Closing Address: Creating Regenerative Cities

In the last couple of years I have gradually developed a concept called 'Ecopolis – the Regenerative City'. I am suggesting that in an urbanising world, the environmental implications of the way cities use resources need to be addressed with great urgency, and that they need to be enabled to develop a benign, regenerative relationship with the world's ecosystems.

Cities are distinct administrative and social units and geographical entities with clearly defined boundaries. As city people we need to look beyond the urban perimeter to better understand the global impacts of a resource hungry, urbanising world. Cities absorb the bulk of the world's natural resources, and their solid, liquid and gaseous wastes are carelessly dumped somewhere in nature. Cities urgently need to reduce their environmental impacts and ecological footprints, and to contribute to restoring damaged ecosystems. Locally, we need to create and protect pleasant, green urban environments, but we also need to revive urban and peri-urban forestry and agriculture, accelerate the deployment of renewable energy systems, make effective use of urban wastes and facilitate the growth of new, green economies.

We need to better understand our responsibilities, not only to the local and global environments on which we depend, but also ultimately to future generations. They want to live on a planet that has not been wrecked by those alive today.

I start my talk by looking at the concept of 'Agropolis', drawing on the work of the 19th century geographer Heinrich von Thünen, who wrote a book called 'The Isolated State'. In this book he describes the 'embeddedness' of towns and cities in their local landscapes. I then move on to look at the city that we inhabit today, 'Petropolis', which is defined by fossil fuel dependence and long-distance supplies with impacts right across the planet. Finally, I present a third concept of the city that I call 'Ecopolis' – the regenerative city.

I also examine the concepts underlying the discipline of urban ecology and whether it should prioritise the study of the urban metabolism and, beyond the urban perimeter, of the ecological footprints of cities. I will also introduce the idea of the ecophilic city, a city that takes responsibility not just for the quality of its local environment, as in the concept of biophilia, but also for its global environmental impacts.

Agropolis

In the mid-19th century the German geographer and economist Henrich von Thünen, in his book 'The Isolated State', showed that in a relatively isolated situation where cities had very limited access to transport systems, they were surrounded by a series of rings of cultivation. These start with the market gardens right on the edge of the town, where most of the vegetable production took place. The next ring was the city forest, the peri-urban forest. In the pre-industrial situation, in the absence of lorries or barges available to transport heavy lumber,

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it was important to have forest nearby, because firewood and building timber are heavy. Then further out, there were various rings of less and less intensive cultivation, producing grain, root vegetables and other food and fodder crops. Finally, maybe half a mile or even further away, there was the rough grazing for cows, horses, sheep and goats.

In contemporary prints of medieval cities and their surrounding countryside, the 'von Thünen rings' are much in evidence.

Twenty years ago I was filming for the BBC in and around a German town called Dinkelsbühl, one of the last European towns still surrounded by a ring wall. There I saw how in the evening cows were still being herded from outlying pastures back into the town itself, to be milked in stables within the city walls. In the morning they were herded out to graze again. That was an extraordinary thing to witness, something that does not exist in many places any longer.

These kinds of layouts (eg., Figure 1) of productive landscapes surrounding towns can still be observed in remoter, less accessible parts of the world. In many European cities urban and peri-urban forests still survive, being used primarily as amenity forest rather than for firewood or timber. The timber we use is imported from further afield these days. Firewood, of course, has become largely superfluous, and food, of course, is now brought in from all over the world.

In some parts of the world, such as China, despite the pressures of suburban growth, urban and peri-urban agriculture still plays a very important role. Even in megacities such as Shanghai, peri-urban farmland is actually administered by the city authorities themselves in order to secure a local supply of vegetables, fruit and pond fish.

Traditionally, the nutrient supply for food crops was provided from compost, manure and also from night soil. In China until recently, night soil was routinely used for growing food crops. Such seemingly unsavoury practices have fallen out of favour, but the new reliance on artificial fertilisers (and pesticides) is polluting rivers and coastal waters. We need to find new ways of closing the circle, and of utilising urban sewage and compost as a nutrient supply to peri-urban farms.

