

# Harvesting California's Renewable Energy Resources:

## A Green Jobs Business Plan



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# Federal Stimulus Legislation and California Green Jobs

- Host of studies show California ranks No. 1 in generation of green jobs from investments in renewable resources
- As a whole, renewable energy projects create four to six times as many jobs as equivalent investments in fossil fuels
- California diversity of renewables can create jobs in all regions of the state: North, South, East and West



# 33% RPS is First Step: CA Support Growing...

- Governor's Executive Order of November 17, 2008 (MOU on state and federal permitting for renewables/transmission)
- CARB's Scoping Plan of December 11, 2008 (33% RPS key to AB 32 compliance)
- 2009 Legislative Session: AB 64 (25% by 2015; 35% by 2020; 50% by 2035)



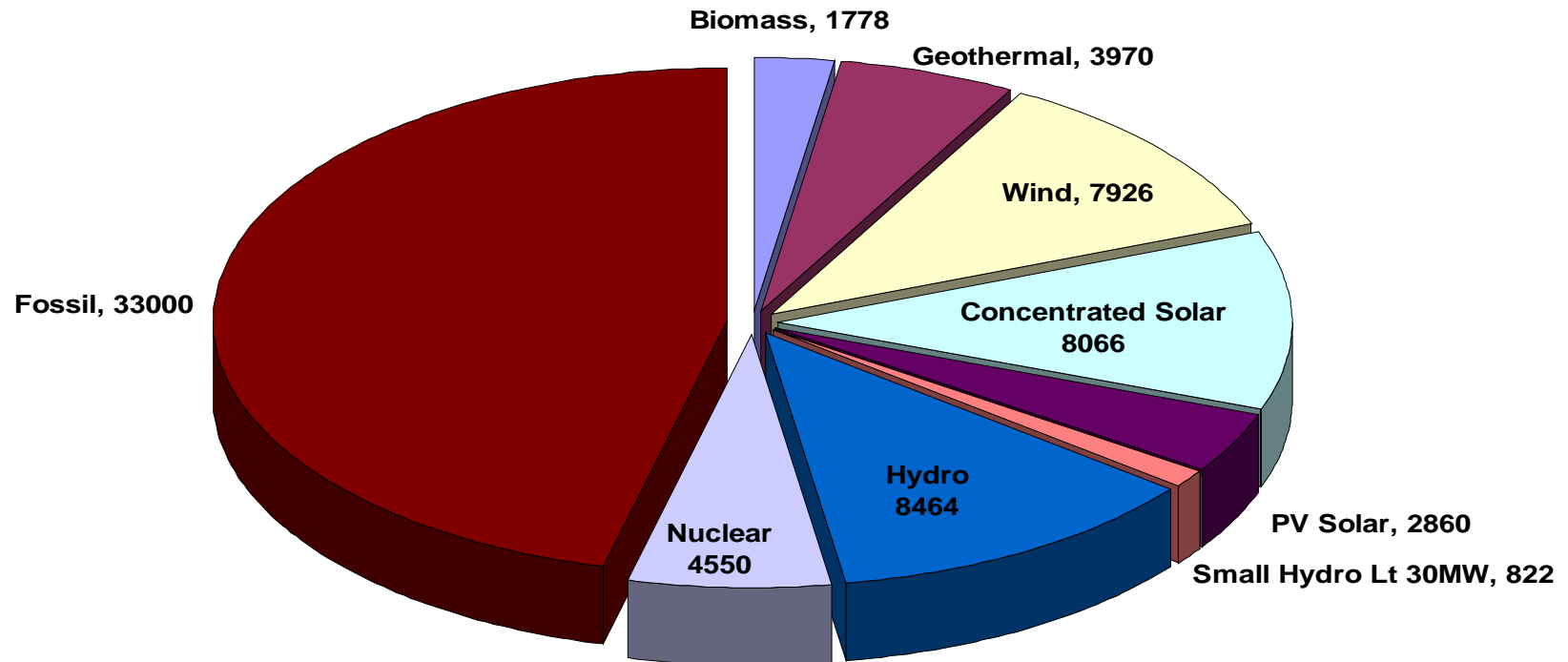
# Job Impacts of 33% RPS

- Over \$60 billion pumped into CA's sagging economy
- Between 100,000 and 235,000 **total** jobs under current business conditions
- Nearly 200,000 manufacturing jobs **alone** with state tax reforms and other policy changes



