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# **Comparative Operational Costs For Solar Wafer Fabs in Clark County, WA**

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## **Comparative Operational Costs For Solar Wafer Fabs in Clark County, WA**

Clark County, Washington has attracted significant interest as a potential location for photovoltaic (PV) manufacturing facilities. The Columbia River Economic Development Council (CREDC) conducted a cost comparison to assess the County's competitiveness with other areas across the U.S.

Based on the expressed requirements of several PV manufacturing clients the CREDC developed a model representing a typical solar wafering facility (Table A). The selected cost factors are wage rates, utility costs, corporate taxes, and incentives. Using information provided by the U.S. Department of Labor, state and local governments, and applicable municipal utility rate schedules the relative cost of doing business was assessed.

Overall, Clark County ranks second in monthly utility estimates (Table B). Labor input costs within the County are among the lowest of all the municipalities for relevant occupations to the photovoltaic industry (Table C).

Only Washington and Texas do not levy a corporate income tax. The absence of a corporate income tax can substantially reduce a company's tax burden. Washington does have a Business and Occupation (B&O) tax levied on gross sales, and Texas imposes a franchise tax on all businesses (Table D). State incentives aimed at solar manufactures range from reduced tax rates to corporate tax credits. For example, Washington State offers a low B&O tax rate of 0.275%, Texas offers a franchise tax exemption, and Oregon extends up to a 50% state tax credit, to a maximum of \$20 million, for PV manufacturers. Only two states, Arizona and California, offer no incentives to solar manufacturers (Table E).

Ultimately, low labor costs, inexpensive water and competitively priced power make Clark County one of the lowest cost locations to maintain a photovoltaic manufacturing facility.



## Specifications For Typical Solar Wafer Fabs

### Power Requirements

- 5 MW demand for year 1, increasing to 12 MW in year 2
- 20 MW max load capacity for future expansion
- 94% load factor, 95% power factor
- Redundancy (Multi-feed, looped) – Reliability is paramount

### Water Requirements

- 200,000 gallons per day
- 3”- 4” meter

### Sewer Requirements

- 192,000 gallons per day
- Non-extra strength (No BOD, No COD, No SS)

### Facility Specs

- 200,000 SF building
- 400 FTE
- 24 hours a day operation

### Locations of comparison

- Clark County, WA
- Austin, TX
- Albuquerque, NM
- Phoenix, AZ
- Portland, OR
- Camarillo, CA
- Albany, NY

Table B



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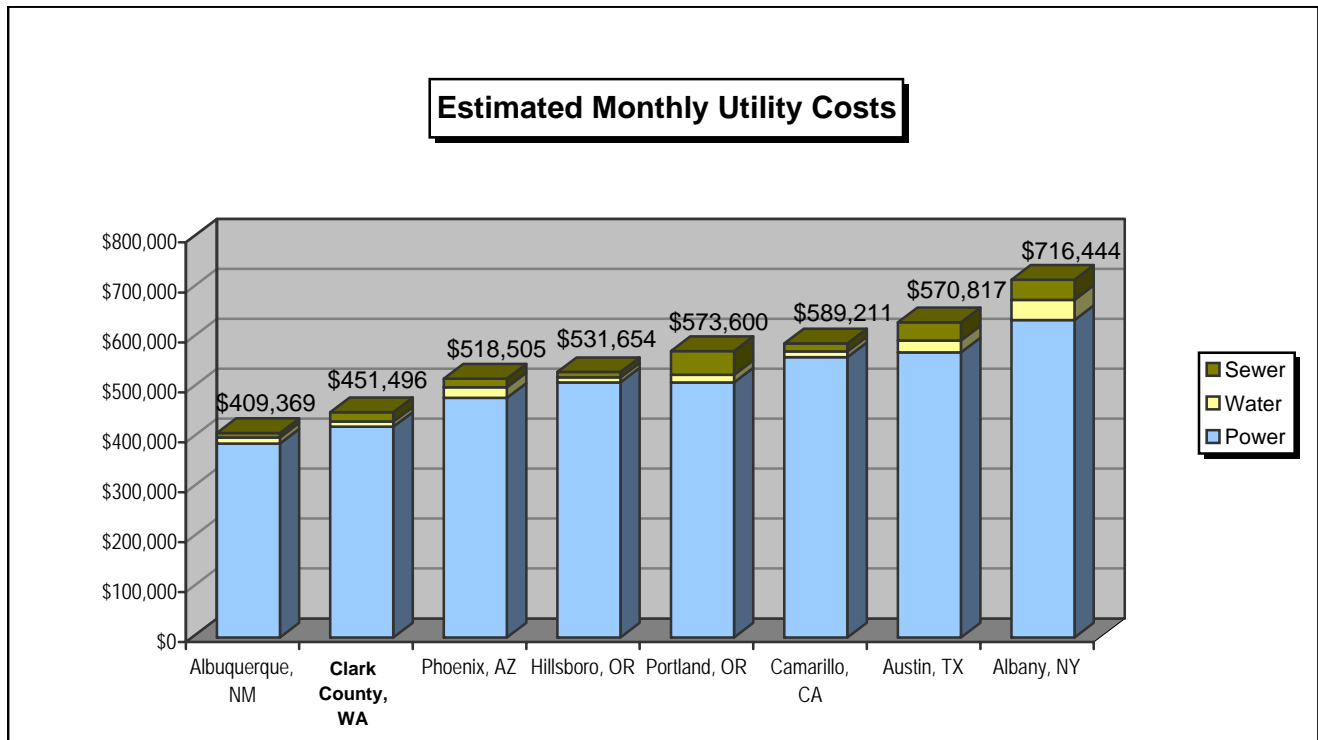
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## Comparative Utility Costs