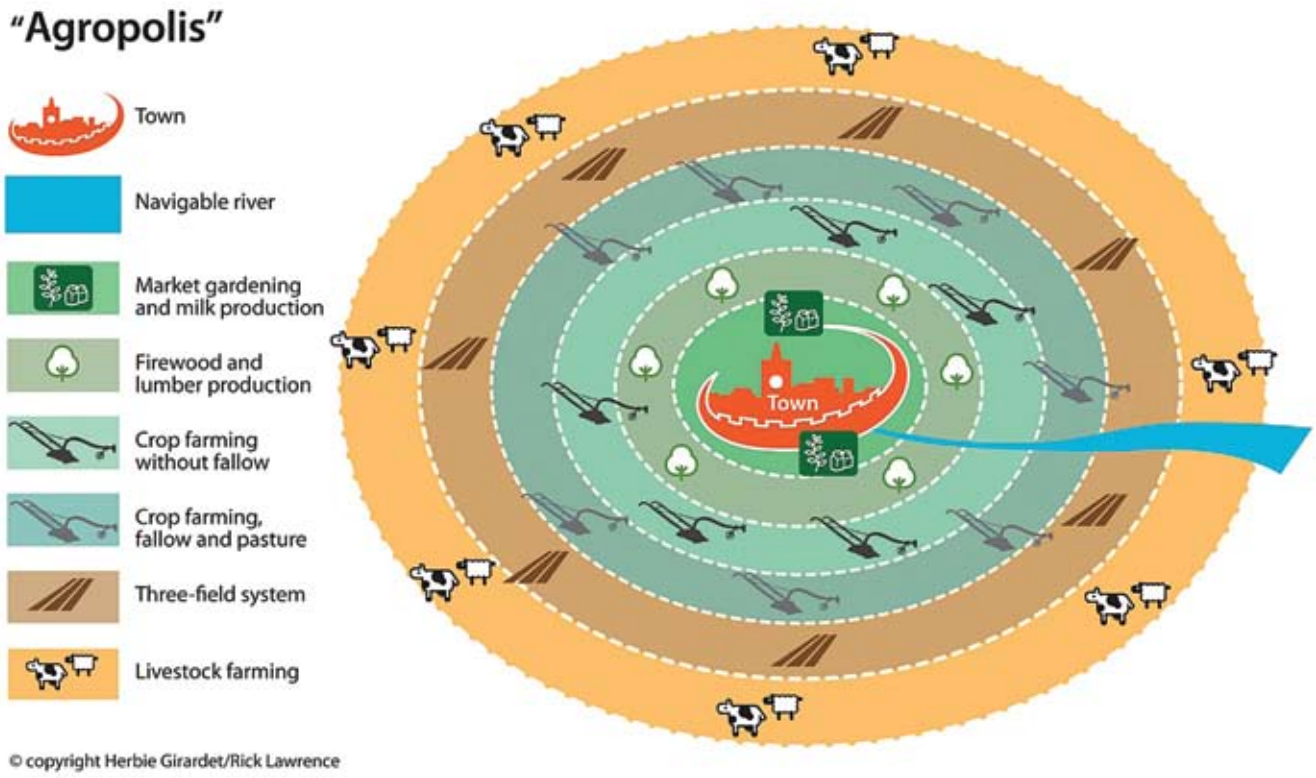

Figure 1: Agropolis – the preindustrial, traditional town defined by reliance on food and fuel wood supplies from its local hinterland

Petropolis

Today we do not live in Agropolis, but in 'Petropolis' (Figure 2). This is the *autophilic* city, not the *biophilic* or the *ecophilic* city. It can exist only because the technologies of the industrial revolution have provided the technological basis for the urban revolution.

But there is a systemic problem. Global urbanisation is reliant on daily injections of oil, gas and coal that accumulated in the earth's crust over hundreds of millions of years. As a giant heat engine, Petropolis is subject to *entropy*: the ancient energy used to run power stations, pumping engines, transport systems, factory conveyor belts, cranes and Internet server farms can be used only once, and ends up as low grade heat and waste gases.

Cities are vast interconnected systems designed to turn energy into 'work' or motion, flowing along their roads, rails, wires and pipes. As fossil energy is used and raw materials are processed, their quality inevitably deteriorates. The order that is established in the form of a city causes disorder elsewhere in nature. Thus, concentrating human activities in high-energy cities increases the level of entropy – disorder, waste and pollution – for the planet as a whole. This systemic reliance on non-renewable energy raises major questions about the long-term viability of our cities.

From the late 18th century onwards, London pioneered his kind of unsustainable urban development. Industrial revolution technologies and global trade fuelled its economy and its unprecedented growth from one million people in 1800 to over eight million people in 1939. London pioneered systems of motorised public transport, long-distance resource supply and linear sewage disposal that have been widely copied around the planet.

London is a magnificent and popular city, with wonderful buildings and a throbbing cultural life. Its public parks and private gardens are famed across the world. It has nearly as many trees as people, but environmental sustainability is not its strongest point. Just take energy: London is dependent on the equivalent of about two super tankers of oil to meet its weekly energy needs.

