

1086-AC-1663      **Ben Fusaro\*** (fusaro@math.fsu.edu). *The Malthusian Challenge – Increasing Human Demands vs Decreasing Resources.*

T.R. Malthus ("An Essay on Population", 1798) predicted the clash between limited resources and a growing population  $P$  and per capita consumption  $C$ . The  $PC$  product represents the impact on the natural biophysical system, which includes the land and minerals of his day, along with clean water, viable fisheries, stored fuels, etc. The purpose of this talk is to provide a different way to value the contributions of the natural system than is currently accepted by many politicians and economists. Their dollar-based methods overestimate and underestimate, resp., the contributions of humans and of the natural system. In a sustainable system, the  $PC$  impact ( $C$  in energy units per cap.) must not exceed the surplus energy that the natural system can provide. Also, the energy units must reflect the work done by the natural system. The concept of embodied energy (H.T. Odum, 1967) does this – one BTU of oil has more embodied energy than one BTU of wood has. Another concept that updates how to value an energy system is the Energy Return on Investment. Exactly analogous to the ROI of business, the EROIs were large for oil and the fisheries of 50 years ago. These two concepts can help gauge the worth of "green" energy systems that promise to offset falling EROIs and yield sustainability. (Received September 25, 2012)