

## Radon Potential as a diagnostic tool for indoor radon hazard mapping

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At over 56% of the annual effective dose, radon is the primary source of ionizing radiation exposure received by the Irish population. Although the average indoor radon concentration in Ireland has been reduced since introduction of the 1997 Building Regulations, it currently stands at 77 Bq/m<sup>3</sup>, which is significantly higher than the worldwide average of 39 Bq/m<sup>3</sup>. Globally, radon is the second leading cause of lung cancer after tobacco smoking, with approximately 300 radon-related lung cancer cases in Ireland every year.

Here we present a methodology to calculate the Radon Potential of a specific geographic area. This is based on *in-situ* radon concentration and permeability measurements. Both parameters are measured at a depth of 80 cm in the sub-soil in order to minimize atmospheric influence. Permeability measurements are made by timing the duration of extraction of 2 lit of soil gas, whereas radon concentrations may be determined using a pulse ionization chamber detector. Such a protocol is capable of producing two separate measurements every 15-20 minutes. Here we present data from the Cooley Peninsula (Co. Meath) and Castleisland (Co. Kerry) and demonstrate that Radon Potential is an effective predictor for indoor radon. Our research indicates that Radon Potential is a useful mapping tool for areas with a low population density, or regions where land use has been rezoned for residential housing (i.e. where indoor radon measurement are few or non-existent). Areas with high Radon Potential can adopt radon preventative measures in new buildings, thereby reducing the radiological hazard to occupants.