We need new tools to understand how our urban systems work and to address the systemic problems

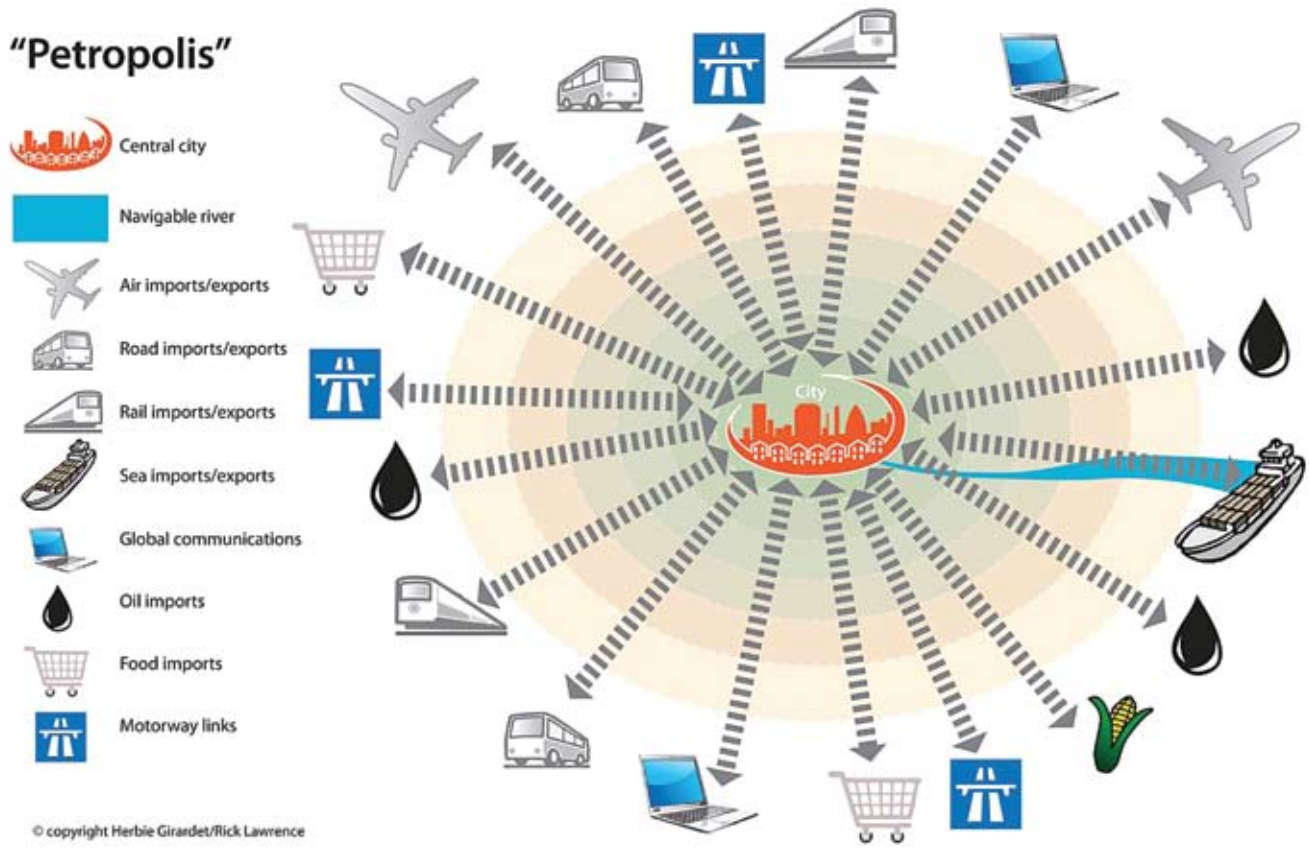

Figure 2: Petropolis – the modern city defined by global fossil fuel dependence and global supplies

of urban sustainability. To get a clearer picture of the environmental 'performance' of cities, balance sheets comparing urban resource flows across the world have been drawn up in recent years. Similar sized cities appear to supply their needs with a greatly varying throughput of resources.

In 1995, I undertook an input-output analysis of London's resource consumption and waste discharge for the new Greater London Authority. My input-output figures for London also allowed me to quantify its ecological footprint. I calculated that about 125 times London's own land surface is required for its food and timber supplies, plus the territories needed to sequester its carbon emissions. But my figures did not include the areas needed to supply pet food and fish. If you add these factors, London's ecological footprint adds up over 250 times its surface area – twice the size of the UK's productive land. Yet London only has 12% of the UK's population.

