



Comparative Analysis of Radioactive Gas Risks for Methane Reservoirs and Nuclear Waste Repositories

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Nuclear energy and shale gas are two energy sources commonly proposed as bridge technologies for immediate reduction of GHG emissions during the transition to more sustainable options. Coincidentally, exploitation of each of these energy resources is associated with an appreciable risk of radioactive gas (e.g. carbon-14 and radon) generation and emissions from deep reservoirs. This issue has in both cases been less widely communicated and researched. For these reasons, we present a systematic comparison, based on literature reviews, of both short- and long-term risks involved for in-situ gas generation, repository integrity, gas migration and reactivity, and (toxic) effects on human health. The relative prospects for successful mitigation and monitoring strategies for gas emissions from deep shale reservoir exploitation and deep repositories for nuclear waste will also be analyzed. For these, reviews of the latest developments in relevant geophysical and geochemical techniques are included. For reactivity and pathway flow modeling, systems analysis and geochemical modeling software will be used (e.g. OLI/Stella/Vensim) The results will be presented in the form of a tool suitable for communication with and engagement of non-expert stakeholders.