# CEERT/CAISO 33% Scenario

33% Renewable - Generation Mix in MW



# ***Which Renewables are Best?***

- Diversity is always key in power supply
- Solar PV generates most jobs (but is the most expensive)
- Wind is cheapest (but generates least amount of jobs)
- Geothermal and biomass provide power 24/7 and bolster rural economies
- It's all good...trade-offs inevitable



# EPRI/CEC Job Estimates

## Number of Jobs/MW

- **Wind:** 2.86 jobs/MW
- **CSP:** 5.93 jobs/MW
- **Solar PV:** 7.26 jobs/MW
- **Geothermal:** 5.67 jobs/MW
- **Landfill/Digester Gas:** 5.00 jobs/MW
- **Natural Gas:** >1.0 job/MW



# Solar PV

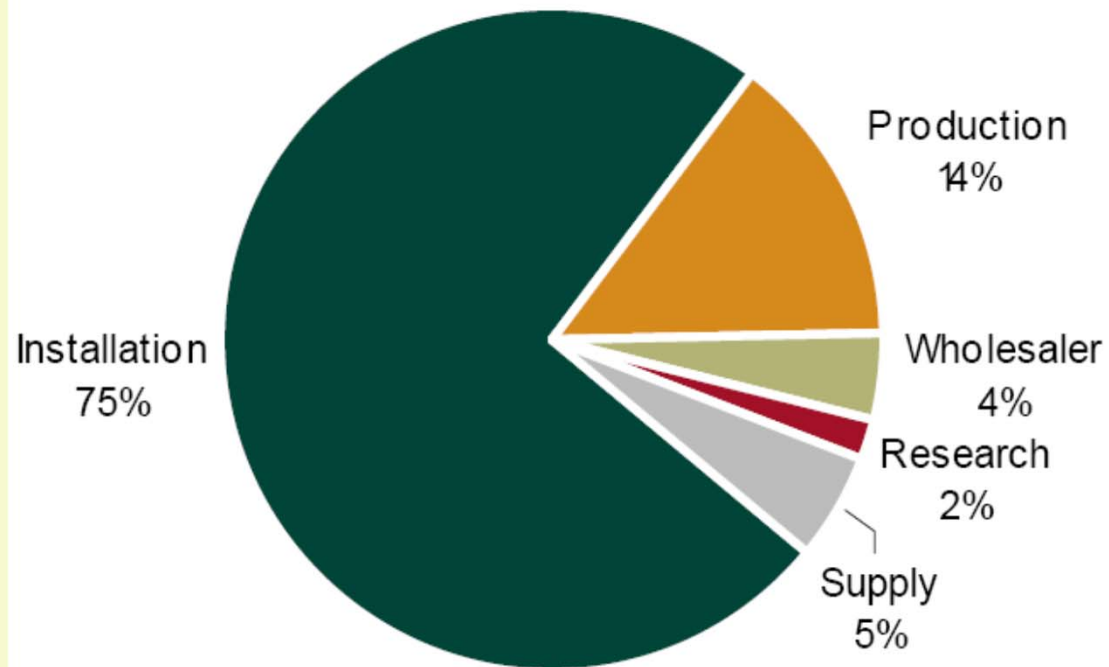
- Barclay's claims solar PV generates >43/jobs/MW.
- How can this be?
- Distributed vs. Central Station
- Best Urban Opportunity
- Ecological Footprint issues with utility-scale solar PV projects in rural regions





# Methodologies Differ & Forecasts Highly Uncertain

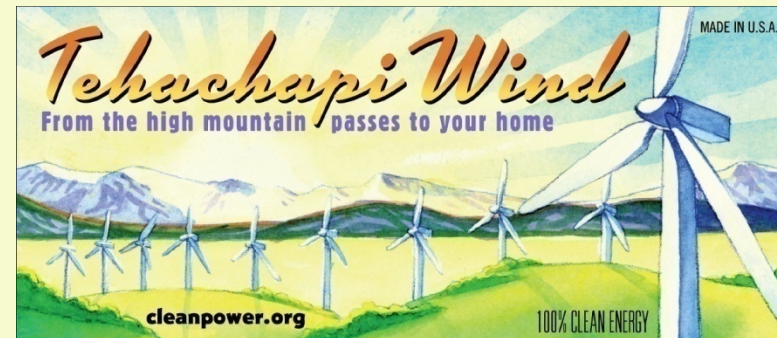
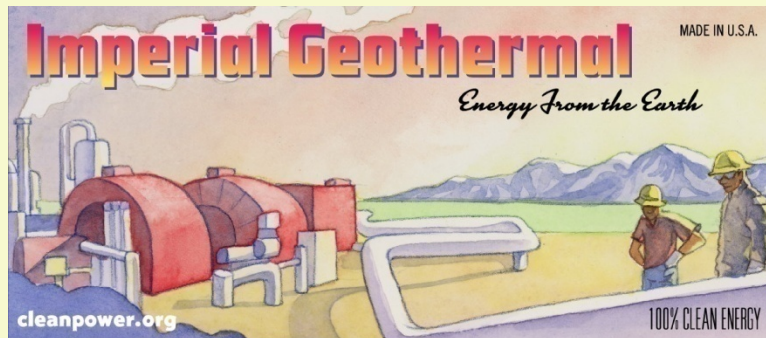
Worldwide Employment in PV-Related Jobs 2030 (3.7M Jobs)