A key systemic problem of Petropolis is that only half of the CO_2 emissions discharged by the world's cities are currently being absorbed by the biosphere – the world's oceans, forests and soils. Yet as climate change looms ever larger, modern cities surely have a major responsibility to find plausible ways for their CO_2 emissions to be sequestered. Urban trees can only make a small contribution to this.

In addition to fossil fuels, an urbanising world now utilises the bulk of the world's biological resources, including timber and forest resources of all kinds. This is a serious concern. We urgently need to find ways of reducing these resource throughputs whilst helping to regenerate the world's depleted ecosystems.

Recently, there has been much talk about the 'triumph' of the city: that solutions to the world's environmental and climate problems can most easily be implemented in cities because, as places where most people live closely together, they have the potential to make efficient use of resources. But I question that optimism. It is certainly true that in the fairly compact cities of Europe, the per capita ecological footprint of city people tends to be smaller than that of rural people. Most rural people have become supermarkets consumers like city people but, in addition, they usually require more personal transport. In the US and Australia, rural transport dependence – and therefore fossil fuel dependence – is even greater. But in China and India, rural people have much more frugal living standards; as farmers and villagers move from their local rural setting into a city, their per capita resource consumption typically goes up fourfold. Urbanisation in this context becomes a major environmental problem. It is true that a move to the city tends to improve people's living standards, but are there better ways to alleviate poverty than enabling more and more people to live off the earth's capital rather than its income?

In this context, our individual contribution to urban resource consumption becomes critically important. Currently, cities have an essentially linear, unidirectional metabolism, with resources flowing through the urban system without much concern about their origin, or about the destination of waste. Inputs and outputs are treated as largely unconnected. Fossil fuels are extracted from rock strata, refined and burned, and the waste gases are discharged into the atmosphere. Raw materials are extracted, processed and assembled into consumer goods that ultimately end up as trash that cannot be beneficially reabsorbed into living nature. In distant forests, trees are felled for their timber or pulp, but all too often forests are not replenished.

Similar processes apply to the urban food system. Nutrients and carbon are removed from farmland as crops are harvested, and then processed and eaten. The resulting sewage, with or without treatment, ends up in rivers and coastal waters downstream from population centres, and the plant nutrients it contains are rarely returned to farmland any longer. Rivers and coastal waters all over the world are 'enriched' by a potent mix of urban sewage and toxic effluents, as well as the run-off of mineral fertiliser and pesticides applied to the farmland used for feeding cities.

The *local* effects of urban resource use also need to be better understood. Cities accumulate large amounts of materials within them. Vienna, with some 1.6 million inhabitants, increases its actual weight by some 25,000 tonnes every day. Much of this is relatively inert materials, such as steel, concrete and tarmac. Other materials, such as heavy metals, accumulate in the local environment and have detrimental effects as they leach from the roofs of buildings and from water pipes. Nitrates, phosphates and various chemicals accumulate in soils and watercourses, threatening the health of present and future inhabitants.

Modern cities are the home of 'amplified man'. Whilst we are essentially biological beings, our 'amplification' via a huge array of technologies defines our identity as never before. This point can be vividly illustrated by our energy consumption. As purely biological creatures our energy output – derived from the food we eat – is a maximum of 100 watts per person (our brains use about 30 watts). If that electricity were generated in a typical coal-fired power station, it would take about 325 kg of coal to power a 100-watt light bulb for one year.

But what about the number of 'energy slaves' we have working for us in the form of motors, engines and machines? In Europe today we actually use about 60 energy slaves to support our daily lives: 59 times more energy is provided by technical means than our bodies can derive from the food we eat. The average daily energy requirement of a European is currently about 6,000 watts, whilst North Americans use about 11,000 watts. This daily energy demand, largely derived from oil, coal and gas, defines our existence as well as our impact on the planet more than anything else.

Our high-energy lifestyles are being copied across an urbanising world, but the awareness is also growing that we live in a world of limits. The more fossil fuel energy we use today, the less will be available tomorrow. And then there is the issue of climate change. Most of the increase in carbon dioxide in the atmosphere is attributable to combustion in and on behalf of the world's cities. At the start of the industrial revolution, atmospheric CO_2 concentrations were around 280 parts per million (ppm), but since then they have risen to 390 ppm. Until recently, it was widely assumed that we could get away with doubling pre-industrial concentrations. But gradually it has become clear that this could cause the planet to overheat, with ever more volatile climatic conditions, sea level rises threatening coastal cities and dire consequences for all life.

In an age of climate change, peaking oil supplies and deteriorating ecosystems, Petropolis is an outmoded model of urbanisation. Whilst the Petropolis model is still spreading throughout the developing world, there is little doubt that it has a profoundly uncertain future. The feast of energy and resource consumption in which we are engaged is an exercise in accelerated entropy – it is up against non-negotiable natural laws and limits.

