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## The IAEA activities on nuclear cogeneration for sustainability and climate change mitigation

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The use of nuclear energy for cogeneration of heat and power is a well-proven path with over 750 reactor-years of operation, mainly in district heating and desalination applications. Nuclear cogeneration is one of the most promising clean alternatives to serve towards achieving sustainable development by contributing to cover part of the continuously growing energy demands worldwide for industrial processes, transportation, industry, residential applications, along with many other sectors. The projects of nuclear cogeneration serve the main elements of sustainability: energy, environment, and cost. Advanced nuclear reactors incorporating cogeneration features are expected to provide more environmentally benign energy systems operating at higher energy efficiency. Furthermore, the recovery of waste heat of nuclear power plants for cogeneration applications would lead to a direct reduction of the overall plant losses and emissions. The IAEA conducts several activities to support its Member States interested in non-electric applications and cogeneration using nuclear energy. The IAEA also developed several tools to elaborate on the feasibility and techno-economics of nuclear desalination, district heating, and hydrogen production applications. This paper highlights the aspects of the use of the nuclear energy for non-electric applications and cogeneration and discusses the main activities of the IAEA on related topics. In addition, the IAEA software tools and toolkits, which are developed to provide support to the Member States with more understanding on the economic viability of nuclear cogeneration options, are highlighted.

### Biography

R El Emam has earned his PhD in mechanical engineering from the University of Ontario Institute of Technology, Canada, in 2014. He is currently working on the project of non-electric applications and cogeneration using nuclear energy at the International Atomic Energy Agency, Vienna, Austria. His current work is focused on hydrogen production, desalination, and district heating applications. Mr. EL EMAM has over 30 publications and chapters in peer reviewed journals, books, and conferences.

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