# Best State Renewable Basins?

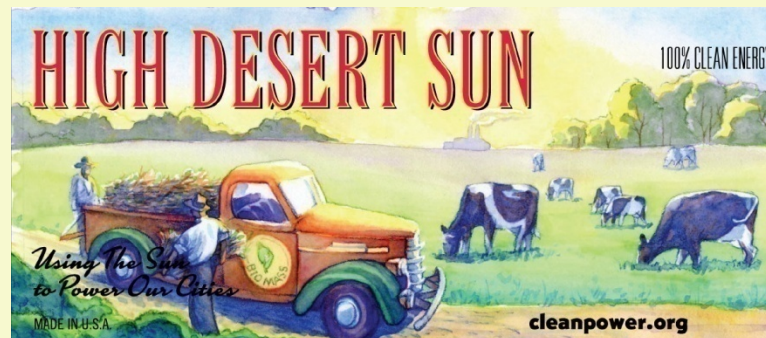
## Southeastern California: Imperial and Kern counties

- Imperial: “Crown Jewel” of geothermal; 25% unemployment rate
- Kern: CA’s premier wind resource & world class CSP; lack of transmission lines



# Need For Green Infrastructure!

- Best way to meet 33% RPS with CA resources is new transmission lines
- Sunrise PowerLink controversy
- Obama's pledge of \$11 billion for "smart grid" and 3,000 miles of new transmission
- Reducing environmental impacts of T&D



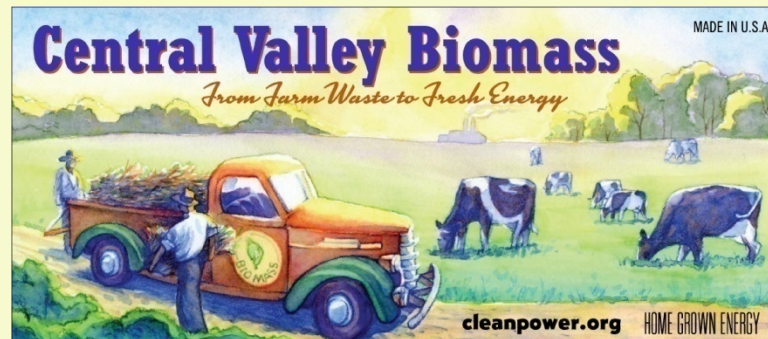
# Urban Green Job Opportunities

- LA, SF and San Diego rank in Top Ten in current US green jobs
- LA: 20,000 total green jobs; Clean Tech Industrial Parks
- SF/Silicon Valley: 8,000 solar jobs



# What about Central Valley?

- Health Impacts: Nation's most contaminated air
- Fresno: highest concentration of poverty in the nation
- Biomass plants: > 300 jobs per facility



# Sacramento by 2038...

- Could rank No. 15 in US in green jobs
- Green Jobs sector to grow from over **8,000 jobs** in renewable energy sector today to **109,570 jobs** in 2038
- By 2038, Los Angeles would rank 4<sup>th</sup> in nation (and No.1 in CA) with **159,321 green jobs linked to renewables**



