

Advice on Nuclear Power for the Next Secretary of Energy
Union of Concerned Scientists

- The overriding goal of U.S. energy policy should be reducing U.S. and global carbon emissions, and stabilizing carbon dioxide concentrations.
- The United States should create a level playing field on which all carbon-free alternatives can compete freely, and compete favorably with fossil fuels. Ideally, this should be accomplished through a carbon tax or a cap-and-trade system. If that is not possible, the administration should replace the current patchwork of subsidies and tax incentives with one that gives equal credit based solely on the amount of carbon emission avoided.
- First priority should be given to reducing carbon emissions through improvements in efficiency. The single greatest opportunity is to increase the fuel efficiency of vehicles.
- But efficiency isn't the complete answer. Even if total energy demand were to level off in the U.S., we would still have to replace carbon-emitting sources with carbon-free sources. In much of the world, energy demand will rise despite efficiency improvements and much of the increased supply must come from carbon-free sources.
- Only five sources are able to provide a substantial fraction of the carbon-free energy that will be needed over the next 40 years. There are: nuclear, biomass, wind, solar, and fossil fuels with carbon sequestration.
- There are no silver bullets; all have major shortcomings. My time is too short to enumerate them here. The challenge of carbon stabilization is so great that we cannot rule out any of these options.
- In particular, we cannot rule out nuclear. It is the most mature

and the most readily expandable of the five. We need an option that would allow a safe and economical expansion of nuclear power.

- The first priority should be ensuring the safe operation of current reactors. This might mean enhanced inspections in the United States and increased cooperation with foreign reactor owners. An accident anywhere in the world would imperil any plans for a greater contribution from nuclear energy.
- A second priority should be efforts to make new light-water reactors safer and more economically competitive. Advanced LWRs are the only nuclear technology that could be deployed on a significant scale in the next 20 years, which is a critical period in the transition toward a low-carbon world.
- A third priority should be R&D on small reactors with long-lifetime cores, that would be particularly suitable for use by developing countries, have a very high degree of passive safety, and be especially proliferation resistant.
- Regarding waste disposal, I believe that it is now clear that nuclear waste can be disposed of safely and economically in geological repositories. But there is no need to rush. Do the work that is necessary to establish the safety of disposal in Yucca Mountain. In the meantime, nuclear waste can be stored safely, securely, and inexpensively in dry casks. If, as I believe, YM will be proven acceptable, its capacity can be expanded by up to a factor of 9, thereby providing disposal for a greatly expanded nuclear fleet. The lack of permanent disposal today should not be a barrier to building new reactors.
- I would vigorously explore the potential for international spent fuel storage and disposal with any country willing to consider hosting one, with the use of these facilities available to any country that commits not to enrich uranium or reprocess spent fuel. I would also strongly advocate the United States provide such services.

The security benefits far outweigh the potential risks. It is absurd for every country that has a reactor to also have a geological repository.

- Any expansion of nuclear power must be done in a way that does not increase risks of nuclear proliferation or nuclear terrorism. International disposal could act as a powerful incentive for countries to voluntarily forego the most proliferation-prone parts of the nuclear fuel cycle—enrichment and reprocessing. I would vigorously pursue other efforts to limit the spread of enrichment and reprocessing facilities. I would recommend terminating all efforts to build a demonstration reprocessing facility in the U.S., impose a moratorium on domestic reprocessing, and actively discourage the spread of reprocessing and enrichment facilities to additional countries. If a new enrichment facility is built in the United States, it should be a model for future facilities elsewhere in the world, in terms of inspector access, safeguards technology, and institutional ownership and operating arrangements.
- A key argument for reprocessing is that uranium resources are insufficient to sustain a once-through fuel cycle. The conventional wisdom is that an expansion of nuclear power would require a move to breeder reactors and a closed fuel cycle. I would commission a high-level study of uranium and supply and demand to determine when the transition to a closed fuel cycle would be economically justifiable. A decision on funding fast-reactor and reprocessing research would await the results of that study. If, as I believe, that study indicates that fast reactors are unlikely to be economically competitive for at least another 50 years, even if nuclear power grows substantially, I would divert current funding for fast reactor and reprocessing R&D to small reactors and other concepts that promise to reduce the cost and the proliferation risks of nuclear power in the next 20-40 years.