Cities, as centres of national economies and consumerism, take more resources from nature than ever before and discharge their waste into the global environment. As they draw down the world's natural capital, planetary boundaries are becoming increasingly apparent. Can cities find ways to live off nature's income, rather than its capital, and to help enhance the natural systems from which they draw resources?

Ecopolis

A critical issue today, as cities become the primary human habitat, is whether urban living standards can be maintained whilst the local and global environmental impacts of cities are reduced to a minimum.

A primary task that we have is to try and map out what is *necessary* in order to try and expand the boundaries of what is politically *possible*. The challenge is to find ways of converting cities into environmentally regenerative systems, offering new green business and job opportunities, but without burdening financially challenged city administrations. We need to create spatial structures that satisfy the needs and aspirations of city people whilst also assuring their long-term ecological and economic resilience.

The idea of 'Ecopolis' (Figure 3) aims to draw together the various themes discussed in this text into one comprehensive concept. The challenge is to provide secure urban habitats that provide pleasant spaces for work, recreation and human interaction; that are free from pollution and waste accumulation; and that help to enhance rather than degrade external environments.

Regenerative cities are created from the inside out. First of all people need green, pleasant spaces for life, work and play that are free from pollution and waste accumulation. They need to benefit from efficient, renewable energy systems, bringing urban energy economies 'back home'. But they also need to ensure that their daily practices contribute to the continuous regeneration of the ecosystems beyond city boundaries on whose well-being they ultimately depend.

Ecopolis is 'biophilic' in that its local environment is enhanced by green spaces for its people to enjoy and benefit from. But it also embraces the wider notion of 'ecophilia' in that it ensures a symbiotic, life-enhancing relationship to the world's ecosystems.

Conceptualising Ecopolis, then, requires us to extend the concept of urban ecology from focusing primarily on the interactions of living organisms within cities and the benefits of vegetation and green spaces for human populations to encompassing the wider global living environment from which cities draw resources. Urban ecology should help us define a mutually beneficial, regenerative relationship between urban populations and the world's ecosystems.

Ecopolis incorporates some elements of Agropolis, the traditional town that emerged out of its local countryside. But unlike Petropolis, its contemporary successor, Ecopolis is powered primarily with modern renewable energy from its own territory and hinterland.

Ecopolis is defined as a regenerative urban system. It is inspired by the way in which the earth's ecosystems function in an essentially circular manner: all waste emanating from nature continuously regenerates its ecosystems, enriching soils and facilitating plant growth.

Planners seeking to design resilient urban systems would be well served to study this efficient, circular, zero-waste metabolism of natural systems. To ensure their own long-term viability, cities need to operate as essentially circular systems, encompassing the rural environments on which they depend. Outputs need to become useful inputs into local and regional production systems. Most importantly, composted organic waste – plant nutrients and carbon – need to return to the farmland feeding cities to ensure its long-term fertility.

In dealing with the metabolism of cities, we need to differentiate between their biological cycle and their technical cycle. With economic growth and increased consumerism, technical waste is being generated in unprecedented quantities. Whilst the recycling of paper, metals and glass has become well established in recent years, technical and electronic waste is accumulating in nature. We are only just beginning to put highly problematic materials such as plastics out of harm's way and to turn them into long-lasting inert

