

35th Symposium on The Search for Extraterrestrial Intelligence (SETI) – The Next Steps
(A4.)

SETI II - Interdisciplinary Aspects (2.)

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SUSTAINABILITY: A TEDIOUS PATH TO A GALACTIC COLONISATION!

Abstract

Exponential growth cannot be sustained for a long period. For example, with a 2% annual growth, our energy consumption would bring us to consume all the solar energy falling on Earth by 2480. At that point, we will be at the level I on the Kardashev scale. Following the same progression, we will capture the whole solar power output (type II) by 3500, the whole power output of the Galaxy (type III) by 4660, and the whole power output of the Universe by 5820! Obviously, this growth rate cannot be achieved over the long run even when throwing overboard numerous laws of physics!

In this paper, we will try to understand what would be the energetic obstacle to a galactic colonisation and the long term survival of a civilisation. Using the solar system as a template, the potential resources in fossil fuels usable to grow from one sustainable level to another will be analysed. Using this information, we will explore the probability of discovering a civilisation at its different stage of energy evolution as estimating some possible value of L.