# Lessons Learned in California Climate Policy

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# Summary of research on California climate policies

- Nearly all research studies show small net job growth, with stimulation of some sectors especially renewables and EE, and sectors that reeive investment from our cap and invest revenue funds.
- Positive economic impact is due to higher job creation in non-fossil fuel sectors compared to fossil fuels, stimulating up front investments that pay off over time– (EE, EVs), and local production vs. imports of fossil fuels.
- Possible contractions in high GHG emitting sectors, which can be managed with intentional policy to invest in abatement and avoid leakage, and back-stop with robust transition assistance.

# California emissions targets to 2020: net impacts to date

- Cap and trade revenues generated $3.4 billion in state investment
- 33% Renewables Portfolio Standard
  - Between 2002-15, about 11, 200 MWs of new renewable capacity was built
  - This created about 33,000 direct job years and 86,000 total jobs

Source: Jones et al, Link-Between-Good-Jobs-and-a-Low-Carbon-Future, Center for Labor Research and Education, University of California, Berkeley, 2016

# Renewable Energy MW Installed and Construction Jobs Created, 2002–15

| Type of Renewable Energy | New In-State MW Capacity Built | Total Construction Job-Years | Blue-Collar Construction Job-Years | White-Collar Job-Years per MW | Blue-Collar Job-Years per MW |
|---|---|---|---|---|---|
| Photovoltaic (PV) | 5,575 | 21,724 | 16,945 | 0.9 | 3.0 |
| Large Commercial (0.25–1MW) | 15 | 88 | 69 | 1.3 | 4.5 |
| Community Scale (1–5 MW) | 618 | 2,405 | 1,876 | 0.9 | 3.0 |
| Utility (>5MW) | 4,942 | 19,231 | 15,000 | 0.9 | 3.0 |
| Concentrated Solar Power | 897 | 6,014 | 4,691 | 1.5 | 5.2 |
| Land-Based Wind Power | 4,226 | 2,754 | 2,148 | 0.1 | 0.5 |
| Geothermal | 105 | 457 | 357 | 1.0 | 3.4 |
| Small Hydro | 48 | 341 | 266 | 1.6 | 5.5 |
| Biomass (+Biogas) | 381 | 1,346 | 1,050 | 0.8 | 2.8 |
| Battery Storage | 2 | NA | NA | NA | NA |
| **Total Renewable*** | **11,234** | **32,636** | **25,456** | **0.6** | **2.3** |

*May not sum or multiply due to rounding

Source: Carol Zabin et al, The Link Between Good Jobs and a Low Carbon Future, University of California, Berkeley, 2016

# Energy efficiency is key element

- IOUs administer most EE programs under CPUC oversight, over $1 billion/year
- 6 direct jobs and 14 total jobs created per $1 million investment
- Workforce training is crucial: to ensure equipment and buildings improvements are installed and maintained correctly
- Training infrastructure includes state-certified apprenticeship system and community colleges

Source: Proposition 39 Jobs Report 2014-2016, Carol Zabin and Kevin Duncan, 2017 University of California, Berkeley.

# Case study: San Joaquin Valley

- Net benefit to rural, less prosperous regions: in eight-county San Joaquin Valley 2013-15, net creation of over 700 direct jobs, $202 million in total net economic impact, including $4.7 million in state and local tax revenue.
- Including revenue that has been allocated thru 2015 but not yet expended, total 2013-15 would be: 7,412 jobs, $1.5 billion economic impact, $45.3 million state-local tax revenue.
- Sectors that gained: construction; consumer savings from reduced energy use.

Source: Betony Jones et al, The Economic Impacts of California's Major Climate Programs on the San Joaquin Valley, Next 10, January 2017.

# High road: Job quality, not just quantity

- Most utility-scale renewables projects provided family-supporting wages, and benefits including training, pension contributions, and family health care.
- Many projects provided apprenticeship and hired local residents from disadvantaged communities, low-income households and veterans.
- Main beneficiaries of growth in renewables were high-unemployment, low-income rural counties, such as our San Joaquin and Imperial Valleys.

