

## HOW SUPPORT FOR MACHINE-BASED SOURCES OF RADIATION CONTRIBUTES TO SUSTAINABLE DEVELOPMENT

**Sarah NORRIS**

*Office of Radiological Security (ORS) - Department of Energy/National Nuclear Security  
Administration (DOE/NNSA), Washington, DC, USA*

**Shea COTTON**

*SMS Contractor for ORS – DOE/NNSA, Washington, DC, USA*

**Matthew KESKULA**

*Argonne National Laboratory, Washington, DC, USA*

As stated by the International Atomic Energy Agency (IAEA), radiation-generating technologies can be used in support of 9 of the 17 UN Sustainable Development Goals. The U.S. Department of Energy/National Nuclear Security Administration's Office of Radiological Security (ORS), with the mission to prevent radioactive materials from being used in malicious acts, has been working to improve options for and adoption of advanced machine-based sources of radiation. In addition to supporting radiological security, these activities directly support the broader development goals of the IAEA. This paper will focus on how the following three areas of ORS work contribute to both security and sustainable development: cancer therapy with medical Linear Accelerators (LINACs), x-ray blood irradiation, and electron beam (e-beam) technologies for reuse of resources and wastes.

Machine-based sources of radiation often provide key advantages over traditional, radioactive source-based means of generating radiation. For instance, x-ray blood irradiators allow consistent, and typically higher, throughput across the lifespan of the device. And e-beam technology can play a significant role in providing clean water for growing urban populations around the world. Despite these technologies having operational, business, and security benefits, ORS recognizes that these technologies present challenges in terms of needing reliable electricity supply, trained/educated staff, and accessible service providers. Therefore, this paper also will highlight these challenges and ORS's perspectives on how the international community can work to address these challenges. Time is of the essence, and advanced machine based radiation generating technologies are essential to confronting the challenges associated with ensuring sustainable development.