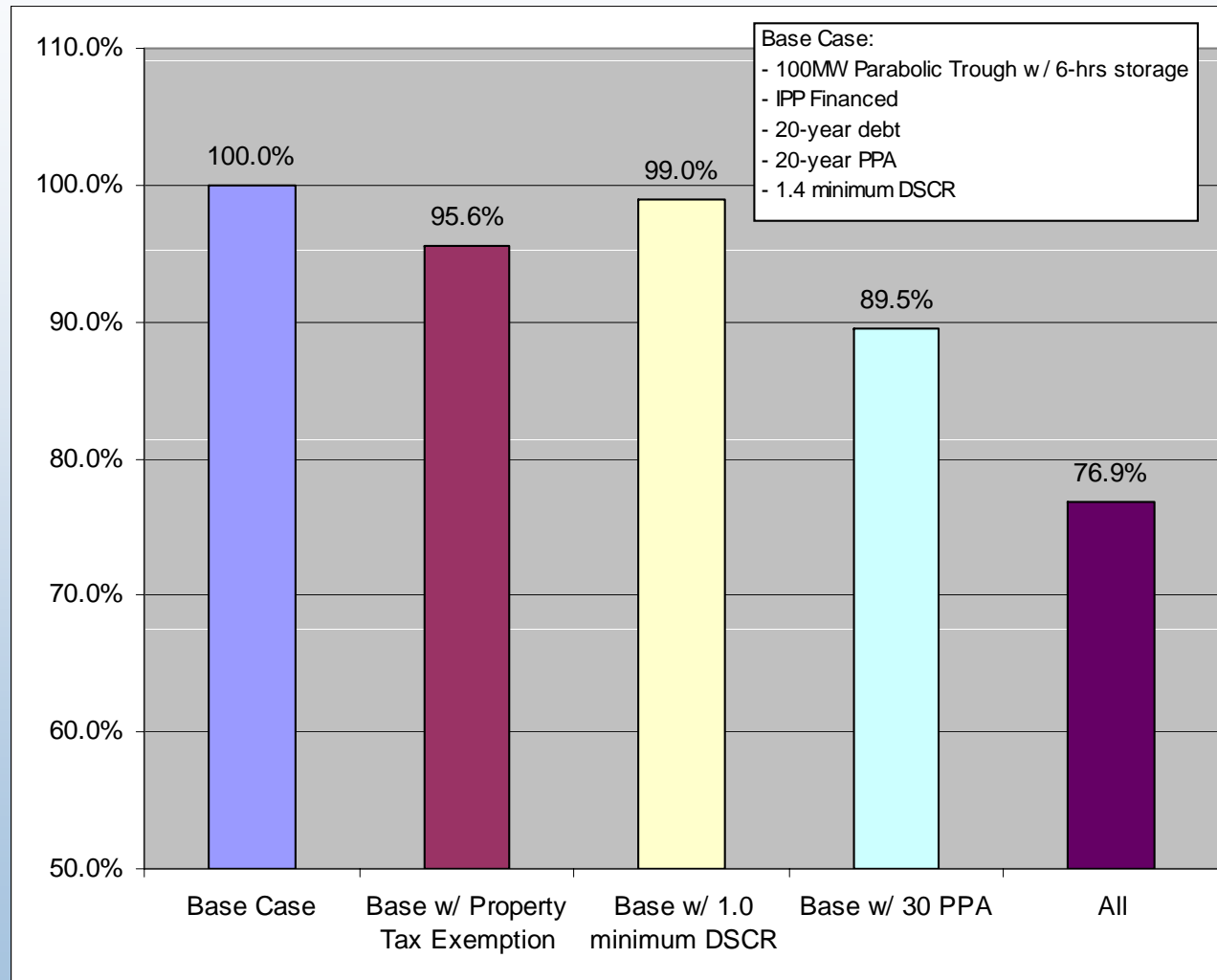
# DOE Estimates 7-8 cents/kWh for Long-Term Cost of Trough Technology



Source:  
DOE

# Policy Options Can Contribute Significantly to Continued Cost Reduction

Source:  
  
January  
2007



Example: policy impacts to cost of a 100 MW CSP plant

# Economic Impacts of CSP Deployments: Case Study Arizona

- A recent study contemplated existing economic impact research:
  - Recent NREL-supported studies performed in CA, NM, and NV examining economic impacts of CSP deployment
  - U.C. Berkeley research conducted in 2004 comparing renewable energy job creation statistics from 13 studies
  - Newly released (2007) Solar Roadmap study for AZ prepared by Navigant Consulting, Inc.
  - 2004 Union of Concerned Scientists study of renewable energy impacts on Arizona's economy
  - February 2006 study of economic growth opportunities for solar energy Industries in Arizona

# Study Findings: Economic Impacts

- Panel of experts convened to compare assumptions, methodologies, results across the CA, NM, and NV studies
- Goal: estimate reasonable impacts expected for AZ
- Participants:
  - Arizona Department of Commerce
  - Black & Veatch
  - National Renewable Energy Laboratory
  - Salt River Project
  - University of New Mexico (BBER)

# Study Findings: Economic Impacts

**Panel conclusion:** Arizona's economic impacts will be significant. *If Arizona builds 1 GW of CSP:*

- \$2 - \$4 billion private investment in State
- 3,400 - 5,000 construction jobs; up to 250 permanent solar plant jobs, many in rural areas
- \$1.3 - \$1.9 billion 30-yr increase in state tax revenues
- \$2.2 - \$4.2 billion increase in Gross State Output

# Conclusions

- CSP derived electricity is becoming competitive and its costs will continue to decrease
- Investment in CSP-friendly policies pays back in jobs, GSP/GDP, tax-base, and net treasury gains
- Policy incentives will be needed to achieve sustained cost reductions
- Enact an 8 year extension of the Investment Tax Credit

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