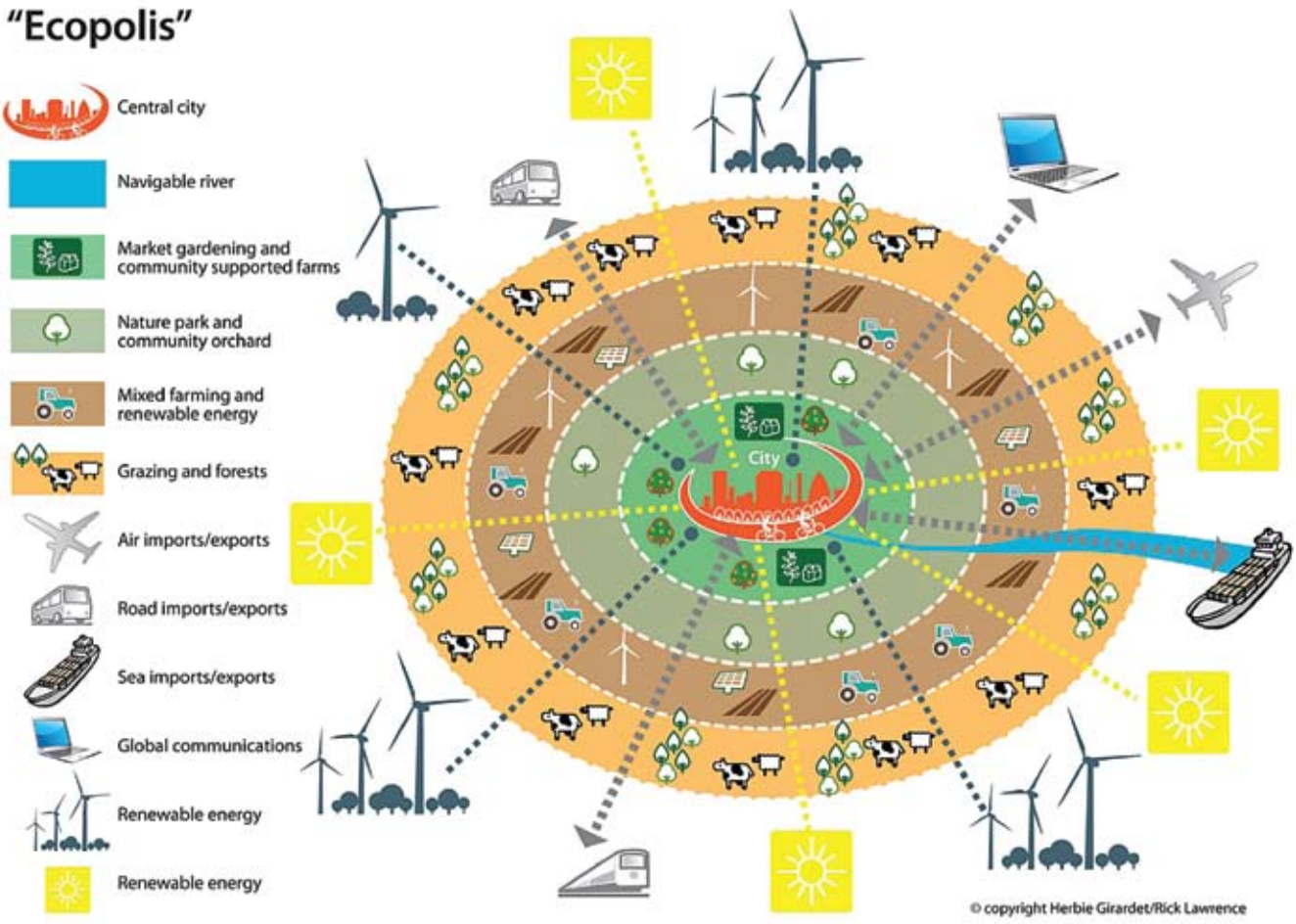

Figure 3: Ecopolis – the city that reconnects to its local hinterland, utilising new modern renewable energy and regenerative, soil-restoring food production systems

The value of ecosystems services

We cannot manage what we do not measure and we are not measuring either the value of nature's benefits or the costs of their loss. We seem to be navigating the new and unfamiliar waters of ecological scarcities and climate risks with faulty instruments. Replacing our obsolete economic compass could help economics become part of the solution to reverse our declining ecosystems and biodiversity loss. We need a new compass to set different policy directions, change incentive structures, reduce or phase out perverse subsidies, and engage business leaders in a vision for a new economy. Holistic economics – or economics that recognises the value of nature's services and the costs of their loss – is needed to set the stage for a new 'green economy'.

From Pavan Sukhdev's report *The Economics of Ecosystems and Biodiversity*

products such as fence posts and outdoor furniture. This issue needs our urgent attention.

Alternatives to fossil fuels are another critical issue. Can modern cities be powered primarily by renewable energy? In recent years, more and more cities have installed solar energy systems within their own built-up areas, but invariably further supplies are needed from elsewhere. A large proportion of the renewable energy required by cities may need to come from peri-urban areas, under a principle that could be called 'energy subsidiarity'. This means that as much renewable energy should be supplied efficiently from as nearby as possible, using combinations of various technologies – solar, wind, biomass, geothermal – plus innovative energy storage systems.

In recent years, the cost of wind power and solar power has dropped dramatically and they have started to seriously compete with fossil fuel energy. Innovative policy instruments, such as feed-in tariffs, have greatly accelerated investment in renewables whilst at the same time helping to reduce renewable energy generating costs. In addition to domestic energy supply, renewable energy for powering electric vehicles is becoming an economically viable proposition.

Biogas from urban waste, and from farm and forestry waste, is another important energy option. Applied together, renewable energy technologies and novel energy storage systems will enable us to de-couple urban systems from their systemic dependence on fossil fuels in a matter of decades.