### Facility Requirements

12,000 kW Demand; 8,234,400 kWh/month; 94% Load Factor; 95% Power Factor; 200,000 gallons/day Water; 192,000 gallons/day Sewer; 24 hours/day Operation

| Location                | Monthly             |                    |                    |                     |
|-------------------------|---------------------|--------------------|--------------------|---------------------|
|                         | Power               | Water              | Sewer              | Total               |
| Albuquerque, NM         | \$388,213.63        | \$12,593.86        | \$8,561.57         | \$409,369.06        |
| <b>Clark County, WA</b> | <b>\$422,119.20</b> | <b>\$10,242.92</b> | <b>\$19,134.09</b> | <b>\$451,496.21</b> |
| Phoenix, AZ             | \$480,079.74        | \$21,091.37        | \$17,333.97        | \$518,505.08        |
| Hillsboro, OR           | \$510,782.38        | \$10,026.49        | \$10,845.37        | \$531,654.24        |
| Portland, OR            | \$510,782.38        | \$15,127.01        | \$47,690.73        | \$573,600.12        |
| Camarillo, CA           | \$561,427.09        | \$11,421.44        | \$16,362.35        | \$589,210.88        |
| Austin, TX              | \$570,817.50        | \$23,863.55        | \$36,915.90        | \$631,596.95        |
| Albany, NY              | \$635,767.22        | \$40,338.68        | \$40,338.68        | \$716,444.58        |



Note: Utility costs are estimates only, and cannot be used to determine actual monthly utility charges.

Table C



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## Occupational Wages for Typical Job Classifications

|  | Clark County<br>WA  | Portland, OR | Phoenix AZ | Albuquerque<br>NM | Los Angeles<br>MSA | Austin TX | Albany<br>County NY |
|--|---------------------|--------------|------------|-------------------|--------------------|-----------|---------------------|
| Occupation Title                           | Average Hourly Wage |              |            |                   |                    |           |                     |
| Electrical Engineer                        | \$34.92             | \$37.07      | \$34.61    | \$40.80           | \$38.15            | \$34.56   | \$36.86             |
| Mechanical Engineer                        | \$38.52             | \$37.88      | \$37.06    | \$38.00           | \$40.17            | \$44.31   | \$39.86             |
| Electronic Equipment Assemblers            | \$12.90             | \$13.39      | \$13.47    | \$11.38           | \$11.95            | \$13.23   | \$17.50             |
| Inspectors, Testers, Sorters, and Weighers | \$16.37             | \$15.59      | \$14.45    | \$19.14           | \$14.74            | \$15.97   | \$16.66             |
| Semiconductor Processors                   | \$14.06             | \$15.85      | \$17.73    | \$16.73           | \$19.44            | \$18.15   | \$15.79             |

Sources: US. Bureau of Labor Statistics, WA Employment Security Department & Oregon Employment Department

Table D



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## Corporate Tax Structure Comparison

