



## Role of Nuclear Power in Sustainable Development

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To address the climate change threat, it is necessary to accelerate deployment of low-emission energy sources and phase out as soon as feasible fossil fuels, or at least use them during the transition in a significantly better manner (e.g., coal liquefaction). A viable solution cannot be provided by any single energy source. Instead, an innovative, merit-based deployment of all relevant low-emission sources is needed. This presentation will broadly cover the role of nuclear power in sustainable development, and specifically focus on synergistic use of nuclear and renewable energy systems.

First, a historical overview of commercial nuclear power will be given. It will include a review of the operating and in-construction nuclear power plants (NPP). Advanced reactor designs and research directions will be presented. Challenges to grid reliability resulting from integration of non-fossil sources (nuclear and renewables) will be summarized.

A discussion on the sustainability of nuclear power will follow, from the standpoint of the use of resources and associated externalities. The need to extend the use of nuclear power beyond the electricity production will be elaborated. The concept of a novel hybrid energy park, NuRenew, will be presented. It synergistically combines nuclear and renewable energy system, facilitating accelerated deployment of these low-emission sources and phasing out of fossil fuel. Benefits of such a system and development challenges will be discussed.

### **Bojan Petrovic**



Prof. Petrovic holds a B.Sc. in Mathematics, and M.S. and Ph.D. in Nuclear Engineering. Since 2007 he has been Professor of Nuclear Engineering at Georgia Tech, Atlanta, GA. His main research interests include reactor physics, advanced reactors design, and numerical simulations of nuclear systems, with the overarching theme of the role of nuclear power in sustainable development. For this purpose, he has proposed the novel NuRenew concept of an energy park synergistically combining nuclear and renewable energy sources. Recently, he was the Lead PI of a multidisciplinary US DOE funded Integrated Research Project (IRP) that included 14 organizations (US and international academia, national labs, industry), aimed to develop a concept of a novel PWR reactor with enhanced safety features. Currently, he is a Co-PI of another DOE IRP project related to advanced salt-cooled reactors.

Prior to Georgia Tech, Dr. Petrovic was Fellow Scientist at R&D Division of the Westinghouse Electric Company, where he was the Deputy Director of the IRIS Reactor development project, an international effort with over 20 organizations from over 10 countries. For his contribution he was awarded 2006 George Westinghouse Corporate-Level Signature Award, the highest Westinghouse Electric Company recognition for technical innovation and excellence. He serves on the Editorial Board of Nuclear Technology, and as a reviewer of over 10 technical and scientific journals. He was the Technical Program Chair for the 2009 American Nuclear Society Annual Meeting, and for the 2003 ANFM-III meeting. He has convened/organized and chaired over 30 sessions at international meetings. Dr. Petrovic has been selected Fellow of the American Nuclear Society, and is a member of the ASTM and ASEE. He has authored or coauthored over 350 scientific and technical publications (including 50 journal articles, about 20 chapters in books and monographs, over 200 peer-reviewed papers in conference proceedings, 7 invited articles in professional/trade journals, over 100 technical reports, and 2 patents); he gave over 50 invited seminars and talks.