

Sustainability Essentials: Take 4

APPETITE, METABOLISM, AND PULSE OF THE CITY: SUSTAINABILITY, ENVIRONMENTAL BENIGNITY, AND BIOMIMICRY

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Projects have life cycles; there are ecologies of commerce and of industries; we can even imagine and discuss how a self-healing infrastructure might behave and be designed. For the Engineer, conceiving of environmental benignity in the behavior of the city would be better done in terms not of the metaphor of the clockwork mechanism, but of Cellular Biology, the human body, the behavior of species in the animal kingdom, and the ecologies in which they have evolved and prospered — biomimicry, in a word.

In the early 1990s, Rees and Wackernagel invited us to conceive of the life of the city as that of a large animal grazing in its pasture. Their goal was to take the areal extent of that pasture — as a representation of the volume of stuff in the world required to feed, fuel, and water the life of the city *and* assimilate back into the world the spent detritus of such living — and to compute its magnitude, as the urban ecological footprint. They were famously successful. Such simplicity of a footprint on the Earth we could all grasp and, adding up all of us in the world, fear. For we would seem to need more than one planet Earth to sustain us in the future. We are not “treading lightly on the Earth” and we should use the calculus of the footprint to bring us back from the brink, even back from overshoot beyond the brink. This sense of impending doom reeks of the myth of “Nature ephemeral” ([Take 2](#)).

The city has an appetite. It may have become bloated and over-weight, hence to impress an ever larger footprint on the Earth. London’s ecological footprint, for example, is estimated currently to be of the order 20M global hectares (about 125 times its geographical area). One can see the fouled, sodden pasture and the ever larger animal sinking ever deeper into the boggy earth.

London, or any city, should *be less bad* for the Environment; it should be supremely eco-efficient. It should reduce its appetite and change its metabolism. It should *do more with less*.

It matters not merely how much is being taken in, but how that water, food, and energy course through the socio-economic metabolism of the city — and emerge thereafter. What is it that they power the

city to do; and how might such “doings” be made to be more sympathetic to the city’s Environment? Our metaphor must be embellished, elaborated, enriched.

The metabolism of the city, its infrastructure, and its surrounds, participate in a web of material cycles, circling around and criss-crossing the globe. Who today can be unaware of the global carbon (C) cycle, not to mention the cycles of nitrogen (N), phosphorus (P), energy, and water? The city is the eye of the needle through which so many of these cycles are threaded, and deeply and comprehensively intertwined, not least through the use of water as the means of conveyance in the world’s conventional configuration of its sanitation and wastewater infrastructures. In an urbanizing and globalizing world, it is self-evident how the choices the “city” makes in respect of the “diets” of its population, its commerce, and its industry will radiate out into the world, conveyed as market signals about what the rest of world should extract from Nature and produce, in particular, as food from agriculture. Which is then to be pushed around the globe, to meet our needs, wants, and luxuries.

This is not just a matter of lowering the city’s metabolism, but one of disentangling the strands of resource and energy flows it so comprehensively muddles up into a ball of colored threads — to be picked apart, thread from thread, and recovered. Separated out, the yellow thread of urine could literally sustain a renewable biofuels economy (modest albeit): on the basis of the self-same micro-organisms that once — over millions upon millions of years — became today’s fossil oil. Now that ought to calm the metabolism of the city. Indeed, it should enable the city to turn a traditional

“bad” into something “good”, for profit (and the planet). Imagine such a re-engineering of the city’s wastewater infrastructure, so that the nitrogen and phosphorus nutrients in sewage could be combined with the carbon of CO₂ in the atmosphere, through photosynthesis, driven by the sun. Oil could then be extracted from the photosynthesized microorganisms. And all this would take place on the time-scales of days, weeks, and months — in the seasonal and annual cycle of things — as opposed to those of the centuries, millennia, and eons of geological time.

Thus do we — and the city’s built environment and its infrastructure — compose the life and pulse-rate of the city to our liking. Everything is enslaved to suit the dominant frequencies of the 24-7, so much lauded in contemporary commerce. We recognize it in the diurnal (but attempted non-diurnal!) of the “The City Never Sleeps”, as much as in the weekly of “Thank God it’s Friday”. Not only does the city impose its 24-7 will on its surrounding environment, if not the global environment. It also seeks to keep out the evolution-driving and evolution-shaping spectrum of frequencies of variation in the world — Nature’s “pulsating paradigm” as the Odum family would call it.¹ And so may our personal, commercial, and industrial lives in the city cycle joyously and emphatically according to the resonant and predominant 24-7 frequencies. Thus may they be immune and insensitive, we hope, to the

¹ And they knew about Nature, Eugene Odum, in particular: as father to Ecosystems Ecology and credited by some as author of the expression “The whole is more than the sum of its parts” (as opposed, just as arguably, to its attribution to Aristotle in his *Metaphysica*).

pounding storm of seconds, minutes, and hours and the exacting drought stretched out over months and years.

Unlike the city's appetite and metabolism, we may not presume to change its pulse-rate. Think on the impossibility of "banish the cycle of the working week"! But we might do something effective with it — something eco-effective, no less ([Take 5](#)).

