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## **Please see attached comment**

As a resident of Cambria, California, I am a stakeholder in what happens in and around our Central California Coast. I am a veterinarian, hiker, wildlife watcher, photographer and admirer of nature with all her intricate and delicate food webs and interconnections frequently ignored by people who do not understand the delicate balance of habitat health, species biodiversity and the human destruction thereof. Along with many other residents, many of whom you will not hear from directly because they don't speak "human", I am deeply concerned that you are even considering our coast as a location for wind farms. I appreciate the idea of moving away from oil and gas energy as detrimental as they are to our environment, but moving forward with wind here is not only short-sighted but also environmentally detrimental to all species living near and beyond our coast. Our veterinary credo is "above all do no harm" so with the delicate balance of our wildlife and coastal habitat already deteriorating, wind farms would not only be harmful, but unscientific and ecologically disastrous. We are in the 6th extinction crisis, it is anthropogenic and according to the IPBES report, 66% of marine and 75% of terrestrial ecosystems have already been lost and OSW would only degrade the few remaining! Given that at least 34 marine species and 180 shore and seabirds depend on our coast to survive, we must not cause further harm. Our Blue, Fin, Sei, Gray, Humpback, Sperm, Right and Orca whales are already endangered or threatened so we must protect them on our shared coast which is the migratory path for all these species! California's coastal ecosystem has already lost 90% of our wetlands mostly due to "development". We must protect what little we have left, not only for the species who live and migrate here, but for the people and environment dependent on this area. Placing OSW between 2 marine sanctuaries in spite of all the documentation regarding their detrimental effects is nonsensical. Healthy ecosystems depend on delicate food webs with biodiverse interconnections ignored by many humans, and it is imperative that the California Energy Commission (CAC) NOT ignore the facts about these wind farms.

This massively destructive project would exacerbate the damage already done and continuing to be done by offshore oil and gas drilling, ships, unsustainable fishing, nets, lines and other gear left behind that trap and kill, plastic, toxins from agricultural runoff, warmer ocean temperatures, oceanic acidification and oxygen depletion habitat loss and degradation, pollution, and climate change. Individually, these human caused detriments are injurious enough, cumulatively, they are severely destructive, and you are actually considering adding wind farms to our/their already dangerous, toxic and competitive home? The PEIS needs to evaluate all of the effects on these animals, ecosystems and biodiversity in a cumulative fashion prior to committing further predictable harm. Implementation of this massive project without observational studies demonstrating short- and long-term hydrodynamic effects and their impacts on ecosystems in and around our coast would be extremely anti-scientific, unsafe and

unwise. The harm caused by wind farms would also extend way beyond our coast. Per NOAA "The second UME began in January 2019 and continues Gray whales continue to face an array of other threats, including entanglement in fishing gear, collisions with ships, and disturbance from underwater ocean noise." Gray Whales in the Eastern North Pacific | NOAA Fisheries. Doing no harm would be reducing oceanic noise, permitting fewer ships and forcing them to reduce their speed, not increasing both via OSW.

Studies should also include OSW effects under NEPA both short and long term well beyond the lease areas prior to any PEIS because you cannot state the environmental impact until you have conducted the research! These studies should include effects on seafloor environments and nutrient upwelling, ocean currents and their speed, terrestrial and marine species numbers and health, migration patterns, with an emphasis on the animals dependent on electromagnetism for guidance, species (all the birds, fish, plankton, mammals) ability to survive this invasion of their home and migration paths.

As noted by Peter Evans et al. "some wind farm related concerns for marine mammals include the intense noise during piling-driving, drilling and dredging operations, increased vessel activities during exploration, construction and maintenance operations, increased turbidity and re-suspension of polluted sediments due to construction, physical decommissioning of the wind farms might involve the use of explosives, the presence of structures (including artificial reef effects causing habitat alterations) and potentially, changes to prey and food webs, continual operational noise and vibrations emanating from the wind turbines, electromagnetic impacts due to cabling that may impact navigation (this may be of particular concern for elasmobranch-Gill & Taylor, 2001), and changes in fish behavior.