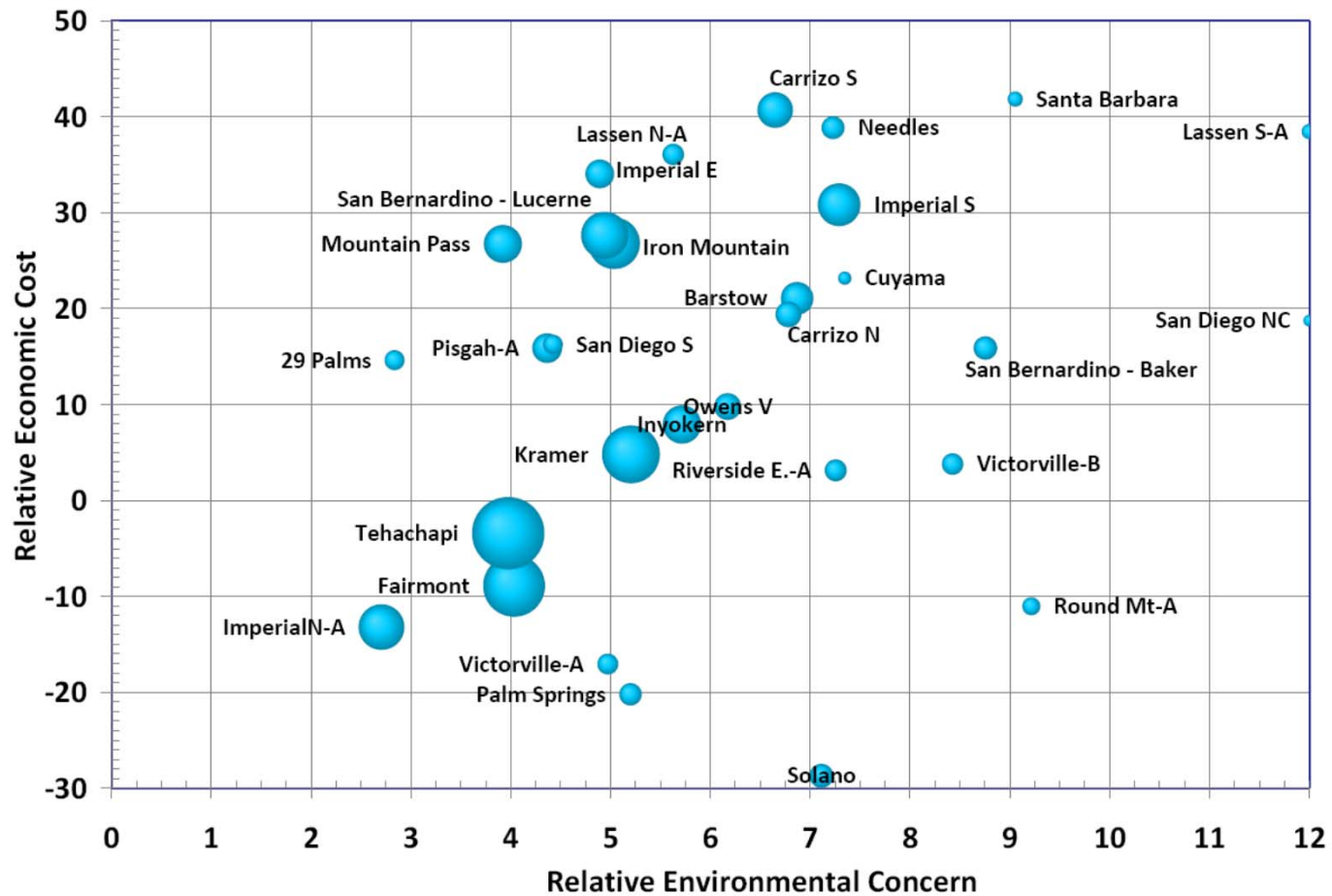
# California's Top Challenge?

## **Green** Transmission Lines

- RETI “Competitive Renewable Energy Zones” (CREZ)
- Best Resource/Least Enviro Impact
- Permitting Hurdles
- New incentives for utilities, developers and environmentalists to get “steel in the ground?”



# CREZ “Bubble” Ranking





# RETI/EPRI/CEC 33% RPS

- **Tehachapi CREZ: 46,075 jobs in CSP, wind and biomass industries**
- **Fairmont (LA County): 36,658 jobs in CSP, wind and biomass industries**
- **Top 8 CA CREZ full renewable resource build-out: 107,564 jobs**
- **Solar PV not in mix**
- **Solar PV under CSI adds >20,000-100,000 more jobs to CA total**



# Conclusions

- Under federal stimulus legislation, CA could generate more green jobs than any other state
- 33% RPS is best first step at state level to capture these economic development benefits
- Most viable way to meet 33% RPS in CA – and Obama’s federal green jobs goal – is to build new “green” transmission lines



# Conclusions...

- Enviros should be at the table and become more informed about renewables
- Solar PV is part of the solution, but not the end all and be all
- Diversity of renewable supply hedges risks
- Family of renewable technologies offers green jobs throughout the entire state
- Renewables generate from 4 to 6 times as many jobs as investments in natural gas

