PRESS KIT

Greenhouse Gas Emissions
Valuation Method

The carbon value coefficient used in the product level EP&L is derived from a subset of the Social Cost of Carbon estimates reported by the economist Richard Tol in his 2009 paper "The Economic Effects of Climate Change". These estimates attempt to value the damage (as a result of current and future climate change) attributable to each tonne of carbon dioxide released in a given year; the "Social Cost of Carbon" (SCC).

The 232 estimates of the Social Cost of Carbon (SCC) included in Tol's paper are based on a wide range of models and assumptions and range in USD from below-zero to four-figure estimates. There are a number of factors that can have a significant impact on resulting SCC estimates. These factors along with PUMAs approach are summarised below:

- **Discounting future damages resulting from 2012 emissions:** PUMA opt to use a social rather than commercial discount rate to estimate the SCC. Within the Social Discount Rate (SDR) the 'Pure Rate of Time Preference' (PRTP) selected by PUMA is 0%, based on the philosophy that no generation should prioritize its welfare over another's. The second element of the SDR is driven largely by assumptions over future economic growth. By averaging this element across all studies which disclose it, an estimate of 3.4% was derived for the overall SDR entering PUMA's analysis.

- **Normalising SCC estimates in 2012 USD:** As well as adjusting for price inflation, older SCC estimates were increased by 3% per annum to account for growth in the SCC as a result of the increased stock of GHGs in the atmosphere (the mid-point of the IPCC's 2-4% range).

- **Valuing damages:** Studies use a range of methods but no formal consensus exists. PUMA's approach was therefore to average across studies.

- **Accounting for catastrophic risks:** When averaging across many SCC estimates, choosing the median value reduces the impact of more extreme scenarios on the result because most estimates tend to be clustered towards the left of the distribution. To help account for the risk of catastrophic scenarios PUMA took the mean of the distribution of SCC estimates.

- **Equity weighting across countries based on income levels:** Many SCC studies make adjustments to damage values to reflect differences in incomes between countries – so called 'equity weighting'. There is currently no consensus on how or if equity weighting should be applied. Therefore PUMA has chosen to take an average across studies.

Applying the criteria and approaches outlined above resulted in an estimate for the 2012 Social Cost of Carbon, expressed in 2012 US Dollars of: $96 (€75) t/$CO_2$e.

This estimate is highly sensitive to the assumptions outlined above and PUMA recognises that there is significant uncertainty around the true SCC. The estimate will be revisited in future years and revised as appropriate depending on developments in the science and economics of climate change.