

This site is archival. [Please visit the current MIZZOU magazine site for up-to-date content.](#)



University of Missouri

MIZZOU

The magazine of
the Mizzou Alumni Association

[Home](#) » [Winter 2012](#) » [Features](#) » Making nuclear clear

Making nuclear clear

The case for nuclear power as part of the mix

Story By Marcus Wilkins | Photo courtesy of Dale Klein

Atomic energy has a unique set of public relations challenges. To most Americans, a monolithic nuclear cooling tower has a different connotation than a gently twirling windmill, shimmering solar panel or even the soot-smeard face of a coal miner.

So when it comes to sustainable energy, the power of the atom might not top most people's lists. Dale Klein, former chairman of the U.S. [Nuclear Regulatory Commission](#), isn't most people. Although he has returned to academia as the associate vice chancellor for research at the University of Texas System, Klein remains an international figure who carries the message of nuclear power as a sustainable alternative.

"Any sustainable energy plan needs to include nuclear," says Klein, BS ME '70, MS '71, PhD '77. "It's compact, and it generates power when the wind is not blowing or the sun's not shining."



Dale Klein, one of the world's foremost experts in nuclear power, recently visited a nuclear power plant in China with his wife, Becky.

Nuclear power is also far more efficient than other sources, according to Klein. When a molecule of any fuel is burned, it produces carbon dioxide and roughly two electron volts of electricity. The splitting of a uranium atom, however, creates 200 mega electron volts, or approximately 100 million times the juice.

Klein says the nuclear industry has not done a good enough job educating the public about its safety. Yet there have been only three major reactor accidents in the history of civil nuclear power — Three Mile Island in 1979, Chernobyl in 1986 and Fukushima in March 2011.

Public fear of power plant safety and nuclear waste is partly due to the “mystic” — silent, invisible and odorless — nature of radioactivity, according to Klein. But it also has to do with the mushroom cloud.

“Things nuclear are viewed differently,” Klein says. “People have said that if electricity had been brought into the public awareness by way of the electric chair, we wouldn’t have light bulbs.”

So on March 11, 2011, when an earthquake and tsunami devastated Japan, the world held its breath as the nuclear power plant in Fukushima faced a historic crisis.

When the magnitude 9.0 quake hit, it shut down the facility’s off-site electricity. The plant’s seismic triggers automatically turned off the reactors and activated the backup diesel engines to keep the cooling pumps running. About an hour later, the tsunami wave flooded the engines and batteries, making it impossible for workers to open valves or move switches. The result was a nuclear meltdown.

“If you shut down a reactor, it’s not like a gas stove where the heat goes away,” says Klein, who visited plant owner Tokyo Electric Power Company (TEPCO) in July to learn from the disaster. “It’s more like an electric stove, and you have to remove [residual] heat.”

The Fukushima disaster has prompted much of the nuclear industry to focus on similar scenarios in which a plant loses off-site power and its backup engines. Klein’s example is the Palo Verde Nuclear Generating Station in Wintersburg, Ariz., which has analyzed a plan to run only critical equipment during a blackout, extending its battery life from eight to 72 hours.

In the U.S., only coastal plants face the potential threat of an earthquake and tsunami, but there are other situations that could occur such as a dam failure.

“There are some reactors where you could have a sea surge,” says Klein, who also chairs the nuclear safety review board of the United Arab Emirates. “U.S. nuclear power plants are looking at beyond-design events and what can be done to protect the public and the environment under those extreme conditions.”

Then there’s the issue of waste disposal. For complex political and financial reasons, the U.S. is the only major nuclear nation that doesn’t recycle spent fuel rods. Some opponents believe recycling will lead to the proliferation of nuclear weapons because the process produces

plutonium as a byproduct, but Klein believes recycling is the best long-term solution.

“The plutonium that you get out of recycled nuclear spent fuel is not the kind of material you would use for a tactical or strategic nuclear weapon,” Klein says.

The industry has produced about 65,200 metric tons of used nuclear fuel in the past 40 years, according to the [Nuclear Energy Institute](#). The NEI website provides the example that if the receptacles were to be stacked end-to-end and side-by-side, they would cover a football field about seven yards deep.

“All commercial nuclear countries expect that geological disposal — in a formation that has been stable for millions of years and likely will be stable for a million years in the future — will be the ultimate solution,” Klein says. “From a storage standpoint, it’s not a safety issue but a perception and a political issue.”

Klein believes the nuclear industry, academia and the government are equally obligated to educate the public and alter this perception. For any successful and sustainable plan to succeed into an unpredictable future, Klein says it’s important for the U.S. not to put all of its eggs in one “energy basket.”

“I grew up on a farm in Clarksburg, Mo., so I’m very familiar with the need to protect the environment,” Klein says. “I think nuclear is an environmentally sound way of generating electricity. It’s not perfect. If there were a perfect source, we wouldn’t be having energy debates. But it should be one of the energy sources in our tool box.”

Share your comments with Mizzou magazine at Mizzou@missouri.edu.

Note: If published, feedback may be edited for length, style and clarity.



[Follow us on Twitter](#)



[Join us on Facebook](#)



[Subscribe to our feed](#)

Published by MIZZOU magazine, 109 Reynolds Alumni Center, Columbia, MO 65211 | Phone: 573-882-5916 |
E-mail: Mizzou@missouri.edu

Opinions expressed in this site do not necessarily reflect the official position of MU or the Mizzou Alumni Association.

Copyright © 2021 — Curators of the [University of Missouri](#). All rights reserved. [DMCA](#) and other [copyright information](#).

An [equal opportunity/affirmative action](#) institution.

Last updated: Feb. 15, 2013