Building a Clean Energy Workforce

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Agenda

- Clean energy jobs
- Utility retirement
- Transitioning fossil fuel workers
- Just transition
Clean Energy Jobs
Clean Energy Job Growth

- Traditional Energy and Energy efficiency 6.4 million
- Increased in 2016 by just under 5 percent
- Adding 300,000 new jobs
- Roughly 14% of all jobs created in the country
Traditional Energy Jobs

- Traditional Energy Sector:
  - Electric Power Generation & Fuels more than 1.9m workers
    - 55% (1.1 m) coal, oil, gas
    - 800,000 in low-carbon emission generation (renewables, nuclear, and advanced low emission natural gas)
    - 374,000 in solar
      - Increased by 25% in 2016
    - 102,000 in wind
      - Increased by 32% in 2016
  - Transmission, Distribution, and Storage
    - 2.3 m: 982,000 retail (gas stations/fuel dealers) & 830,000 utilities and construction
      - Added 65,000 new transmission & distribution for grid modernization
Energy Efficiency and Motor Vehicles

- **Energy Efficiency Sector:**
  - 2.2 million design, installation, and manufacture of EE products and services
    - 1.4m in construction involving EE
      - 74% spend at least 50% on EE-related work, up from 65% in 2015

- **Motor Vehicle and Component Parts**
  - 2.4 m: 259,000 NG, hybrid, Plug-in, electric, hydrogen/fuel cell
    - Increase of 69,000 jobs in 2016
    - Hybrids, plug-ins, EVs 76% (198,000)
    - 489,000 Motor Vehicle Parts cos. Contribute to making cars more fuel efficient
    - 710,000 jobs focus on increasing fuel economy or fuel-switching
Clean Energy Sector is Less Diverse

- Women: 22-34% vs. 47% overall US workforce
- Hispanic/Latino: 14% vs. 16%
- Black/African American: 8% vs. 12%
- Veterans 1 in 10 workers, higher than national ave. of 7%
- 22% over 55
Qualified Workers Hard to Hire

- Almost 3/4 (73%) of sectors report difficulty hiring qualified workers over past 12 months
- 26% report it was very difficult
Electric Power Generation Employment 2015-16

Figure 12. Electric Power Generation Employment by Technology, Q2 2015 - Q1 2016

- Low Impact Hydro: 8,608 (2015), 9,295 (2016)
Figure 13. Fuels Employment by Technology, Q1 2016

- Coal: 74,084
- Petroleum: 502,678
- Natural Gas: 309,993
- Other Fossil Fuel: 18,292
- Corn Ethanol: 28,613
- Woody Biomass/Cellulosic Biofuel: 23,088
- Other Biofuels: 30,458
- Nuclear Fuel: 22,504
- Other: 64,444

Other Ethanol/Non-Woody Biomass, Incl Biodiesel: 8,592
Solar Employment Growth by Industry (2010-16)
Solar & Wind Workers by Project Scale

- **Solar Workers by Project Scale**
  - Residential: 20.6%
  - Commercial: 24.7%
  - Utility-scale: 54.7%

- **Wind Employment by Industry**
  - Construction: 37.2%
  - Manufacturing: 12.1%
  - Trade: 14.0%
  - Professional Services: 29.0%
  - Utilities: 4.1%
  - Other: 3.7%
Advanced Energy Economy—3 Million Jobs

- Nearly 2m on EE products and buildings
- More than 600,000 clean generation
- 100,000 in advanced grid technologies
- 100,000 in biofuels
- 200,000 in advanced transportation

Over 3 Million in U.S. Now Work for Clean Energy

National business groups, citing government statistics, say jobs providing cleaner energy options equal those in retail stores, twice those in building construction.
Environmental Entrepreneurs (E2)

- 2.5 million work in clean energy businesses across 50 states late 2015
- EE largest job-creator
- 414,000 in renewable energy, 300,000 in solar; 77,00 in wind.
## Environmental Entrepreneurs (E2)

<table>
<thead>
<tr>
<th>Industry</th>
<th>No. of Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>299,953</td>
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<tr>
<td>Wind</td>
<td>77,088</td>
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<tr>
<td>Geothermal</td>
<td>7,645</td>
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<tr>
<td>Biofuel</td>
<td>18,804</td>
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<tr>
<td>Low-Impact Hydro</td>
<td>8,608</td>
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<tr>
<td>Other</td>
<td>1,826</td>
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<tr>
<td><strong>Renewables Total</strong></td>
<td><strong>413,924</strong></td>
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<tr>
<td>Storage</td>
<td>27,140</td>
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<tr>
<td>Smart Grid</td>
<td>12,880</td>
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<tr>
<td><strong>Clean Distribution Total</strong></td>
<td><strong>40,020</strong></td>
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<tr>
<td>Other Ethanol/Non-Woody Biomass</td>
<td>14,761</td>
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<tr>
<td>Woody Biomass</td>
<td>18,031</td>
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<tr>
<td><strong>Fuels Total</strong></td>
<td><strong>32,792</strong></td>
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<tr>
<td><strong>Renewable Energy Generation</strong></td>
<td></td>
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<tr>
<td><strong>Energy Efficiency Total</strong></td>
<td><strong>1,880,148</strong></td>
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<tr>
<td>Energy Star Appliances</td>
<td>162,083</td>
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<tr>
<td>Energy-Efficient Lighting</td>
<td>328,288</td>
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<td>Traditional HVAC</td>
<td>630,587</td>
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<td>High AFUE</td>
<td>185,545</td>
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<tr>
<td>REHC</td>
<td>135,102</td>
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<td>Advanced Materials/Insulation</td>
<td>292,667</td>
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<td>Other</td>
<td>145,876</td>
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<td><strong>Advanced Vehicles Total</strong></td>
<td><strong>169,939</strong></td>
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<tr>
<td>Hybrid</td>
<td>53,030</td>
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<tr>
<td>Electric</td>
<td>55,401</td>
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<tr>
<td>Natural Gas Vehicle</td>
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<tr>
<td>Hydrogen Vehicle</td>
<td>2,822</td>
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<tr>
<td>Fuel Cell Vehicle</td>
<td>6,801</td>
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<tr>
<td><strong>All Sectors Total</strong></td>
<td><strong>2,536,823</strong></td>
</tr>
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E2 Sector Comparison

