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**Grounds for concern**

Sunlight is the greatest life-giving force on our planet. It is also a potential source of more clean energy that we can ever use.

The amount of solar energy reaching the surface of the Earth is estimated to be a staggering 3.4 million exajoules (EJ) a year. To give you some idea of how much this is, a single EJ is one quintillion (one million trillion) joules (the T hoku earthquake and tsunami measured in at 0.175EJ).

The sun’s rays bathing the Earth in a single year are enough to supply humanity, at its current rate of primary energy consumption, with energy for 7,000 to 8,000 years.

That means that capturing just a minuscule fraction (less than 0.1 percent) of this abundance could theoretically cover all our energy needs. It is little wonder that solar energy has created such a buzz of excitement. It is “free”, clean, green and is in absolutely no danger of running out for the rest of human existence.

However, numerous economic, political and technical barriers stand in the way of tapping this apparently boundless resource.

One largely neglected factor is land. Most people do not think of land as a constraint on our ability to exploit this manna from the heavens. But solar installations are so space-hungry that switching large proportions of our electricity supply to solar power would occupy enormous swathes of land.

Just how much is not really known because official statistical reporting and models assume the land use of solar installations to be negligible and, hence, exclude this factor.

To fill this knowledge gap, a new study, produced as part of the European Union-funded LOCOMOTION project aimed at producing environmental policy models, estimates that the land requirements for solar energy are far from negligible.

Focusing on the EU, Japan, South Korea and India, the simulation forecasts that, in a scenario where 80 percent of electricity is extracted from the sun by 2050, solar installations would require as much as 5 percent of the total landmass (in the case of Japan and South Korea).

In the EU, the land requirements would reach up to 2.8 percent of the bloc’s total territory. To give you an idea of the scale of this, an estimated 4 percent of EU land is currently covered with man-made surfaces, such as cities, towns, villages and roads and other infrastructure required to sustain them. “If at least half of the produced electricity comes from solar power. Land for solar would amount to over 50% of the current EU urban land, over 85% for India, and over 75% in Japan and South-Korea,” the paper observes.

“This huge demand for land will not help the renewable transition,” Dirk-Jan Van de Ven of the Basque Centre for Climate Change (BC3), the lead author of the study, told me. “Land occupation usually has several negative side-effects, and the aesthetic impacts will be noticed by many, potentially affecting public support for such a transition,” he added.

These environmental side effects can be both direct and indirect. Potential direct impacts include the conversion of arable land and the fragmentation of ecosystems.

Excerpted: ‘There are grounds for concern about solar power’

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