

ENERGY

TECHNOLOGY

SITTING BULL COLLEGE

POWER PLANT EMPLOYMENT

Power Plants produce electricity by drawing energy from resources such as: COAL, OIL, WIND, RADIOACTIVE ORE, WATER, SUN

Jobs of power plant workers vary from plant to plant depending on the type of fuel used and the age of the equipment.

Some jobs are typical to most plants:

BOILER OPERATORS: heat water until it becomes steam, which turns the turbine and generator to produce electricity

TURBINE OPERATORS: monitor the speed and temperature of the turbines, start and stop turbines

SWITCHBOARD OPERATORS: regulate voltage and the amount of electricity which flows out of the plant

AUXILIARY OPERATORS, ENTRY LEVEL OPERATORS, PLANT HELPERS: assist with equipment inspection, read gauges, meters, dials, etc.

Power Plants also employ other workers: Electricians, Engineers, Mechanics, I&C Techs., Lab Techs., Warehouse & Office, Fuel Handlers, etc.

TRAINING, QUALIFICATIONS, ADVANCEMENT

Plant Operators need a combination of Education, On-The-Job Training and Experience.

Candidates with strong mechanical, technical and computer skills are generally preferred.

Job seekers with college or vocational school degrees will have an advantages in finding a job and advancing in that job.

Workers selected for jobs in energy plants will undergo extensive on-the-job training and classroom instruction to become fully qualified.

Refresher courses and simulator training are offered to keep operator skills sharp and plant performance at its best.

Several states require employees to earn and maintain a license to operate energy plants. North Dakota does not require a license.

OTHER REQUIREMENTS

Energy company recruiters look for individuals with strong math and science backgrounds. Understanding math and electricity are important; workers learn many of these concepts in specialized training courses.

Workers should also be good at working with tools, have problem solving skills and the ability to figure out how things work.

Many companies require that prospective employees be tested to measure: Reading comprehension, understanding of mechanical concepts and mathematical ability.

After finishing work in the classroom, most entry-level workers start as helpers or laborers and advance to more responsible positions as they become more comfortable in the plant.

PLANT WORK ENVIRONMENT

Operators who work in the Control Room sit or stand at a control panel. The work is not physically strenuous but it requires constant attention.

Operators outside the control are can occasionally be exposed to hot temps., dusty atmospheres, loud noise. Safety equipment is provided and its proper use is required.

Because electricity is generated around the clock operators are required to work rotating shifts. One of three 8 hr. shifts or one of two 12 hr. shifts is required each day.

Shift work hours and days vary from plant to plant:

12 hr. days---4 days on, 4 days off or
7 days on, 7 days off or
10 days on, 10 days off

Work on rotating shifts can be stressful and fatiguing because of the changes in living and sleeping patterns.

EMPLOYMENT

Energy Industry: Approx. 700,000 employees in the nation in the power and process industries.

Job Prospects: Expected to be excellent because of the large number of retirements expected.

Renewable Energy: Approx. 200,000 direct jobs & 250,000 indirect jobs.

Job Prospects: Newly created jobs are expected to double the number of employees by 2025

Earnings: Median annual wages \$58,470 in 2008

Middle 50% earned between \$47,850 and \$68,250

DEVELOPING A WIND FARM

- * Site wind resource (min. average annual wind speed) 12mph
- * Existing transmission lines---How much infrastructure needs to be installed
- * Secure access to land---lease agreements, roads. Planning phase requires cooperation of landowners and local community
- * Establish necessary capital---\$2,000,000 per megawatt. Facility should be in excess of 20megawatts (13 turbines, \$40,000,000)
- * Reliable market or power purchaser---secure a committment from one or more buyers for approx. 20 yrs.
- *Siting a wind project: endangered or protected species
appropriate area for industrial development
sound and aesthetics may be issues
environmental and social issues
- * Energy economics---financing methods, state incentives
- * Zoning and permitting---complex social and environmental factors
- * Contact turbine manufacturers and project developers
- * Operation and maintenance agreements

WIND ENERGY 2030

20% OF ENERGY WILL BE SUPPLIED BY WIND POWER

800,000 JOBS WILL BE SUPPORTED BY WIND POWER

350,000 WORKERS DIRECTLY EMPLOYED BY THE WIND
INDUSTRY

\$1.5 BILLION INCREASE IN PROPERTY TAX REVENUES

\$600 MILLION INCREASE IN ANNUAL PAYMENTS TO RURAL
LANDOWNERS

Natural gas consumption would decrease 11%

Coal consumption would decrease 18%

25% reduction in CO2 emissions

17% reduction in electric power water usage

ENERGY TECHNOLOGY PROGRAM

- * Students prepare for entry level plant operator positions
- * Graduates qualify for employment in many energy related industries
- * Evening classes are offered at SBC. Students have computer program and research assignments in addition to classroom lecture
- * Graduates will receive an associate degree in Energy Technology. The program will be a combination of 47 technical and 27 general education credits.
- * There is currently an interest in SBC offering a Windsmith Program. This certificate program will prepare individuals for employment in future Wind Energy positions.
- * There are 4000 energy employees in this area of the country. 40-50% will be retiring in the near future-this opens up 2000 jobs, plus renewable energy may provide an additional 2000 positions.

WHAT'S NEW IN ENERGY

VEHICLES POWERED BY HYDROGEN

- * 30 to 80% increase in mileage over gasoline
- * Very clean fuel, only emission is water vapor
- * Hydrogen can be obtained from many sources:

- waste materials
- enzymes from wood chips and grass
- nitrogen-fixing bacteria
- manure
- water

BIOMASS: anything that grows can be used to produce energy

SOLAR CELLS: produced from tobacco plants (transform the plant cells)

SUPERCONDUCTORS: carry high voltage with no line loss

CO2 CAPTURE: info. similar to DNA is coded into synthetic crystals (400% increase in efficiency over current methods)