Renewable energy does not make sense without energy efficiency. Many remarkable breakthroughs are now also underway regarding the energy efficiency of buildings, production processes and transportation systems, and these are best deployed in unison with renewable energy systems.

Urban and peri-urban agriculture is another important feature of Ecopolis. How can more urban food supplies come from nearby regions than is currently the case? Many examples of successful urban and peri-urban agriculture can now be found all over the world.

The urban agriculture and forestry practices used in Havana, Cuba stand out. They are a remarkable example of how a crisis in the early 1990s – the collapse of the trading relationship been Cuba and the Soviet Union – was turned into an opportunity to create an urban food supply system from within and around Havana; not just vegetables but also bananas and a wide range of tree crops. The Cuban model is of great relevance for cities across the world, particularly in developing countries.

Increasing regional food supplies is an important issue at a time when global climate change is threatening to affect long-distance food supplies, with unexpected droughts and floods causing havoc to farms across the world. There is growing concern about the security of global urban food supplies over the coming decades as both temperatures and climate variability rise.

In Europe and America, creating greenspaces and amenity landscapes in and around cities tends to have priority over food production, but in other parts of the world there is an urgent need to assure both urban food supplies and livelihoods for the urban poor.

Of course, modern cities tend to be much larger than traditional human settlements. Far more people have to be accommodated in cities today than even a hundred years ago, and this needs to be factored into developing concepts for creating human settlements fit for the 21st century.

Copenhagen is large city of over three million people, and it a remarkable example of green innovation.

In its post-war urban plan of 1947, Copenhagen set out to develop along five 'green fingers' centred on commuter rail lines that extend from the city's 'palm', the dense urban fabric of central Copenhagen. In between the fingers, green wedges were created to provide land for both agriculture and recreational purposes. Then, in 1962, as the volume of traffic became intolerable in its old narrow streets, a radical redesign of the heart (the palm) of the city was undertaken. Copenhagen's City Council decided to establish a car-free pedestrian zone in the maze of narrow streets and historical squares of Copenhagen. Today, with a total length of almost 3.2 km, it is the longest inner-city pedestrian street system in the world. It has resulted in a Mediterranean-style ambience in which markets, cafes, restaurants and greenspaces proliferate.

In Copenhagen, urban green solutions combine liveability, sustainability and regenerative development in a very effective way. Initiatives on energy efficiency, combined heat-and-power and renewable energy have gone further than almost anywhere in the world, and the same goes for circular waste management. Copenhagen also has more cyclists than most other European cities due to a highly developed network of cycle lanes. Pedestrianisation of the city centre goes hand in hand with ubiquitous cycle routes and cleverly designed public transport schemes.

But Copenhagen has further ambitions. It is working to become the world's first carbon neutral capital city by 2025. Its municipal strategic climate action plan combines 50 initiatives. These have already yielded significant environmental as well as economic benefits. The green economy in the capital region grew by 55% from 2007 to 2012, generating thousands of new jobs.

Such complimentary, multifaceted approaches to regenerative urban development are being implemented elsewhere too. In 2003, I was invited to work as a 'Thinker in Residence' in Adelaide. The then premier of South Australia, Mike Rann, asked me to produce a plan for greening metropolitan Adelaide in conjunction with city planners, community groups and the business community. The task was to propose ways in which a highly inefficient, carbon intensive city could be turned around, and how this could benefit the local economy.

In the mid-19th century, Adelaide had been conceived as a pioneering garden city set in 760 hectares of parkland covered by tens of thousands of elm and eucalyptus trees – an environment of great amenity value. But after the Second World War, low-density automobile-driven growth came to expand this city into a suburban region of 1.3 million people. As in many other cities across the world, commuting, consumerism and throw-away attitudes soon came to define life in Adelaide. But since 2003, remarkable things have started to happen. Adelaide has become a world-leading green city. Above all else, the tremendous possibilities inherent in turning a highly inefficient linear urban metabolism into a circular system were recognised.

In 2003, there was hardly any organic waste recycling in Adelaide, but since then it has become a world leader in turning organic waste into compost for use on nearby farmland. In conjunction with the use of recycled waste water, 20,000 hectares of peri-urban farmland in a place called Virginia on the northern edge of the city supply a wonderful variety of vegetables and fruit that is sold primarily in Adelaide's central covered market. To deal with deforestation, to help stabilise the soil and to counter increases in ambient temperatures, some three million trees have been planted in and around the city.

