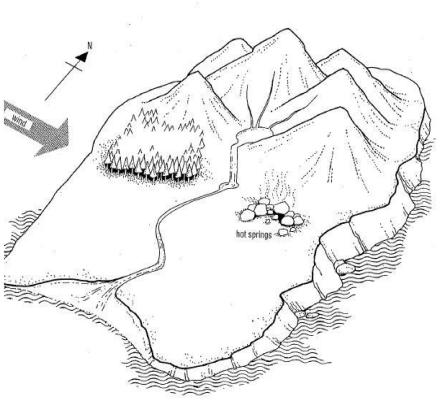
% Joule island



Joule island is a remote island located in the pacific, this island is a site of a three-year project involving a team of thirty scientists who will be staying there. I will be planning for the energy needs of the team, because the island is isolated the scientists need to be self-reliant as they cannot be expected to be supplied on a regular basis. I will also be analysing the effect of energy production on the local environment and try to ensure that the team has a minimal impact. On the island there will be not fossil fuels allowed as it all must be sustainable.

In this project I will need to do the following: select the energy source energy source which will have the lowest impact on the environment, Evaluate the environmental impact that each energy production option has on the local environment, to consider the different available energy types and to plan and assess for energy needs of the 30 scientists who will be staying there for three years.

as the energy source has to be sustainable there will be no fossil fuels allowed, so there are 6 types of energy sources that could be reliable. But there are 4 that I think would work the best on the island and ensure that the scientist have no problem with the energy. These are:

Wave energy:

Wave power is produced by the up and down motion of floating devices placed on the surface of the ocean. In other words, wind produces waves, and then waves produce energy. As the waves travel across the ocean, high-tech devices capture the movements of ocean currents and the flow of waves to generate power. The advantages of using wave energy are that waves do not cost money and they will never run out, so the money goes into building the power station and that there are not many safety risks with wave power generation. But there are also a few disadvantages such as they may not always be able to generate energy as waves can be big or small, I will need to figure out a way to transport the energy from the see to land and that as not many people have tried to generate energy this way the equipment may be expensive.

Wind energy:

When wind blows past a wind turbine, its blades take in the wind's kinetic energy and it turns around, turning it into mechanical energy, this rotation turns an internal shaft connected to a gearbox, which speeds the rotation by a factor of 100. That spins a generator that produces electricity. One of the advantages of using

wind energy is that wind is free, and it will never run out so instead of paying the cost of the wind the money can be spent on building the best wind turbines and also there are very few safety risks when you use wind turbines. But there are also a few disadvantages, such as wind turbines can only be placed somewhere that has a lot of wind or they won't be effective, some days there may not be wind so there would have to be a backup energy source, there would have to be multiple turbines and many people do not like the way the look and say they spoil the view.

Tidal:

Tidal energy is made by the movement of tides and oceans, when the water from the rise and fall of tides is a form of kinetic energy. Tidal power surrounds gravitational hydropower, and that uses the movement if the water to move the turbines and make energy. The advantages of tidal energy are that the tides are free once the power station is built and they will not run out and that we know the exact time that tides happen so we know when electricity will be produced. The disadvantages of tidal energy are that you may need to build a dam which is expensive, the tides only happen twice a day so electricity can only be produced at those times and it may not be good for animals who live nearby.

Geothermal Energy:

Hot water is pumped from underground under high pressure. When the water reaches the surface, the pressure decreases, which can make the water turn to steam. The steam spins a turbine, which connects to a generator and then produces energy. Disadvantages for geothermal energy are that they can be difficult to control and they can occasionally produce harmful gases. But they advantages are that the energy is free and won't run out and does not produce greenhouse gases.

Solar energy:

Solar technologies change sunlight into electrical energy either through photovoltaic panels or through mirrors that concentrate solar radiation. This energy can be used to make electricity or be stored in batteries or thermal storage. The advantages of solar energy are that the energy from the sun is free and that the sun will always be there during our lifetime. The disadvantages include that it is relatively expensive to build a solar power station, that if it is cloudy or in is night-time there is not enough light so the electricity cannot be made, and some people do not like the look of solar panels.

Energy sources	How many	location	Building cost ($ million)	Running cost ($ million)	Average power output in summer (MW)	Average power output in winter (MW)
Wind power	2	West coast	150	10	10	20
Tidal	1	ocean	100	15	20	20
solar	1	South east plain/ flat land	125	10	7.5	5
Geothermal	1	Hot springs	50	5	3	3
Total	5		425	40	30.5	38

I have put the wind turbines on the west coast of the island because this is the place where there is most wind and if I put it in the mountains the mountains would block the wind. I have put the tidal system is here because it is by the shore making it the best and easiest place to build. The solar panels were placed in the south east as it is on flat clear open ground. I put the geothermal energy source on the hot springs because it was a good heating source.

Conclusion:

In conclusion, I think that I choose a good balance of sustainable energy sources. Of course, there is no such thing as the flawless energy source because all of them have their advantages and disadvantages some more than others that is why we removed energy sources that produce fossil fuels as we want to keep the beautiful island in its natural form and not damage it.

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