



Wind Assumptions:

| Year of | 2014 |
|---|------------|
| Construction | |
| Total Project Size-Nameplate Capacity | 300 MW |
| Turbine Size | 2000 kW |
| Number of | 150 |
| Turbines | |
| Installed | \$2,100/kW |
| Project Cost | |
| Variable O&M | \$12/MWh |
| Cost | |
| Fixed O&M | \$30/kW |
| Cost | |

Findings:



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Hypothesis: Wind, solar, and natural gas jobs can replace those currently held in the US coal industry.

Project goal

- simulator.
- The NEWS model uses 3 years of data to integrate cost-optimal US.
- NEWS to consider the economic

Potential to generate:

- Cheaper electricity prices

A Labor Market Analysis of the Electricity Sector for 2030 using the National Energy with Weather (NEWS) Simulator

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To assess jobs, tax revenues, and earnings generated by the National Energy with Weather System (NEWS)

hourly 13-km wind and solar power combinations of wind, solar, natural gas and transmission across the contiguous

NEWS previously only used weather and cost considerations to determine site placement. This project enables benefits of renewable energy and to spread those benefits across the country.

Project Assumptions

- All parts of the process done inside one state.
- Cost assumptions identical with NEWS model.
- Utilizing the National Renewable Energy Laboratory's Jobs and Economic Development Impact Models





Conclusion: Hypothesis holds true

744,000 annual direct jobs under national HVDC system • Net gain: 573,000 jobs More than 4x the coal jobs lost • \$53 billion in direct earnings • \$4 billion in state tax revenues



Industries capturing maximum economies of scale. Homogeneous cost of installation across all states.

| | 2014 |
|--------------|--------------------------|
| erial | Crystalline silicon |
| | Single axis |
| ameplate | 1,000 kW |
| | |
| alled | 100 |
| ate Capacity | 100,000 kW |
| Cost | \$2,600/kW _{DC} |
| | \$25.00/kW |

Methodology

- Step 1: Isolate industry segments
- Step 2: Record jobs and earnings
- Step 3: Divide by total MW
- Step 4: Program into NEWS Model
- Step 5: Run 27 energy mix scenarios

 - Nine possible divisions
- Step 6: Record and study results





Potential to reduce: Carbon emissions (78% compared

- with 1990 levels)
- Boom and bust development cycles
- Water consumption by energy production (~65% compared with 1990 levels)

generated for each job type • Three possible price assumptions Results for national HVDC transmission system shown here

Health care expenditures due to coal



Natural Gas Assumptions:

| Year of Construction | 2014 | |
|--------------------------|------------|--|
| Project Size - Nameplate | 500 MW | |
| Capacity | | |
| Capacity Factor | 30% | |
| Heat Rate (Btu per kWh) | 6,430 | |
| Construction Period | 12 | |
| (Months) | | |
| Plant Construction Cost | \$1,300/kW | |
| Cost of Fuel (\$/mmbtu) | \$7.85 | |
| Fixed O&M Cost (\$/kW) | \$10/kW | |
| Variable O&M Cost | \$3.27/MWh | |

Findings:





| Direct Induced \$50,000,000,000 | ect Annual | Earnings | |
|---|------------------------------------|------------------|------------------|
| \$40,000,000,000 - | | | \$15,435,030,212 |
| \$30,000,000,000 — | | \$11,893,853,419 | \$10,101,144,260 |
| \$20,000,000,000 — | \$9,398,068,015 \$5,869,405,765 | \$7,618,880,223 | #22 COD 500 200 |
| \$10,000,000,000 — | \$11,762,677,095 | \$16,246,562,537 | \$22,608,580,299 |
| \$- — | R-Low, NG-High | R-Mid, NG-Mid | R-High, NG-Low |

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