All of the afore mentioned detrimental impacts are "foreseeable activities" and therefore should be enough for CEC to halt wind farm consideration on our coast. All life is interdependent and harming marine life, harms us as well. Just a "small" example of how important healthy marine ecosystems are for humans, "phytoplankton is the fuel on which marine ecosystems run. A decline of phytoplankton affects everything up the food chain, including humans," according to Daniel Boyce. "Phytoplankton has decreased 40% since 1950 due to rising ocean temperatures.

Once the studies have been completed, they need to be published so we can all see the results and consider whether it provides more benefits or detriments. Indigenous communities deserve to be included because The Chumash were already shortchanged by only receiving 5,600 acres instead of the 7,600 acres they and we deserved. OSW would be damaging to the animals and habitat in this sanctuary and well beyond. Olivia Rosane wrote "The study authors modeled what would happen if all capacity announced as of 2015 were installed, which amounted to 120 GW by 2037. Specifically, they looked at the impact of the atmospheric disturbance caused by the wind turbines on the water below and the building blocks of the marine food web: nutrients,

phytoplankton, zooplankton and sediment biomass, according to the press release. "Our results show that the extensive expansion of offshore wind farms will have a significant impact on the structuring of marine coastal ecosystems," study co-author Ute Daewel said in a press release. "We need to better understand these impacts quickly and also take them into account in the management of coastal ecosystems." The few estuaries remaining are nurseries for many ocean animals providing critical habitat for endangered and threatened species. Estuaries protect our communities from flooding, improve our water quality and reduce the impacts of climate change by sequestering carbon dioxide. We here on the coast depend on these positive environmental effects for our own health and safety. It is vital the CEC understand the interdependent nature of our ecosystem and that we cannot afford further degradation of our water, land, air and the species who contribute to maintaining that balance that we humans take for granted.

One of our favorite animals depends on estuaries to survive: our southern sea otter who flourished along our coast until they were nearly extirpated by fur hunters. Sea otters are still recovering but only because they are protected, and people are becoming more responsible for their actions. I noticed that you failed to mention the detrimental impact OSW would have on our sea otters who are the foremost tourist attraction in Morro Bay as well as a vital keystone species. According to NOAA "Overgrazing by fish and sea urchins is a particularly large problem for kelp forests. Predators such as sea otters and sea stars typically keep populations of urchins and grazing fishes in check; this keeps the numbers of urchins and fish in balance, so they don't mow down entire kelp forests. However, recent declines in otters and sea stars on the West Coast have led to an explosion in the number of urchins, which is bad news for kelp forests as they face increased grazing."

Elkhorn Slough is an amazing place, but wind farms would destroy this vital habitat for otters and other species. We know that kelp forests are vital living entities and even NOAA states: "Unfortunately, kelp forests today face a variety of threats, such as commercial kelp harvesting, pollution, and climate change, which exacerbates El Niño southern oscillation (ENSO) events and negatively impacts kelp reproduction and survival."

It is also noteworthy that you are pushing for floating cabling and sub-station technology to use in this deep ocean WITHOUT RESEARCH ON THE ENVIRONMENTAL IMPACT THE VERY HIGH-LEVEL EMF WOULD HAVE ON MARINE LIFE! Prudence and intelligence use caution: please don't continue to push technology that is untested in part because it is not even commercially available yet. The PEIS needs to evaluate all of the effects on these animals, ecosystems and biodiversity in a cumulative fashion prior to committing further predictable harm.

Unfortunately, more whales have been dying on our coast and magnetic fields produced by OSW would disrupt their sonar and increase their mortality. Solar Storms and Magnetic Field: New research suggests that solar storms, which disrupt the Earth's magnetic field, may interfere with gray whales' internal GPS. This interference could cause them to strand on beaches and ultimately lead to their deaths.

Europe and our own East Coast have OSW and we can learn from their mistakes. The

CEC needs to analyze the results from existing OSW prior to implementation of wind on our shores. The National Academies of Sciences and other current best available science and data are vital to acquire unbiased reviews and outcomes. CEC needs to utilize the global impacts of OSW by the United Kingdom's Plymouth Marine Laboratory (Szostek, 2023) to not only avoid unnecessary harm and destruction, but to demonstrate that CEC is a responsible entity; unless you learn from other's mistakes, you can't be trusted to move forward at all.

SEER, United States Offshore Wind Synthesis of Environmental Effects Research report is clearly applicable, accessible (9) and a prerequisite for PEIS.