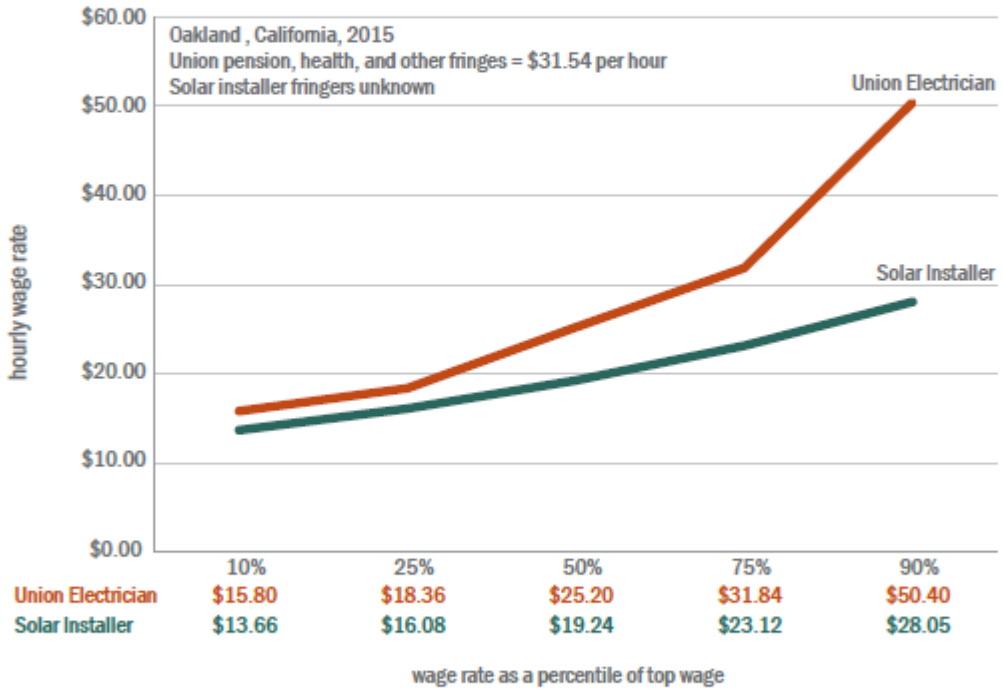
# Utility-scale solar = quality jobs

| Craft | Training | Pension | Health | Total Benefits | Wage |
|---|---|---|---|---|---|
| Boilermaker | $0.75 | $16.20 | $8.57 | $25.52 | $41.66 |
| Bricklayer | $0.82 | $7.37 | $7.90 | $16.09 | $40.56 |
| Carpenter | $0.57 | $4.41 | $6.60 | $11.58 | $40.40 |
| Cement Mason | $0.60 | $8.09 | $7.52 | $16.21 | $32.30 |
| Electrical Utility Lineman | $0.26 | $8.18 | $5.50 | $13.94 | $52.85 |
| Electrician-Wireman | $0.93 | $8.52 | $8.97 | $18.42 | $38.20 |
| Insulators | $0.64 | $11.51 | $8.14 | $20.29 | $37.99 |
| Ironworker | $0.72 | $12.97 | $9.42 | $23.11 | $33.50 |
| Laborers | $0.64 | $6.50 | $6.86 | $14.00 | $31.39 |
| Millwright | $0.57 | $4.41 | $6.60 | $11.58 | $40.90 |
| Operating Engineer | $0.80 | $9.65 | $11.20 | $21.65 | $31.39 |
| Painter, Industrial | $0.79 | $3.04 | $8.05 | $11.88 | $30.72 |
| Pipefitter | $2.55 | $11.05 | $7.11 | $20.71 | $42.93 |
| Roofer | $0.30 | $1.62 | $6.00 | $7.92 | $28.73 |
| Sheet Metal | $0.73 | $14.54 | $7.92 | $23.19 | $35.55 |
| Teamster | $1.52 | $5.00 | $16.02 | $22.54 | $28.24 |
| **Average weighted by share of work** | **$0.91** | **$8.59** | **$8.63** | **$18.13** | **$36.84** |
| **Benefits as a percent of average wage** | **3%** | **23%** | **23%** | **49%** | |

Source: Carol Zabin et al, The Link Between Good Jobs and a Low Carbon Future, University of California, Berkeley, 2016

Exhibit 10

## Comparison of wages and wage trajectories for rooftop solar installers and union electricians in California




Source: US Bureau of Labor Statistics and Construction Electrician/Construction Wireman Wage and Fringe Benefits, California Bay Area Region[19]

# California's missed opportunity: community solar

- California has failed to take advantage of mid-scale projects, i.e. community solar, which can lower per MW cost and create better jobs.
- Oregon has an important opportunity with SB 1547, which mandates PUC to write rules for community solar by July 1.

# Workforce training lessons learned in California for post-2020 period

- Incorporate contractor and workforce standards into program requirements for climate policies to help ensure well-paying jobs for workers and ensure quality workmanship.
- Where feasible, use community workforce agreements.
- Use existing training infrastructure, particularly certified apprenticeship programs.
- Create inclusion programs to create job pipelines for workers from minority, low-income and disadvantaged communities into apprenticeships.

# CA climate policy to 2020 and beyond: broad stakeholder support

- Free allowances for electric utilities (not generators), industrial facilities and natural gas distributors
- Free allocation amount declines over time
- Investor-owned utilities must consign their free allowances to be sold at auction; must use proceeds for ratepayer benefit
- Major corporations support renewal of cap and trade

# Impact on Native American tribes

- Tribes benefit because they can qualify for selling carbon offset credits under the Cap and Trade program.
- Seven tribes in California and other states, including Oregon's Warm Springs Confederated Tribes, have sold credits under the program to preserve forestland.