

# *Sustainable City Regions: Re-localising Landscapes in a Globalising World*

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This paper emphasises physical, technological and economic variables in a globalising world, and how they might influence local economies and local landscapes. With the expected 'big rollover' in demand versus supply of oil in the next decade, the scale of the landscape will change in response to a permanent rise in the price of transportation and shipping fuels. Air travel will become less accessible, as will shipping of high mass, low value-added materials and goods. This will necessitate the re-establishment of more local supplies and shorter transport distances for people and goods, and for the first time in human history the perceived size of the world will expand. In response, the 'grain' of the landscape will become finer. More people will populate the rural landscape, while cities and towns will become more compact.

The landscape is influenced by the three major operative technological systems (matter, energy and information). While the depletion of oil will greatly affect matter and energy, it will have less influence on information, which is relatively immune from entropic thermodynamic effects. While source-to-end-use distances will shorten, world per-capita energy expenditures will fall, and more local goods will be created and consumed, it remains to be seen whether this contraction in the scale of the instrumental landscape will be matched by more localised ownership, or by continued globalisation of corporate systems of production and distribution. Assuming the former is preferable, the paper concludes by suggesting that the bioregion, or natural 'life place', is the appropriate location for the protection of biodiversity, sustained use of resources, and identity and life satisfaction of local inhabitants.

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## INTRODUCTION

I AM A 'BIOREGIONALIST', one who believes that the world would be a much better place if it could be organised around 'naturally defined', 'self-similar regions', each of which would have a unique identity, culture, and strategy for living as much as possible within that region's ecological limits and potentials.

A 'bioregion' is literally and etymologically a 'life place' – a unique region definable by natural (rather than political) boundaries with a geographic, climatic, hydrological and ecological character capable of supporting unique human and non-human living communities.<sup>1</sup>

## KEYWORDS

*Bioregion  
Sustainable  
Technology  
Life place*

## THE TALE OF "THE THREE BEERS"

My focus in this paper hinges on economic and energy trends and the relative ways technologies are manifest in the regional landscape. To illustrate the essence of my message, allow me to begin by telling a hypothetical (but highly realistic) fairy-tale: the "Tale of the Three Beers".

Once upon a time there were three beers, Papa Beer, Mama Beer, and Baby Beer. Papa Beer was a 'Budweiser'. In his homeland he was fond of referring to himself as the 'King of Beers', and was brewed uniformly at several places, but was shipped all over the world as an icon of American culture. He was owned by a multitude of stockholders, and his stock was traded worldwide. Much hoopla was made by advertisements and billboards about how good he was to drink, but slowly the people tired of his boring, watery taste.

In the small town of Davis, California, there was another beer. Her name was Sudwerk, and she was a local micro-brew. She was the proud product of a local brewer who had been to Germany, studied brewing, then moved to Davis intending to produce the best tasting beer in the world. She was made from regional ingredients and was consumed mostly by locals, who flocked to her brew pub to drink a few pints and talk to their friends. She was actually part of a trend; there were a great many such local 'Mama Beers' springing up, one in each major American city, and many even in small towns. People began to drink so much of her kind of micro-brewed beer that Papa 'Bud' Beer began to fear for his life.

With the help of his stockholders, an idea came to Papa Bud Beer. He would steal Mama Beer, marry her, keep her in servitude and produce offspring. So Papa Beer stole Mama Beer, and their first child, nicknamed 'Baby Beer', was actually formally called 'Pacific Ridge Pale Ale'. She had a picture of the snowy Sierra Nevada mountain range on her label, which proudly said 'Brewed in Northern California', and was styled to look a lot like her mother, the micro-brewed beer. King Bud wanted Baby Beer to appeal to all the folks who drank Sudwerk and other micro-brews. But unfortunately, Baby Beer was actually brewed at her father's enormous Budweiser plant in Fairfield, far away from those snowy mountains on her label.

For a while, Papa Beer was very proud. Soon, however, the people tired of Baby Beer's flat, watery taste and her deceptive label. 'Local beer, my rear', the people said, and soon stopped buying her. One day, Baby Beer died from lack of attention by customers. Mama Beer soon divorced Papa Beer and joined a social movement to promote more local micro-brewed beers.

But the story doesn't end here ... there will be a sequel. Papa 'Bud' and his five or six huge global beer friends began to buy local micro-breweries as the only way to win back the market share they had lost. Stay tuned for the next episode ...

This allegorical tale is analogous to what is happening in many sectors of the global economy today. And before I elaborate, let me make an emphatic point up front.

The type of ownership, distribution and consumption of essential goods to, from, and within our regions will have an immense impact on the nature of local landscapes, communities and ecosystems.

## ALTERNATIVE ECONOMIC FUTURES

Consider the important geographical and ownership relationships between the sources, distribution networks, end uses, and waste or recycling locations of the things we need for modern life. There are basically three different future scenarios for the way these conditions might relate:

### *Scenario one*

Resources are harvested, products are produced, and both are shipped across vast distances, consumed, and the wastes are disposed of 'globally', where ownership of the means of production is shared by a globalised network of investors.

