

Tidal Power and Solar Roads: Clean Energy Solutions For a Country Going Green

Of all the countries in the world, China is the top carbon emitter. In fact, it emits 28% of all carbon emissions, which is why I would go to China to address the problems of carbon emissions as well as their effect on global health (UCSUSA). In addition to being the top carbon emitter, China's main source of emissions is in manufacturing, which presents the problem: how do we make manufacturing clean? (ChinaPower). Manufacturing uses huge amounts of energy to produce the things people use every day, and if the energy used is created by non-renewable power sources, the global effects can be severe. Even China's non-manufacturing emissions, such as vehicles, still rely on energy to function, meaning that even if China were able to transfer all vehicles to electric, the electricity required to run those vehicles would still be producing a carbon footprint.

This carbon footprint presents a problem to global health, particularly because the majority of China's energy is produced by coal-fired power plants, a pattern which is expected to continue through 2040 (IEA). These coal-fired power plants can produce "hazardous air pollutants," which can cause health problems such as heart and lung diseases (Tox Town). Some pollutants released by coal-fired power plants can also affect learning, memory, behavior, and harm the brain, as well as cause asthma and breathing disorders (UCSUSA). Therefore, to pursue a healthier and more environmentally friendly country, China will have to find an energy source that is both renewable and safe for the people who live around it.

To find a way to create this clean renewable energy, it is important to research multiple solutions, so as to be sure that we can overcome climate change and all of its effects. The two options that seem most likely to work are tidal power plants and solar panel roads. The Chinese

coastline stretches for 14,500 kilometers, or 9009.8 miles (Baker). The water is affected every day by tides, just like it is across the globe, and tidal power is a way to take advantage of the energy created by tides (National Geographic). Each tidal power plant requires at least 7 square miles of water to produce enough energy, and each plant could produce an estimated 450 terawatt hours, also known as TWh, of electricity (Ocean Energy Council). Last year, in 2018, China used 6840 TWh (Statista). This means that 15.2 tidal power plants would have been necessary to power all of China last year; however, it is to be expected that power needs will continue to increase before they can be reduced, so I would estimate 17 tidal power plants would be able to run China. Therefore, 119 miles of Chinese water would be taken up with tidal power. This still leaves 8890 miles of coastline to be used for marine life, fishing, and other purposes. However, the importance of pursuing multiple options should be kept in mind, so the best course of action would be to invest in researching tidal power plants, then build 8-10 of them, which would leave 8952-8939 miles of undisturbed coastline.

The other energy option that would reduce or completely dissolve use of non-renewable energy, is solar panel paved roads. Solar roads have begun to be installed around China, and I believe it is important that this continues to happen. Currently, solar roads cost \$120 per square meter and produce \$15 of electricity per meter. In addition to this cost, they would need to be repaired more often than pavement, but would pay for itself within 15 years. Although solar roads do not produce as much energy as regular solar panels can, they provide a way to maximize space and produce energy where previously there were only cars (Bradsher). This type of energy production is especially relevant for China, because of the 813.47 million people living in urban areas in 2017, about 1.4 times the amount of people living in rural areas. This number

has increased steadily since 2007 and means that as China urbanizes, land becomes more and more of a commodity (Statistica). Because of this, the cost of land will increase, making it more and more expensive to use solar farms to produce energy (Huifeng). Because solar roads take up no real-estate space, solar roads are one of the best options to create renewable energy that can then be used to replace coal produced energy and therefore reduce harmful pollutants in the air (Bradsher). And, although solar paneled roads are expensive, China put 126.6 billion dollars into renewable energy back in 2017, and would most likely be willing to invest in an option that could help save the land, air quality, health of its people (Smith).

Overall, I think that to create a solution to global health, we first need to address the core problem of climate change, which would include reducing our carbon emissions. To reduce carbon emissions, we would need to find a clean way to produce energy, so that factories and cars could be run by clean energy. I would choose China to be the focus of this, and invest in tidal power and solar roads. I would choose the former to provide a constant source of energy, and the latter to maximize space. Through a combination of these two methods, I believe China could become the first country to use fully renewable energy, and lead the way in defeating climate change and its accompanying problems.

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