The 47TW of global surface heat flux provides the fundamental constraint on the Earth’s energy budget. Conventional cosmochemical and geochemical models for the Earth predict 16-21 TW of radioactive power, while other models range from 12 and 31 TW. The core contribution of radiogenic heating is considered negligible. Given 6-8TW of this energy is in the continents, leaving only ~13TW (c.f., 3-22TW) of power to drive Plate Tectonics. A global MORB compositional estimate identifies the Depleted Mantle, a top of the mantle layer given its sampling by ridges, as having ~8 ng/g U, K/U=2x10^4, and Th/U=2.9 and thus ~6TW of power, assuming a mass fraction of ¾ Depleted Mantle and ¼ OIB source (7TW) and the latter having ~1.5 times enrichment of K-Th-U relative to the BSE. Recent measurements of the Earth’s geonuetroino flux are consistent with the above 20TW model for the planet, implying a three layer silicate Earth with no additional reservoirs of radioactive elements; thus the residual flux of 27TW is the secular cooling component that can be partitioned into a CMB flux (20% to 50%) and mantle contribution. Thus, the Mantle Urey (Ur) ratio, a measure of the mantle’s radiogenic heat contribution to the total mantle heat flux, is ~0.3. Such a low mantle Urey ratio is at odds with most parameterized convection models (i.e., Ur = 0.7) for the Earth. Results from the KamLAND and Borexino geoneutrino detectors provide new insights and constraints on secular cooling of the Earth.