“According to the International Union for Conservation of Nature (IUCN) Red List of Threatened Species the world's most comprehensive inventory of the global conservation status of biological species at least 37% of the world's sharks and rays, 33% of reef corals, 26% of mammals (including marine) and 21% of reptiles are threatened with extinction. Many of these species live in oceans and marine environments, but overfishing, habitat loss and degradation, pollution, as well as climate change, have plagued many animals to the brink of extinction.” 11 of the Most Endangered Species in the Ocean in 2024 | Earth.Org

. We have the power to reverse our destructive behavior; NOT placing wind farms on our coast would be the intelligent, logical, and responsible action.

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Your “community benefits agreement” is insulting and beyond reasonable comprehension. Do you honestly think that “buying off parties”, bribery for destruction of irreplaceable wildlife and marine habitat is a proper way to demonstrate democracy and conduct business?!

Our Central California Coast is beautiful, and we love it. We share it with many amazing creatures in wonderful habits, but our coast is fractured, vulnerable, delicate and in need of protection, not further destruction by CEC and OSW projects. We do not want to be industrialized like so much of the rest of the California Coast. There would need to be a maintenance and operations base; I imagine you intend to destroy OUR Morro Bay HARBOR THAT WE ENJOY AND RESPECT FOR FISHING, TOURISM, WILDLIFE WATCHING AND OTHER RECREATION AS YOU DREDGE, “DESTRUCT” AND STORE EQUIPMENT ON OUR IRREPLACEABLE BEACH AND WETLANDS. Please do your due diligence by reading and considering all of the materials,

researching and reviewing best current scientific data and considering the fact that we live here in a fragile, delicate balance with the few remaining animals and sanctuaries that are not only homes to these amazing creatures, but sanctuaries for those who reside here as well as all the tourists who come to admire what we MUST preserve. We must be responsible for our actions in and out of our own homes and communities given we all share this one planet, human or not.

Sincerely,  
Dr. Allyson Dallmann

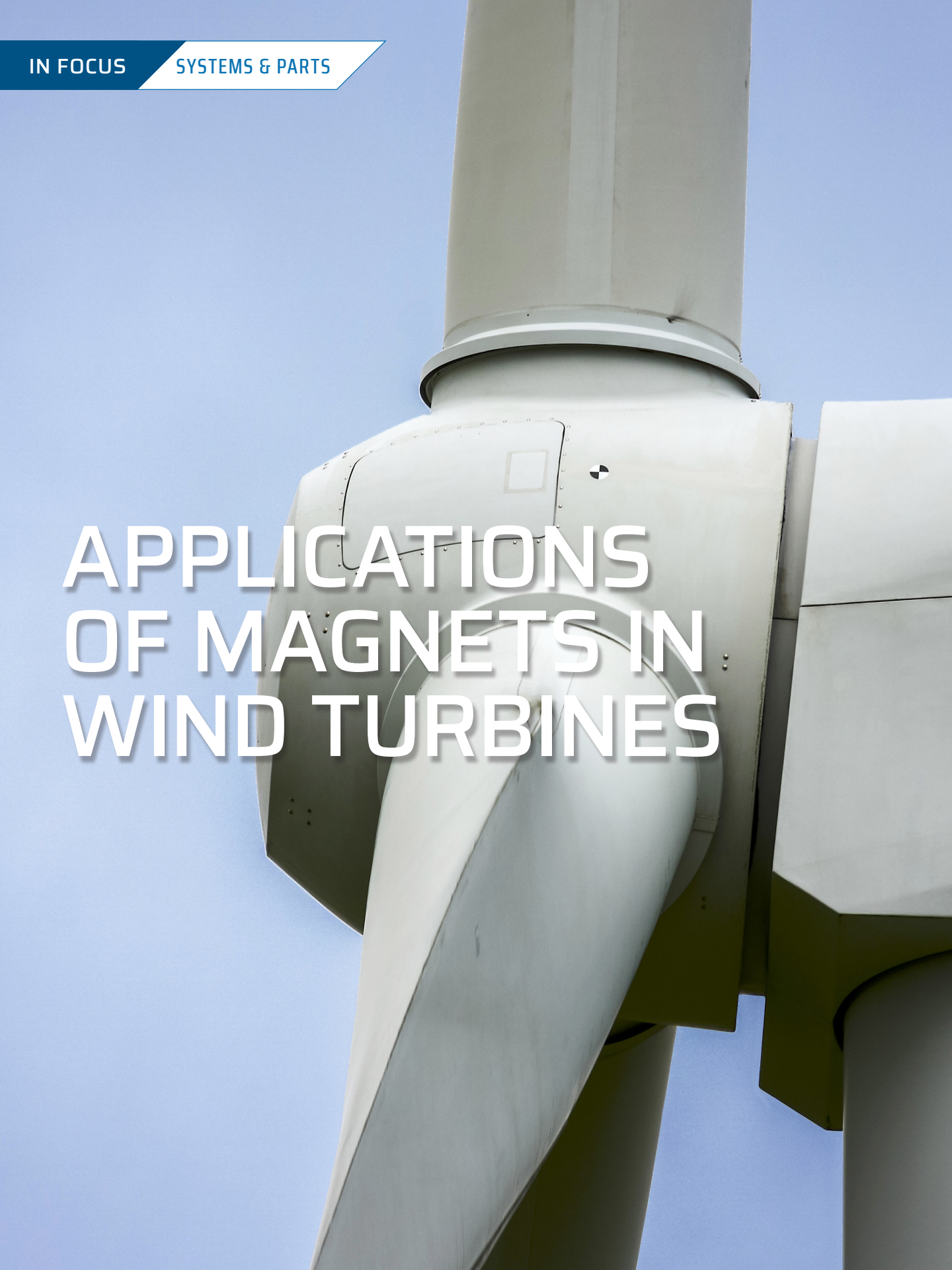
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11 of the Most Endangered Species in the Ocean in 2024 | Earth.Org

