COLLOQUIUM

A Roadmap for Nuclear Energy Technology

Dr. Tanju Sofu
Argonne National Laboratory

June 28, 2017
4:00 p.m. - Wilson Hall, One West

The prospects for the future use of nuclear energy worldwide can best be understood within the context of global population growth, urbanization, rising energy need and associated pollution concerns. As the world continues to urbanize, sustainable development challenges are expected to be concentrated in cities of the lower-middle-income countries where the pace of urbanization is fastest. As these countries continue their trajectory of economic development, their energy need will also outpace their population growth adding to the increased demand for electricity. In the U.S., the pending retirement of the existing nuclear fleet, representing over 60 percent of the nation's emission-free electricity, also poses a challenge. The DOE's vision and strategy aim to expand the use of nuclear power by supporting sustainability of the existing nuclear fleet, deploying new large and small-modular water-cooled reactors, conducting R&D for advanced reactor technologies with alternative coolants, and developing sustainable nuclear fuel cycle strategies. Since the current path relying heavily on water-cooled reactors and "once-through" fuel cycle is not sustainable, next generation nuclear energy systems under consideration aim for significant advances over existing and evolutionary water-cooled reactors. Unless the new public-private partnership models emerge to tackle the licensing and demonstration challenges for these advanced reactor concepts, however, realization of their enormous potential is not likely, at least in the U.S.