Sector Comparison

- Renewable Energy Generation: 413,924 jobs
- Clean Distribution: 40,020 jobs
- Fuels: 32,792 jobs
- Advanced Vehicles: 169,939 jobs
- Energy Efficiency: 1,880,148 jobs

No. of Jobs (million)
RE & Solar Facts and Figures

Renewable Energy

- Solar: 72.5%
- Wind: 18.6%
- Biofuel: 4.5%
- Low-Impact Hydro: 2.0%
- Geothermal: 1.8%
- Other: 0.4%

Facts & Figures: Solar Jobs

- 299,953 solar jobs
- 30% Part-time
- 70% Full-time

209,000 people work in solar full-time or close to full-time, according to The Solar Foundation and BW Research Partnership.

20% job growth rate for the third consecutive year.

115,000 solar jobs added since 2010.
May 25, 2016 - Major Milestone

- Number of U.S. jobs in solar energy overtook those in oil and natural gas extraction for the first time in 2015
- Helping drive a global surge in employment in the CE business
U.S. Solar Workforce 2017

250,271
SOLAR WORKERS IN THE UNITED STATES, AS OF 2017

4% DECREASE SINCE 2016

168% INCREASE SINCE 2010

The Solar Foundation™ for a bright future
Solar Workforce Demographics

- Women: 27%
- Latino/Hispanic: 17%
- Asian: 8%
- African American: 7%
- Veterans: 9%
Wind turbine technician fastest growing profession in the US
4 million jobs in 2016, up from 3.4 million in 2011
Solar and wind growing 12 times as fast as the rest of the US economy
Compound annual growth rate of employment in fossil fuel industry -4.5% from 2012-2015 RE jobs 6% from 2012-15.
Average number of US coal mine employees dropped by 12% in 2015
Advanced Vehicles

Note the importance of corporate average fuel efficiency standards.
Utility Retirement
Baby Boomers Exiting Utilities

- Energy utility industry averages the 2nd highest average employee age—54 industries studied.

- Nearly 1/5 (19.2 percent) of within 5-7 yrs of retirement

- Energy utility industry facing manpower-womanpower crisis. Done little to attract new talent

- Failure to recruit new talent seen in rising average age of workers; since 1995, the number of workers aged 55 and older has increased by 225 percent.

- Loss of know-how; risks losing crucial intellectual capital
Aging Utility Workforce

• Power sector will need more than 100,000 new skilled workers by 2018

• Nuclear Energy Institute estimate 39% of nuclear workforce eligible for retirement by 2018; need 20,000 new workers

• 40% of workforce at America's electric and natural gas utilities eligible for retirement by 2019

• Almost 62% of utilities employees have potential to retire or leave from 2014-2024

• Assume for every 1,000 employee, 100 or so leave at a cost of $2,300-3,600 per hire, major cost (and productivity losses)
Transitioning Fossil Fuel Workers
Transitioning Coal Country

- 2016 86,035 coal workers, 57,325 miners
- Coal-mining jobs peaked in 1985 with 178,300 jobs (BLS)
- Solar and wind 475,545; solar market tripled in revenue from 2011-16
- Coal country communities suffering; job losses; lost tax revenue; severe economic dislocation fertile ground for climate denial
Transitioning Coal Country

- Coal once thrived in 25 states
- Coal miners technically skilled; coders, engineers, business owners
- “if renewables are an important part of your CSR program, don't forget about the S”
- Companies should engage more directly in rebuilding the communities that powered their paths to great wealth
Pay Scale is an Issue

- Average coal mining job in Colorado paid $91,049 in 2015 according to the National Mining Association.

- Solar installer jobs “living wage” $15-25/hr, ($31,200-52,000) annually

- That’s a big gap

- Also coal miners are union; most solar workers are not
Just Transition
Just Transition

- Framework developed by unions to ensure that as the economy transitions to more sustainable world, workers are not left behind and low-income people participated in the green economy

- Just what does it mean?
Green for All

- Build a green economy while lifting people out of poverty
- Unions + environmentalist to push any-poverty measures and clean energy economy
- Co-founded Van Jones & Majora Carter; launched in 2007
- Green Jobs Act of 2007; $125m annually
Mission-Critical Focus Required

- The transition to a clean energy economy offers an opportunity to right the significant wrongs of our capitalist society that rewards (richly) the capitalists and not the workers

- Addressing income inequality and climate change simultaneously is vitally important and deeply challenging
Transitioning from Fossil Fuel to Clean Energy

www.cleanenergytransition.net