*Additional submitted attachment is included below.*

# APPLICATIONS OF MAGNETS IN WIND TURBINES

A close-up, low-angle shot of a white wind turbine nacelle and blades against a clear blue sky. The nacelle is the central housing for the generator and gearbox, and the blades are the large, aerodynamic structures that capture the wind's energy. The image is used as a background for a technical document.



*Magnets are being used to lower costs, improve reliability, and increase maintenance intervals in many wind farms around the world.*

By DAVID PIPER and JUDITH M. GUIDO

**P**ermanent magnets play a critical role in some of the world's largest wind turbines. Rare earth magnets, such as powerful neodymium-iron-boron magnets, have been used in some wind-turbine designs to lower costs, improve reliability, and reduce the need for expensive and ongoing maintenance.

## WIND TURBINE GENERATORS

In 1831, Michael Faraday created the first electromagnetic generator. He discovered that an electric current can be created in a conductor when it is moved through a magnetic field. Nearly 200 years later, magnets and magnetic fields continue to play an integral role in modern electric power generation. Engineers continue to build upon Faraday's inventions, with new designs to solve 21st century problems.

Some utility scale wind-turbine designs use induction generators to produce electricity. Induction generators use electromagnets designed into a rotor assembly to create a magnetic field. These electromagnets take a small amount of current from the power system to generate a magnetic field in the rotor, which is then rotated within the generator near stationary coils of wire. This rotating magnetic field induces a large current in the stationary coils of wire, which can then be used to power homes, schools, and businesses.

This design typically requires slip rings to power the electromagnets and a gearbox to convert the low rotational speed of a turbine shaft to the higher speeds that induction generators require in order to produce electricity. These gearboxes can be massive, typically weighing between 15 and 80 tons. The added weight of a gearbox requires designers to build stronger (and more expensive) towers. Gearboxes also require ongoing periodic maintenance, which can be challenging in certain applications, such as offshore windfarms. In addition, gearboxes cause friction losses and reduce overall efficiency.

A permanent magnet synchronous generator is an alternate type of wind-turbine generator. Unlike induction generators, these generators use the magnetic field of strong rare-earth magnets instead of electromagnets. They do not require slip rings or an external power source to create a magnetic field. They can be operated at lower speeds, which allows them to be powered by the turbine shaft directly and, therefore, do not require a gearbox. This reduces the weight of the wind-turbine nacelle and means towers can be produced at a lower cost. The elimination of the gearbox results in improved reliability, lowered maintenance costs, and improved efficiency. The ability of magnets to allow designers to remove mechanical gearboxes from wind turbines is illustrative of how magnets can be used innovatively in solving both operational and economic problems in modern wind turbines.

