



*Reflections, Issue 11*

## **THE CONTEXT FOR THINKING ABOUT 'ECO-CITY' INITIATIVES<sup>1</sup>**

*Dr William E. Rees, FRSC*

*Professor Emeritus, School of Community & Regional Planning, University of British Columbia  
williamrees.org*

**Abstract:** The ultimate goal of eco-cities is to achieve full ecological – as well as social and economic – sustainability. But can these cities really do the job their advocates claim they will? Is urban sustainability possible? This piece is a summary of a presentation given by Bill Rees, the originator and co-developer of the 'ecological footprint' concept. He argues that 'unsustainability' is an inevitable property of the interaction between urban-industrial society, as presently conceived, and the ecosphere. No society is sustainable if its maintenance and growth are being financed by the depletion of natural capital. To avoid 'sleep walking' into disaster, society must create truly sustainable cities that achieve 'one planet living' based on a smaller, materially efficient, more equitable 'steady-state' global economy. This will require unprecedented levels of cooperation at all spatial scales.

**Keywords:** sustainable city, eco-city, natural capital, ecological footprint, one planet living, ecological economics, biocapacity.

---

Eco-cities are an urban innovation touted as one of the solutions to conjoined problems of urban sustainability, environmental degradation, and climate change. While they were proposed as early as the 1970s, they have only become real in the last decade or so, with announcements of the construction of model eco-cities Dongtan, near Shanghai, China, and Masdar, near Abu Dhabi, UAE. Hundreds of related initiatives are now underway or about to be launched worldwide. But can these cities really do the job their advocates claim they will? Is urban sustainability possible?

---

<sup>1</sup> Summary of presentation to NEXUS Conference 2015 UNU-FLORES, Dresden, 25–27 March 2015.

My starting premise is that ‘unsustainability’ is an inevitable emergent property of the systemic interaction between urban-industrial society, as presently conceived, and the ecosphere. The values and models driving contemporary capitalist neoliberal economies are incompatible with the structure and function of ecosystems and even the real economy. Humanity’s natural expansionist tendencies (e.g., the potential for geometric increase) are being reinforced by a cultural narrative based on perpetual economic growth and endless technological progress on a finite planet.

A sustainable society can be understood as one that maintains adequate constant (or growing) stocks of human, manufactured and natural capital, maintained in separate accounts. Such income-producing capital constitutes society’s real wealth. With this in mind, economist Sir John Hicks’ defined sustainable income as: “That level of consumption that can be enjoyed from one accounting period to the next without reducing wealth”. Corollary: No society is sustainable if its maintenance and growth are being financed by the consumptive depletion of its capital, especially essential, non-substitutable forms of *natural* capital.

By this ‘constant capital stocks’ criterion, techno-industrial society is radically unsustainable.

Enabled by technologies based on abundant, cheap fossil fuels, the human enterprise has expanded geometrically since early 19<sup>th</sup> Century. From a base of about one billion in 1880, the population stands at 7.3 billion today and energy/material consumption has increased much faster than population. Ironically, the continuous growth that contemporary society takes to be the norm describes the single most *anomalous* period in human history.

The result on a finite planet is inevitable. The human enterprise is in a state of *overshoot* in which demand for nature’s goods and services outstrips supply. There are only 12 billion hectares of productive land and water ecosystems on Earth but humanity’s effective ‘ecological footprint’ is nineteen billion hectares. (It would take 1.5+ years for Earth to regenerate the renewable resources humans currently use each year.) We make up the difference between sustainable (Hicksian) consumption and actual consumption—humanity’s ecological deficit—by liquidating natural capital.

Now consider cities. We usually think of cities as areas dominated by the ‘built environment’ and characterized by high population densities. They are hotbeds of artistic, cultural and political activity and regarded as “engines of national economic growth” (Jane Jacobs). All this is true, but we forget that cities are also complex *biophysical* systems subject to natural law.

Under the 2<sup>nd</sup> law of thermodynamics cities are *dissipative structures*, open systems that can maintain themselves and grow *only* by consuming and degrading available energy/matter extracted from their host environments (ecosystems) and by ‘dissipating’ the resultant waste back

into their environments. In short, cities maintain their internal 'order' (negentropy) at the expense of increasing the external 'disorder' (entropy) of the ecosphere.

Seen this way, the city is a node of intense energy and material consumption and waste generation dependent on a complementary, vastly larger area of productive ecosystem that lies mostly *outside* the city. The city's *de facto* ecological footprint is typically several hundred times larger than its geographic area.

It follows that cities are highly vulnerable to global change. Entropic degradation and climate change threaten food, water and other resource supplies; consequent geopolitical tension and civil strife would undermine social order. A projected increase of urban populations by 2.5 billion by mid-century (equivalent to the *entire* human population in 1950) exacerbates the problem .

All things considered, the human enterprise may actually be forced to *contract* in coming decades. As an intelligent species capable of foresight and evidence-based planning, we can choose between:

- Business as usual, risking a chaotic implosion *imposed by nature* followed by geopolitical turmoil and resource wars, or:
- A well-planned, orderly and cooperative descent toward a socially just sustainability for all.

Unprecedented levels of cooperation at all spatial scales are an obvious key to success—sustainability is a collective problem that demands collective solutions. (No city or country can achieve sustainability on its own.)

In this light, a true 'eco-city' must strive toward a smaller, materially efficient, more equitable 'steady-state' global economy that could function indefinitely within the means of nature. Since an equitable share of Earth's biocapacity (a 'fair Earth-share') is 1.7 global average hectares (gha) and the *per capita* eco-footprints of residents of high-income cities is typically five to seven gha, such cities should be planning for a 65% - 75% reduction in energy-material throughput.

This is not merely an academic target. 'One-planet living' is an absolute requirement on our single Earth. Achieving it is technically possible, socially desirable and ecologically necessary but will require rethinking the 'good life', adjustments to consumer life-styles and national/global population reduction strategies

Problem: This is a world in denial. The fact is that: "The masses have never thirsted after truth. They turn aside from evidence that is not to their taste, preferring to deify error..." (Gustave le Bon 1896). To make matters worse, the corporate right has *socially engineered* current

generations to reject science and ignore reality in defence of the *status quo*. We have entered a new 'age of *unreason*'.

Governance is profoundly affected. Indeed:

...self deception ... plays a remarkably large role in government. It consists in assessing a situation in terms of preconceived fixed notions [i.e., ideology] while ignoring any contrary signs. It is acting according to wish while not allowing oneself to be deflected by the facts (Tuchman 1984).

As a result, globally, it is still 'business as usual'. The world is on course for collapse — ecological implosion, resource wars, civil insurrection and geopolitical chaos.

And it wouldn't be the first time: "...what is perhaps most intriguing in the evolution of human societies is the regularity with which the pattern of increasing complexity is interrupted by collapse..." (Tainter 1995). The modern tragedy is that the world community could, in theory, break from this pattern but as yet *shows no signs of getting serious about sustainability*.

Can ecological thinking wake this world of sleep-walkers?

---

The paper should be referenced as follows:

Rees, W. (2015). The context for thinking about 'eco-city' initiatives. *International Eco-Cities Initiative Reflections Series*, Issue 11. University of Westminster. Online: <https://www.westminster.ac.uk/eco-cities/reflections>