Metropolitan Adelaide, then, has acquired many of the attributes of a regenerative city. There has been a remarkable benefit from all of these measures in terms of creating a new green, regenerative economy in Adelaide. Here is a summary of the transformations that have occurred since 2003:

- Over 30% of electricity produced by wind turbines and solar PV panels.
- Photovoltaic roofs on 140,000 (of 600,000) houses, and on most public buildings.
- Tindo, the world's first bus running on solar energy.
- Solar hot water systems mandated for new buildings.
- Large-scale building tune-up programmes across the city region.
- 60% carbon emissions reduction by municipal buildings.
- 15% reduction in CO_2 emissions in Greater Adelaide since 2003.
- Construction of Lochiel Park Solar Village, with 106 eco-homes.

- Water-sensitive urban development across the city region.
- Three million trees planted on 2,000 hectares for CO_2 absorption and biodiversity.
- A zero-waste strategy driven by ambitious recycling incentives.
- 180,000 tonnes of compost a year made from urban organic waste.
- 20,000 hectares of land near Adelaide used for vegetable and fruit crops.
- Reclaimed waste water and urban compost used to cultivate this land.
- Thousands of new green jobs.

Cities in many countries are taking similarly positive initiatives, trying to decouple from a systemic dependence on fossil fuels, and from reliance on global food imports whilst trying to create a regenerative relationship between themselves and the ecosystems beyond.

An important point in this context is to secure adequate and clean water supplies for cities by the protection and restoration of nearby watersheds. The detrimental effects of rapid runoff and landslides from denuded hillsides in city regions across the world have been widely reported, and the importance of watershed protection and reforestation is all too evident.

A growing number of cities are taking significant ecosystem initiatives beyond their urban boundaries. The measures initiated by New York City in the nearby Catskills watershed are a prime example. The Catskills is the largest unfiltered water supply in the United States and is one of New York City's most important natural resources, providing about 1.3 billion gallons of drinking water to roughly nine million people every day. Because artificial filtration for that much water would have been prohibitively expensive, New York City decided to invest millions of dollars to protect and regenerate the watershed instead, and to maintain its high water quality.

The Catskills watershed, which supplies 90% of New York City's water, is the largest naturally filtered water supply in the United States, covering over 400,000 hectares. Maintaining quality standards for such a large water supply without artificial filtration requires millions of dollars each year. This money is not spent on technology, but on outreach and education, land management and acquisition, and is a joint initiative between watershed NGOs and municipalities.

Large-scale reforestation and forest protection initiatives like this are now being taken in various parts of the world. For instance, in denuded river catchments, such as the headwaters of the Yellow River in China, thriving reforested landscapes and agricultural landscapes have been created on a vast scale.

Then there is the issue of carbon sequestration by vegetation and forests. Trees have an enormous surface area. A few years an American forester and I did a back-of-the-envelope calculation to try and estimate the loss of surface area caused by the reduction in the world's forests cover over the last 100 years. A preliminary finding was that the actual land surface area of the planet may have been reduced by as much a 50%. This is an issue worth exploring further.

I am, of course, referring primarily to the effects of the loss of the earth's living surfaces, rather than the rock surface or denuded soil surfaces. In a climate-challenged world, large scale reforestation – for storing CO_2 in tree canopies and soils and for countering soil erosion – has to be a crucial issue for the world community.

It is important to emphasise again that the creation of regenerative cities will require not just changes to urban land and resource use planning, but also national and trans-national policy initiatives.

We need to move out of Petropolis into Ecopolis. The ecological, economic, social and *externalities* of our urban systems have to be addressed in effective new ways. We need creativity and initiatives at the local level, but we also need appropriate *national* policy frameworks to enable useful things to happen *locally*. Without national policy initiatives, enhanced by lively public debate, the necessary changes will not happen fast enough, if at all. For example, feed-in tariffs for renewable energy in Denmark and Germany came out of vigorous public demand that was turned into national policy that was then implemented primarily at the local level.

The participation of the general public in developing regenerative cities is also crucially important. In Curitiba in Brazil, large public displays show how the recycling of timber and forest products has dramatically reduced the need to cut down trees. In cities everywhere the general public needs to become aware of the benefits of participating in this sort of process.

Cities cannot implement everything by themselves. They need to work together to lobby for transformative national policies on renewable energy, waste recycling, energy efficiency, local food supply, local revenue raising, and so forth that enable cities with bold new regenerative development initiatives.

Internationally, cities need to work closely together to develop and implement policies for regenerating regions across the world that have been damaged and depleted by urban consumption patterns. Our global connectedness has reached unprecedented levels, but trying to find shared solutions to the many environmental problems linked to global urbanisation has barely begun. It is becoming apparent that the connectivity facilitated by the Internet can be instrumental in facilitating these processes. A few international organisations have made a tentative start, but much more needs to be done.

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