## MAGNETIC MOUNTING SOLUTIONS FOR LADDERS AND OTHER EQUIPMENT

The interior of a wind turbine is filled with cables, ladders, and sometimes elevators to allow workers to access the turbine nacelle. This equipment must be secured to the wall of the tower. The traditional solution to this problem was to either drill holes for mounting brackets through the tower wall or to weld brackets directly to the tower. However, drilling holes through the tower wall reduces its mechanical strength and creates opportunities for metal fatigue and corrosion, which can sacrifice the integrity and safety of the tower. Welding brackets directly to the tower requires skilled labor. Both solutions increase overall construction time and cost.

Some wind-turbine manufacturers have developed magnetic mounting systems that securely attach ladders and other equipment to the steel tower walls. This method allows equipment to be secured to the tower without the need to drill holes or weld brackets to the tower walls. This progressive mounting solution reduces construction time and costs without causing opportunities for either metal fatigue or corrosion and is yet another illustration of how magnets can be used effectively in solving operational and financial constraints in modern wind turbines. The use of several strong neodymium magnets strategically placed along the entire length of the ladder increases worker safety by securing the ladder in a manner that prevents swaying or other lateral movement that could cause a worker to slip and fall, causing physical harm to individuals as well as operational and financial harm to the company and industry at large.

## SUSTAINABILITY AND GROWTH OF WIND ENERGY AS A RENEWABLE RESOURCE

Wind energy is among the fastest growing sources of energy in the utility sector today. U.S. wind producers are expected to double the existing production capacity from 113 GW in 2020 to 224 GW by 2030. [1]

"The enormous benefits of utilizing magnets in wind turbines to produce a cleaner, safer, more efficient and economically viable source of wind energy has enormous positive implications for our planet, population and the way we live and work," said Adam Poling, Amazing Magnets Chief Operating Officer.

As such, the company is committed to dedicating multiple resources to this renewable resource and space.

Wind is a clean and renewable fuel source that can be used in the production of electric power. Wind turbines can be used in conjunction with other renewable energy sources to help states and countries meet renewable portfolio standards and emissions targets to slow the rate of climate change. Wind turbines do not emit carbon dioxide or oth-





Some wind-turbine manufacturers have developed magnetic mounting systems that securely attach ladders and other equipment to the steel tower walls. (Courtesy: Amazing Magnets)

er harmful greenhouse gases, which makes wind-powered energy better for the environment than fossil fuel-based sources.

In addition to reducing greenhouse gas emissions, wind energy provides additional benefits over traditional power generation sources. Nuclear, coal, and natural gas power plants use a surprisingly large amount of water in the production of electric power. In these types of power plants, water is used to create steam, control emissions, or for cooling purposes. Much of this water is ultimately released into the atmosphere in the form of condensation. Conversely, wind turbines do not require water to produce electricity.

Wind farms' value therefore increases exponentially in arid regions where the availability of water is limited.

Perhaps an obvious but significant benefit of wind power is the fuel source is essentially free and sourced locally. In contrast, fuel costs of fossil fuels can be one of the largest operating costs for a power plant and may need to be sourced from foreign suppliers that can create a dependence on interruptible supply chains and can be affected by geopolitical conflicts. This means wind energy can help countries become more energy independent and reduce the risk of price fluctuations in fossil fuels.

Unlike finite fuel sources such as coal or natural gas,





wind is a sustainable energy source that does not require fossil fuels to generate power. Wind is produced by temperature and pressure differences in the atmosphere and is a result of the sun's heating the Earth's surface. As a fuel source, wind provides an infinite supply of energy and, as long as the sun continues to shine, wind will continue to blow.

## CONCLUSION

Magnets play an important role in some of the world's largest wind turbines. Wind is one of the fastest growing sources of clean energy. As such, the role magnets play in helping create this clean energy should not be overlooked, as it is aligned with the mega-trend of sustainability and

all of its benefits. Magnets are being used to lower costs, improve reliability, and increase maintenance intervals in many wind farms around the world and are also being used to reduce construction costs of new turbines by eliminating the need for more costly equipment mounting designs. ✎

## REFERENCES

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