THE COMING CLIMATE CRUNCH

- The trillionth tonne of carbon
- How disastrous can it get?
- Engineering alternatives

Meinshausen et al. 2009a
Allen et al. 2009
Exemplary emission pathways in order to remain within a budget of 750 Gt between 2010 and 2050. At this level, there is a 67% probability of staying below a warming of 2 °C.
Solving the climate dilemma: The budget approach
“World Formula” for Climate Policy

\[ C_{\text{glob}}(p) = \int_{T_1}^{T_2} E_{\text{glob}}(t) dt \]

Total global CO$_2$ budget in period $[T_1, T_2]$ that keeps global warming below 2°C with probability $p$

Integral over global profile of CO$_2$ emissions

\[ C_{\text{nat}} = \int_{T_1}^{T_2} E_{\text{nat}}(t) dt = C_{\text{glob}}(p) \frac{M_{\text{nat}}(T_M)}{M_{\text{glob}}(T_M)} \]

National CO$_2$ budget in period $[T_1, T_2]$ as defined by ratio of national population $M_{\text{nat}}$ to world population $M_{\text{glob}}$ at time $T_M$

Integral over national emission profile

Fraction of global CO$_2$ budget as defined by ratio of national population $M_{\text{nat}}$ to world population $M_{\text{glob}}$ at time $T_M$