

# Topic 5

# Wind Energy Benefits



# Topic 5a: Economic Benefits

## Introduction

Wind energy has many benefits, most of which can be categorized as either economic or environmental. Many of the economic impacts affect the area where wind farms are located. Through the creation of new jobs and increased tax revenue, wind energy helps rural communities prosper.

## Job Creation

A large component of the creation of a wind farm is the amount of workers it takes to complete the project. During the development phase, wind farms need to be planned, sited and financed. This can affect numerous people and companies. Each wind farm typically creates construction jobs for 100-150 people. During the construction phase of the wind project, these workers:

- Build the access roads
- Lay the concrete for the turbine bases
- Transport the turbine pieces (tower sections, blades, nacelles, etc.)
- Operate heavy machinery (bulldozers, cranes, etc.)
- Build transmission lines and substations



After construction, approximately 10 people have full time jobs associated with the wind farm. These workers perform operation and maintenance procedures on the farm and the turbines.

## Tax Revenue

As the Weatherford Wind Energy Center took shape, the city of Weatherford saw numerous economic benefits. Mike Brown, Mayor of Weatherford, stated, “We’ve seen our sales tax increase by about 20% recently. We attribute part of that to the guys working in the town, the hotels being full, and having them eat at our restaurants.” Schools in these areas often benefit from the wind farm as well. The Weatherford school district received a check for \$140,000 from the wind developer in 2005. They have used this money for new playground equipment and security systems. The school will continue to receive this money until 2009.

## Landowner Payments

Just as many people have leased their land to the oil and gas industry, hosting pumps and derricks on their land, the same is happening with wind turbines. Landowners are paid to host turbines on their land. A wind developer will lease land for:

- Future wind development
- Wind resource assessments and monitoring
- Wind farm development.



A local landowner can make anywhere from \$3,000 - \$5,000 per turbine per year. In 2005, the estimated payments made to landowners in Woodward, OK from Florida Power & Light’s Oklahoma Wind Energy Center were \$290,000. This is a very large benefit to small communities and rural farmers.

# Topic 5a: Economic Benefits

## Teacher Discussion Questions

- 1.) Ask the students to discuss in what ways can wind power help stimulate the economy?
  - a. *Discuss the different scales of impact on the economies, e.g. locally, statewide, and nationwide.*
  - b. *Possible answers could be: tax revenues for local towns and communities; the state keeps money in state instead of sending it out to other states for sources of energy, for example, Oklahoma sends money to Wyoming for the coal resources we use; or that wind turbine manufacturing facilities can be relocated in a state and bring hundreds of jobs, another example, DMI Industries, a wind turbine tower manufacturer is locating a manufacturing plant in Tulsa.*



- 2.) If a farmer has 5,00 acres of land in windy, western Oklahoma, what benefits can he see on his land with wind power development?
  - a. *The farmer can lease his land to a wind development company and receive royalty payments for hosting wind turbines on his land. It is an opportunity for rural landowners to earn a second income.*



- 3.) What kinds of jobs would a wind farm create?
  - a. *Discuss what different types of jobs, e.g. construction, engineering, etc. will be created during the development and construction phase of the wind farm to the operations and maintenance phase.*



- 4.) Wind farms are being built in areas where the population is declining. When a wind farm is built, new jobs are created. How does this help the surrounding area?
  - a. *Discuss that with the creation of jobs, more people stay within the community and that allows for greater economic benefits, e.g. tax revenue for the town.*

# Topic 5b: Environmental Benefits

## Introduction

Wind power is a clean, renewable energy technology. It does not cause air or land pollution, it is renewable, and it does not consume water resources. Each of these benefits will be expanded on below.

## Air Pollution

Pollution from conventional power plants effects the air quality of the surrounding region and even contributes to global problems. Gases such as sulfur dioxide, nitrogen dioxide, and carbon dioxide along with particulate matter, mercury, and volatile organic compounds are the culprits. Carbon dioxide is the main greenhouse gas that is responsible for global warming. With the installation of more wind farms, less carbon is emitted. Global warming is responsible for increased global average temperatures and a myriad of other environmental impacts. Other gases, along with the particulate matter from coal fired power plants, can aggravate health conditions such as bronchitis, asthma, and even heart disease.



## Land Pollution

After the pollutants are released into the air from fossil fuel power plants, they eventually are brought back down to the earth in the form of acid rain or they simply settle to the ground. Acid rain damages buildings, kills plant life, and pollutes rivers and streams which in turn harm wildlife. Humans can sometimes ingest these polluted wildlife. For example, fish with high levels of mercury in them near a coal plant would be unhealthy for human consumption. Wind energy does not cause pollution that can harm humans.



## Renewable Resource

The wind is a renewable resource; so long as the sun continues to shine, the wind will continue to blow. Wind energy is a solution for a world that depends on limited supplies of coal and oil for our energy needs.

## Waterless Resource

Wind power also helps conserve water resources. Many power plants, such as coal or nuclear, use water to cool the plants down or to produce steam for the generators. Billions of gallons of water are used every year for this process. This water could otherwise be used for human consumption and use. Wind energy can bring electricity to arid areas without having to worry about water resources. This is convenient for those in Oklahoma, the dry southwest, and elsewhere.



## Topic 5b: Environmental Benefits

### Teacher Discussion Questions

- 1.) What do the students see as environmental benefits of wind power?
  - a. *They can list benefits such as: wind power is a clean resource, a renewable resource unlike oil and coal, and that wind power does not contribute to global warming.*
- 2.) How can wind energy help with global warming?
  - a. *Electricity generated from the wind does not emit carbon dioxide and other harmful gases into the atmosphere that coal power plants emit. Wind energy can reduce carbon emissions that cause global warming.*
- 3.) How can wind energy help decrease our dependence on foreign oil?
  - a. *A portion of the country's electricity that is produced from oil. This oil can be both foreign and domestic in origin. By installing more wind energy, some of the electricity produced by oil can be offset by the wind, therefore reducing our dependence on oil.*
- 4.) What environmental benefits do other renewable technologies have? e.g. solar power, geothermal power, hydroelectric energy.
  - a. *These renewable sources of energy share similar benefits as wind power. Much like the wind, these renewable resources listed above do not emit harmful pollutants and gases into the atmosphere. Solar and geothermal power harness energy that is renewable and plentiful.*
- 5.) How does wind power improve the health of Oklahomans and citizens nationwide?
  - a. *Dangerous pollutants such as sulfur dioxide, nitrogen dioxide, particulate matter, such as dust or volatile organic compounds can aggravate health conditions and cause citizens to be hospitalized. Different health conditions can range from bronchitis, asthma, and even heart disease. The wind energy that is being installed today is displacing these harmful pollutants that could have otherwise been released by a coal fired power plant.*