|   | Clark County, WA  | Austin, TX  | Phoenix, AZ   | Ventura County, CA   | Portland, OR  | Albuquerque, NM   | Albany, NY  |
|---|---|---|---|--|---|---|---|
| Corp Inc Tax                              | None  | None  | 6.97%   | 8.84%  | 6.60%   | up to 7.6%  | 7.50%   |
| Personal Inc Tax                          | None  | None  | up to 4.75%   | up to 9.3%   | up to 9.0%  | up to 5.3%  | up to 6.85%   |
| Other Business Taxes                      | B&O Tax - 0.275% on gross sales                                     | Franchise Tax - 1.0% net taxable surplus                            |   |  |   |   |   |
| Property Tax (per \$1,000 assessed value) | Average \$10.48   | Average \$21.60   | Average \$15.15   | Average \$10.3   | Average \$20.26   | \$40.245 on .33 of assessed value                                   | Average \$29.07   |
| Sales Tax                                 | State 6.5%, County 1.7%   | State 6.25%, Local up to 2%   | State 5.6%, Local up to 4%  | State 7.25%, Local up to 1.5%  | None  | State 5%, Local up to 2.813%  | State 4%, Local up to 5.5%  |
| Unemployment Insurance                    | Average 1.7% on the first \$34,000 in wages                         | Start 2.7% on the first \$9,000 in wages                            | Start 2% on the first \$7,000 in wages                              | California Unemployment has 3 separate taxes. 1) SUTA 1.5%-6.2% of the first \$7,000 of an employee's wages. 2) SDI 0.8% of wages up to \$86,698. 3) ETT 0.1% of the first \$7,000 in wages. | .9%-5.4% of the first \$30,200 of an employee's salary.   | Start 2% on the first \$19,000 in wages                             | Start 4.1% on the first \$8,500 in wages                            |
| Workers' Comp                             | Average rate: Electronic products mfg - .3133 cents per worker hour | Suggested rate: Electrical Apparatus mfg 9.59% per \$100 of payroll | Suggested rate: Electrical Apparatus mfg 2.43% per \$100 of payroll | Median Suggested rate: Electrical Apparatus mfg 7% per \$100 of payroll  | Workers' Compensation is broken down into 3 separate taxes. 1) Average rate: Electrical Apparatus mfg 2.73 per \$100 of wages paid. 2) 4.6% Premium Assessment fee of the annual total premium. 3) Workers Benefit Fund, paid to the state, 1.4 cents per worker hour worked paid by employees, and 1.4 cents per hour worked paid by employer. | Suggested rate: Electrical Apparatus mfg 6.24% per \$100 of payroll | Suggested rate: Electrical Apparatus mfg 3.96% per \$100 of payroll |



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Table E

## Applicable State Incentives For Solar Wafer Manufacturers

|                    | Arizona | California | Washington  | Texas   | Oregon  | New Mexico  | New York  |
|--------------------|---------|------------|---|---|---|---|---|
| <b>Incentive 1</b> | None    | None       | <b>Lower B&amp;O tax rate</b>   | <b>Franchise Tax exemption</b>  | <b>Business Energy Tax Credit (BETC)</b>  | <b>Advanced Energy Tax Credits</b>  | <b>Clean Energy Business Growth and Development</b>   |
|                    |         |            | Reduced B&O tax rate of 0.275% on gross sales   | A corporation in Texas engaged solely in the business of manufacturing, selling, or installing solar energy devices is exempted from the franchise tax. The franchise tax is Texas's equivalent to a corporate tax. | BETC offers a 50% tax credit, with a maximum credit of \$20 million. The tax credit is taken over five years: 10% each year. Any unused credit can be carried forward up to eight years. Under the pass-through option, a project owner may transfer a tax credit to a pass-through partner in return for a lump-sum cash payment (the net present value of the tax credit up to 35%) upon completion of the project. | Advanced energy facilities, such as solar thermal electric generating, advanced technology coal generating or recycled energy, may qualify for up to \$60 million in credits. The credit is equal to 6 percent of facility development and construction expenditures.   | This initiative is designed to help clean energy businesses achieve success, grow, and develop new markets through new or expanded activities within New York State. It will provide clean energy related business projects with grants totaling up to 50% of project cost with a maximum of \$200,000 per project.   |
| <b>Incentive 2</b> |         |            | <b>Sales and Use Tax PV Production Consumables</b>  |   |   | <b>Alternative Energy Product Manufacturers Tax Credit</b>  | <b>Renewable, Clean Energy, and Energy Efficient Product Manufacturing and Incentive Program</b>  |
|                    |         |            | Chemicals and gasses used in the production of photovoltaic materials are exempt from state Sales and Use tax |   |   | Manufacturers of electric or hybrid vehicles, fuel cell systems, renewable energy systems, IGCC systems, and carbon sequestration equipment may receive for a tax credit of up to 5 percent of their capital expenses. The credit may be applied against gross receipts, compensating, or withholding tax and may be carried forward for up to 5 years. | Project funding is broken down into three separate phases, each of which has different limitations. <b>Phase I</b> provides money for facility and site characterization activities. Funding in this phase is limited to \$75,000 and no more than 5% of the total funds requested. A 50% cost share is required for this phase. <b>Phase II</b> covers pre-production development subject to the proposer satisfying defined project milestones. No more than 20% of the total funds requested may be for pre-production development, up to a maximum of \$300,000. A 50% cost share is required for this phase. <b>Phase III</b> is a production incentive payment based on the sale of clean energy products produced at the facility. The remaining 75% of total funding is available for this phase, subject to a 75% cost share and a total funding limit of \$1.5 million per project. |