### *Scenario two*

Resources are harvested, products produced, consumed and recycled 'locally', where capital ownership of the means of production is also localised within naturally definable regions concurrent and coincident with local cultures and economies.

### *Scenario three*

Resources are harvested, products are produced, consumed and recycled locally, but capital ownership of the means of production is shared globally and consolidated within a few giant corporations in each sector.

I am convinced that the first scenario is actually a physical impossibility. Trends toward this future direction will end, inevitably, and sooner than we think.

## THE END OF "OILLUSION"

In previous papers I have mentioned a condition I call "oillusion" – the mistaken assumption that an endless supply of cheap fossil fuel exists to expand world trade and facilitate global economic expansion indefinitely. It is remarkable how many economists and economic models cling to this version of reality. Under this false presumption, the only barriers to supposedly 'free' trade are those of labour and financial capital.<sup>3</sup>

Recently, however, estimates by industry experts on the amount of oil remaining have been reduced dramatically, and the projected time until the 'big rollover' – when oil demand exceeds supply – has been shortened. Estimates by trustworthy energy think tanks now put that point as close as 2010, or even 2007. The *National Geographic's* June 2004 cover image broadcasts the "End of Cheap Oil". Oillusion, it seems, is showing some cracks in its façade.<sup>4</sup>

After the rollover, there will be a steep rise in the price of oil, as it will be increasingly costly to remove more oil from the ground. This steep rise in the price of oil is known as the "Hubbert Peak", after petroleum geophysicist M King Hubbert, who in the 1950s pioneered a method of projecting the decline in oil availability and the concurrent peak in oil production. Nearly all energy forecasters agree that it will no longer be business as usual.<sup>5</sup> Some scientists think there is so little oil left in the ground it is possible that global warming will not be a factor in the long term.<sup>6</sup> According to a few forecasters, that point has already occurred.

Therefore, regional landscapes forged by the presumption of endless, cheap oil, and economies built on the synthetically low-priced importing of most physical necessities via long-distance shipping, are in for some serious readjustment. At

that point, for better or for worse, society becomes beholden to renewable energy sources, which have vastly different accumulation rates and cannot be harvested or sustained at anywhere near the current 'flux' rate, or rate of per-capita energy expenditure. Global per-capita energy consumption must then decline, and human life on earth must become dramatically more energy efficient.

But, as I will emphasise, because the 'economy' (and money itself) is merely electronic information, it is not constrained by the same physical limitations that affect matter and energy. Culture, political power, stock in corporations, currency and so forth, are all forms of 'information', which can be global, local or anything in between, with scant concern for the limits of material goods or energetics.

## ECOLOGICAL FOOTPRINTS AND BIOCAPACITY

One way to perceive feedback between our own organismic existence and the condition of our earthly support systems is the 'ecological footprint' – a calculated area of land that would be needed if we were to live sustainably with respect to food, fibre, energy and water.<sup>7</sup>

Cities and nations of the developed world often create ecological footprints up to 20 times the area of their own local regions. The city of Vancouver, Canada, would need an area 19 times as large as its home region to provide sustainably for its food, fibre, wood and water needs. The Netherlands would need a land area 15 times as large as the country itself. My own ecological footprint as a consuming Californian is over five hectares, or about twelve acres.

Each country also has a calculable index of 'biocapacity', which is a measure of the amount of productive land contained within the nation's borders that is available for servicing the country's needs for water, grazing, crops, energy. If a region or nation's biocapacity is less than its ecological footprint, then that country or region has an 'ecological deficit'. If the biocapacity is greater than the ecological footprint, the region or nation has a 'surplus'.

It is helpful to look at some statistics for both the United States and New Zealand. According to the data, New Zealanders 'consume' an average of 8.7 hectares of land per person, while Americans consume 9.7 hectares. But New Zealand, with a population of 3.8 million, has a net ecological surplus of 14.28 hectares of productive land per person, while the United States has a net ecological deficit of 4.43 hectares per person.<sup>8</sup>

How might these statistics translate in terms of potential for regional/national self-sufficiency? Quite simply, you New Zealanders have excess capacity for ecological productivity and self-reliance, given your rich and productive natural environment considered in relation to your population. We Americans, on the other hand, have already exceeded our ecological footprint needs and are literally milking other nations and regions for our ecological services. There is no doubt that we are taking some of your excess biocapacity. Hopefully, we are buying it from you and not stealing it.

While ecological footprints say nothing about where countries obtain their extra biocapacity, they do say a great deal about which regions and nations of the

world are living beyond their local limits (Japan, Great Britain, the United States, Germany, for example). They also reveal which countries have excess natural capacity (New Zealand, Canada, Australia, Brazil, Argentina, for example), and which countries just about break even (Sweden, Indonesia, Thailand, for example).

## JANE JACOBS AND THE CITY REGION

The elder stateswoman and American urban theorist, Jane Jacobs, put forward a very powerful theory in the mid-1980s with her famous book, *Cities and the Wealth of Nations*.<sup>9</sup> In that book, she articulates her conclusion that the true foundation of economics is in the relationship between a city and its countryside, or (I might interpret), its 'life place'.

