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## Core message

General adoption of the **J-value** as a guide would make decisions on nuclear safety transparent and easy for **everyone** to understand – **politicians, regulators, public and the media alike.**

### The Public's Excessive Fear of Radiation

Many former occupants of contaminated areas around Chernobyl and Fukushima Daiichi are convinced they will die young. This perception of a very high and unquantified threat to life after a big nuclear accident explains much of the wariness of nuclear power on the part of both public and politicians, an emotion reflected in press coverage.

But only about 3 months' life expectancy would have been lost by the people worst affected after the Fukushima Daiichi accident had they not been relocated but had stayed put for the 6 years needed before the dose decayed to Japan's safe return level, 20 mSv y<sup>-1</sup>.

This compares with the 4½ months' life lost to air pollution by the average Londoner living today.



### Change in Life Expectancy vs. Probability

Change in life expectancy is more informative and easier to understand than probability because it incorporates additional actuarial information.

It differentiates between early and delayed death in a way the bare probability cannot match.

This is important for the nuclear industry as the average loss of life expectancy from a fatal radiation cancer is only half that lost to an immediately lethal car accident occurring at the same time as the radiation exposure.

### The J-value

The J-value (J for judgement) is more informative and even easier to understand. It allows the maximum reasonable cost of a protection measure to be established by finding an objective balance between the increase in life expectancy and the safety expenditure required.

Life quality lies at the heart of the J-value, as measured by the life-quality index (LQI). The maximum reasonable expenditure is reached when the increase in LQI due to the greater life expectancy conferred is just matched by the decrease in life quality caused by the reduced effective income.

The J-value is a binary decision variable, found by dividing the actual cost of the safety measure by the maximum it is reasonable to spend.  $J > 1.0$  implies that resources should not be committed to reducing the hazard in the way proposed; on the other hand the expenditure will be deemed justifiable if  $J \leq 1.0$ . Nothing could be simpler.

Moreover, the objective and ethically based J-value method has now been validated against empirical data for 90% of the world's nations



### Mass Relocations after Chernobyl and Fukushima

The J-value showed it was justified to relocate **fewer than 20%** of the **335,000** people actually evacuated after Chernobyl.  
**None** of the **160,000** people moved out after the Fukushima Daiichi accident needed to go.

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