

The Case for Nuclear Energy and its role in a low carbon future

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Nuclear energy- The two most controversial words amongst environmentalists. For some people, it elicits memories of the disasters at Three Mile Island, Chernobyl, and Fukushima. For others, it elicits a hope for a carbon neutral future. [Nuclear energy emits the lowest amount of carbon emissions for an exceptionally low price compared to fossil fuels or even traditional renewable sources such as solar and wind energy.](#) However, the previous disasters and concerns over nuclear waste rightfully bring up concerns over safety. What is the path for nuclear energy and what role should it play in the energy transition away from fossil fuels? There is a case for utilizing nuclear energy alongside other renewable sources to take advantage of the benefits while not being fully dependent on it. This should not be a debate about whether nuclear is to replace solar and wind, but rather the rate at which nuclear should be developed to replace fossil fuels.

The biggest selling point of nuclear energy is that it can serve as a major source where hydroelectric energy and geothermal energy are not able to provide affordable renewable energy at a large scale. Hydroelectric and geothermal energy are pitched as cost-effective and renewable alternatives to fossil fuels. As an Oregonian, I am aware of our comparatively cheap electricity compared to the national average, although PGE and PacifiCorp have not been the best distributors and are the biggest barriers to a regional public utility commission for Portlanders. However, when [comparing our rates to those in New York and Texas](#), for example, which rely on [coal](#) and [natural gas](#) to generate much of their electricity, our rates are much lower than theirs. Oregon is lucky to have the Columbia River and other tributaries in its basin that can provide smaller dams. However, areas without access to larger rivers may encounter more problems for developing hydroelectric power.

At the same time, if we are to transition our cooking, heating, and transportation systems away from oil and gas, we will be required to generate a lot more electricity, and we cannot rely on building more dams in all cases. If we are to transition toward electric cars or even electric trains powered through overhead cables, we will be required to generate more electricity, and for a carbon neutral future, nuclear will serve as a cost-effective alternative to natural gas-fired power plants for electricity generation. Solar and wind's success is mostly due to both sources being less expensive than coal and cleaner as well, the same features to which natural gas owed its success. If solar and wind power can effectively replace coal consumption, it will be much easier for nuclear, hydroelectric, and geothermal energy to replace oil and gas consumption.

We also must remember that while many large dams in Oregon have installed fish ladders and fish hatcheries to ensure a stable fish population and ensure fishing access for indigenous people who value fish as being central to their culture, there are disputes regarding smaller dams. The Bureau of Reclamation was [required to destroy the Chiloquin Dam](#) in Oregon that threatened the fish population. This was a result of pressure by many tribal governments that led to the Bureau of Reclamation taking over the dam and destroying it. Thankfully, some water rights have been secured, and [some issues have been resolved](#) among the respective federal, state, provincial, and tribal governments in the Columbia River Watershed. However, water rights are always a contentious matter. Therefore, it is impossible to rely solely upon hydropower.

There are luckily examples of nuclear power's success in practice. In the Asia-Pacific Region, the greater regional economy has been characterized as one of the fastest-growing economies. At the same time, while the region has expectedly increased its carbon footprint, the [large-scale development of nuclear power has resulted in a lower carbon footprint](#) than what the region would otherwise have if they chose to use more coal, oil, and gas. Simply put, nuclear energy has allowed the region to experience economic growth without sacrificing sustainability as much as it otherwise would, and for a low price.

The biggest concern, is of course, the valid grievances from earlier disasters. Chernobyl, Fukushima, and Three Mile Island were all the result of technological problems and a lack of modernization, and the plants were incredibly old as well. Similarly, in the aftermath, many people [distrusted the authorities and accused them of negligence and mismanagement](#). This will require governments to regain the trust of the public regarding nuclear energy. The authorities must consult various subject matter experts to ensure all concerns and potential problems are addressed. Similarly, the government must effectively involve all stakeholders to ensure not only a beneficial recovery process but a sustainable development process that mitigates potential problems. Simultaneously, the development of nuclear energy will be required to have systems to identify potential problems before they result in a potential disaster like the ones previously mentioned.

Nuclear safety is also a major concern, particularly regarding storage and potential accidental emissions and waste. [Strategic plans will be required to be developed to handle nuclear waste](#). The previous practice of storing nuclear waste in geological formations is not the most ideal. However, newer technologies such as nuclear recycling are beginning to address this problem, and the concerns regarding oil superfund sites are becoming a much larger concern with more potential risks than nuclear waste.

An example of effective nuclear safety policy in action is [China's regulatory process](#) regarding nuclear energy. They have developed strong institutions with a process based on clear rules and evidence-based practices rather than adhering to the NEPA model that relies on lawsuits and a vague environmental review process. China focuses on making nuclear safety its top priority. This combination of strong regulatory institutions and evidence-based processes that focus less on a vague interpretation of environmental law have proven to be effective in both ensuring safety and enabling development of nuclear energy on a large scale.

We are all aware of the concerns of “three-eyed fish in the river.” For those of us in younger generations, we may be more open to nuclear energy, but our parents were part of the generation that witnessed the worst nuclear power plant failures, whether sudden or gradual. This is reflected in how shows like *The Simpsons* portrayed Homer Simpson, a nuclear power plant operator, and notoriously stupid and lazy man known for his “weaponized incompetence” at home, as falling asleep on the job. This was such a problem that there would be “three-eyed fish” in the river after the nearby river was contaminated because of Homer sleeping on the job. When I voiced openness to nuclear energy, naturally, my mom’s first concern was “Well, are we gonna get Homer Simpson falling asleep on the job and then have three-eyed fish in the river?” with her typical snark. However, even she is less hostile to nuclear energy now after hearing about recent success.

As a society, we must acknowledge the concerns regarding nuclear safety and previous institutional failures, but we need to carefully consider all the evidence and not allow our “gut” and “knee jerk” reaction to write off all the potential of nuclear energy. It will be required to play a role in the energy transition unless we want to avoid reducing emissions or be required to reduce our standard of living. Everyone wants to maintain their standard of living and is simultaneously concerned about climate change, and nuclear energy provides a path forward to prevent and mitigate the severity of climate change and reduce carbon emissions while maintaining our standard of living.