Wind Power: Advantages

Category	Advantages
Environmental impact	- Wind energy is a renewable energy source, and will not run out like coal or gas. - There are almost no greenhouse gas emissions produced by wind power. - The damage or destruction of a wind turbine would not result in the massive evacuation of millions of people, nor cause a radiation leak like a nuclear power plant. The damage would likely be localised, and have a smaller impact on the nearby environment. - Wind power does not produce a long-term waste storage problem like nuclear power. - Wind power does not produce health problems. - There is little to no damage to the earth, as wind does not need to be mined or extracted. - There have been no reports that wind turbines kill birds. Most fly over or around the turbines. - Turbines have little to no impact on the wind speeds, humidity or rainfall in the local area.
Public opinion	- The majority of people in the USA and in Europe find wind turbines visually acceptable. - With careful design, noise levels can be kept low. - Wind turbines have little effect on navigational aids and audio signals.
Economics	- The energy payback period for wind turbines is only around half a year. This means that after a few months of producing energy, the turbines have already made the amount of money it cost to install them. - Wind is a free energy source, unlike coal or gas, which are extracted, bought and sold. Thus, the cost to use it as an energy source does not rise or fall with inflation. Countries cannot have a monopoly on the source, as wind exists everywhere. - Offshore wind turbines are more efficient than those on land. - Wind power technology has rapidly improved to the point where wind energy can produce electricity on a large-scale commercial basis. - Wind turbines are easier and more affordable to maintain and repair than large non-renewable power plants. - Wind energy systems could provide at least 20% of the UK's electricity needs. - Companies with a high power usage could have wind energy systems on their sites to power their own machinery.
Reliability	- Wind energy is, on a yearly average, very reliable for countries such as the US and the UK where wind is very common.

Created by Megan Phillips and Katie Dawson, University of Reading

	- Energy companies could be able to adapt to utilise the wind's variability (on a daily basis) in order to produce electricity. - Wind power can be combined with other forms of energy. For example, wind and solar power can be used together to balance out days when it is cloudy, or less windy.
Jobs	- It is estimated that there will be an increase of new job positions in the wind power industry. - The increase in employment may allow for the increase of consumption (buying goods). Not only would the increase in jobs, wages and consumerism be good for the general economy, it could also increase the opportunity for new jobs in other sectors. For instance, with an increase in consumerism, more jobs could be created to produce and sell the consumer goods.
Future opportunities	- Wind energy systems are promising for developing countries and countries that have already developed. - Countries with sparsely populated but windy coastal regions, such as Pakistan, could benefit from installing large wind energy farms on coastal strips.
Location and geography	- Rural communities might benefit from wind power the most, as they are often located in areas where conditions are favourable. Rural towns are less built up, and have more space to build the turbines. They also do not require as much energy as large cities. - Heating in rural villages might be provided using wind furnaces. Wind power produces enough energy to provide the amount of heat that the average person needs on a daily basis. - Wind turbines require less land than solar power for the same amount of energy to be produced. - Offshore wind turbines are ideal because stronger and persistent winds are more common at sea than on land. - The possibility that ice may form and then fly off the blades (causing a threat to people nearby) would be reduced by shutting down wind turbines during icy conditions. - It is possible to grow crops and allow farm animals to roam up to the base of the wind turbine, meaning that land use for wind energy is more efficient and versatile than other sources of energy. - When considering the UK, there is great potential for wind energy in the windy, shallow, offshore waters, especially along the east coast of England.

Wind Power: Disadvantages

Category	Disadvantages
Environmental impact	- Wind turbines may negatively impact the local wildlife. Birds have been injured after colliding with the blades, and in some cases, the turbines may scare away local birds, or alter their flight courses. Wind energy may not be the most popular source of energy for local wildlife enthusiasts.
Public opinion	- Some argue that wind turbines are visually undesirable. - The public may criticise offshore wind turbines if they obstruct private boats in recreational areas. - There may be restrictions on where and how many turbines can be constructed. For instance, regardless of efficiency, the turbines would have to remain outside shipping lanes and waters dedicated to other uses. - Wind turbines need to be located in areas that are exposed and unobstructed, and this often means that they are very visible. - Large groups of wind turbines may be unaesthetic, particularly in scenic or recreational areas. - Some turbines can be noisy, and may disturb local residents. - Wind turbines have been found to create television interference. - Public opinion is very important, for without public support, wind energy projects are less likely to proceed. Plans for wind energy projects may have to be altered if public opinion is strongly against their construction. - The concern over its visual impact has been largely responsible for the absence of any UK national wind energy programme, despite its promising economics.
Economics	- Industries are reluctant to invest in wind power until efficient energy storage solutions have been perfected to compensate for the wind's variability. - Without a global effort, the use of renewable energy in only a handful of countries would not be enough to reduce the impact of climate change. This means that many countries do not see it as economically worthwhile to invest in renewable energy, unless an international, collective effort was made. - Developing countries would be seeking to increase their levels of energy consumption to enjoy the same levels of luxury as developed countries. Thus, they may want to follow the same pattern of development as the developed countries, and this may include the construction of non-renewable power plants. - Wind turbines cost more in deeper waters, and further away offshore. Though there are stronger winds further offshore, the initial costs are far greater than onshore wind turbines.
Reliability	- Wind is variable, and just like most sources of renewable energy, changes daily depending on weather conditions.

Created by Megan Phillips and Katie Dawson, University of Reading

	- Wind power is less concentrated than, for instance, wave power, and is irregular. This creates the need for energy storage, and a back-up power supply.
Jobs	- With more jobs in the renewable energy sector, there could be a decline in the number of jobs in in the traditional sectors of energy production (non-renewable energy).
Future opportunities	
Location and geography	- Though not common, lightning strikes on wind turbines can cause the machinery to set fire. - Depending on their location, they may also be subject to earthquakes, and would need to be built to withstand these natural hazards. - It is possible that a blade, or a piece of the blade, may break off, or that ice may form and then be thrown off, creating a potential hazard. - Placing windmills on hills does have its issues. For example, due to the location on the summit, they are limited for space. There is also a need to construct a road for access from the hill top to the nearest existing road, and this is usually quite long. Furthermore, the windmills' power output needs to be transmitted to the nearest existing electricity system. The cost of both the access road and transmission will usually exceed the cost of the windmill itself.