Contributions of RATEN ICN Pitesti in the INPRO Tools Development, Application and Training

Cristina Alice Margeanu
Institute for Nuclear Research (RATEN ICN) Pitesti, Romania
cristina.margeanu@nuclear.ro

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ABSTRACT

The International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) was established in 2000 by the International Atomic Energy Agency's (IAEA) General Conference resolution CG(44)/RES21, with a focus on global nuclear energy sustainability and long-term nuclear energy strategies, encouraging technological and institutional innovations in Nuclear Energy Systems (NESs) development and deployment.

Over time, the INPRO collaborated with IAEA experts and Member States to develop a set of decision support tools for constructing nuclear energy scenarios and performing studies to support national strategies for sustainable nuclear energy. The INPRO methods and tools include: NEST (economic evaluation of NES options based on economic metrics), MESSAGE-NES (long-term modelling and developing alternative scenarios, including NES optimization and material flow analysis), NES Simulators (simplified estimations for mass flow & economic indicators related to NES options), KIND-ET (screening, comparative evaluation and ranking of NES options), ROADMAPS-ET (development of structured map of actions and timeframes for the promising deployment scenarios), and FRAMES (short-term quantitative and comparative evaluations of various energy system scenarios and technology options, grid integration of renewables, based on lowest cost).

Most of these tools were initially applied and tested in the framework of various INPRO collaborative projects in pilot case studies to model, analyse and evaluate nuclear energy systems. Furthermore, the INPRO has begun to distribute the tools and also provide specific training on their application through other INPRO activities such as INPRO Schools and the INPRO Advisory Service.

Since 2011, RATEN ICN specialists have been actively involved in INPRO activities, including methodological developments, performing case studies on nuclear energy development scenarios and NES options assessment, workshops, service missions, videoconferencing consultancy, and educational component (training, distance learning, competency building). In particular, they have participated in the INPRO tools development and testing, applied these tools in national case studies and analyses, and also have been invited as national experts for training on the tools application in various INPRO activities. These contributions will be briefly outlined, with a focus on the last year's activity.