Jacobs presents four key concepts having direct or indirect implications for the economics of bioregions: import replacement, city regions, improvisation, and faulty currency.

### *Import replacement*

To be self-sufficient and vital, cities and their surrounding regions must replace imports with their own raw materials, goods, services and expertise. Most cities, Jacobs contends, are not vitally import-replacing. By replacing imports, cities and their surrounding regions may:

- Enlarge markets for local and nearby rural goods.
- Increase the numbers and kinds of local jobs.
- Increase transplants of city work into the local region.
- Create new uses for the technology of rural production.
- Grow city capital.

### *City regions*

Jacobs posits the 'city regional' economy as the true, classical means of providing necessities for people. A dominant city and the life place that supports it form a 'city region'.

### *Improvisation*

What allows cities to become import-replacing city regions, according to Jacobs, is improvisation.

### *Faulty currency*

Jacobs (1984) clearly criticises national (and, by extension, international) currencies: "National or imperial currencies give faulty and destructive feedback to city economies and ... this in turn leads to profound structural economic flaws, some of which cannot be overcome no matter how hard we try."

As we shall see, Jacobs's notion of self-sufficient economic city regions will become ever more critical in the post-fossil-fuel world economy. Her 'city region' and the evolving 'bioregion' might converge to describe the same territory, as more and more economic activity is based upon quality of life and other measures of environmental quality, such as clean water, clean air, renewable energy, biodiversity and recreation.

## ECONOMIC RE-LOCALISATION AND BIOREGIONAL THEORY

With the end of illusion comes a very large additional dimension to natural re-localisation: can the evolving notion of a life place or bioregion be expanded to include that region which best represents the scale for provision of life's basic necessities? In short, can our bioregions begin (once again) to provide more of our basic resources such as food, water, energy and material goods? Might we be able to suggest that natural regions could be the simultaneous locus for social identity, biodiversity and a self-reliant economy?

As oil prices for the shipping of goods increase as a percentage of production costs, manufacturers will look at the relative costs of shipping versus labour in new light. After the big rollover, as shipping costs increase in comparison with labour, venues for production will be found closer to centres of consumption, and the overall 'grain' of the economic landscape will become finer. The end of cheap fossil fuels will mark the beginning of the re-scaling of the world's regional landscapes. Quite simply, we will not have the luxury of wasting our expensive fossil fuels to ship the same type of product in both directions across vast oceans.

Herman Daly, the unofficial dean of ecological economists, states: "Americans import Danish sugar cookies; Danes import American cookies. Exchanging recipes would be more efficient."<sup>10</sup> In one sentence, this suggests some important trends for the future. While we will not have excess fossil fuels to ship the same types of goods across oceans and between continents by sea or air, we will have the ability to continue exchanging information.

## MATTER, ENERGY AND INFORMATION

Consider this prescient quotation from Norbert Wiener, the inventor of cybernetics, who in 1961 said: "Information is information, not matter or energy. No materialism which does not admit this can survive at the present day."<sup>11</sup> Perhaps unknowingly, Wiener hit upon one of the most significant truths facing the landscape of the twenty-first century: the very different role that information, energy, and matter play in the structuring of our everyday regional landscapes.

Let us consider matter. Utilitarian movement of physical material, people and manufactured goods through the landscape not only forms the landscape but lends itself to obvious visual expression.

If one were to time-sample the environment experienced by a person once each hour of each day, one would find that most humans spend most time in surroundings of human-made matter and structure: walls, furniture, rooms, auto interiors, streets, parking lots, landscape vegetation, warehouses, stores, offices, bedrooms, yards and so forth. Most of these physical materials have been changed or altered significantly by humans. Whether we speak of the landscape, structural or 'product' environment, humanly manipulated matter literally and conspicuously envelops our daily existence.

Compared to matter, however, energy is not quite as legible in the landscape. It manifests itself primarily through the movement it facilitates in material systems.

Some systems of energy, like nuclear power plants, for example, are highly illegible: we just do not know what is going on inside. Other energy systems, like hydroelectric dams and wind turbines, have more clarity. We are vaguely aware of certain elements of the electrical utility grid (wires, substations, high-voltage lines and so on), but we really know little of where our electricity comes from or of the complex spatial order by which it reaches our homes and businesses.

Information is perhaps the truly invisible technical infrastructure. In its purest, mathematical form, information is invisible, yet information technology increasingly drives our global cultures and economies. 'Sunrise' industries, upon which we base our economic hopes (genetic engineering, computer software, cellular telephones and computer networks), create 'value' from information quantity and quality, not transformation of physical material or changes to landscapes.

Information technology is every place and no place at once: it can no longer be 'emplaced' or resisted – only disguised ineffectively at the very few points where it touches the land in some tangible fashion. One out of every ten college students walking between classes is talking on a cell phone, and that number is climbing. What does this imply for the future of our landscapes? Some people complain about the placement of cell phone towers, considering them 'ugly' and getting them hideously disguised as pine trees. Ironically, it is the 'function' of the cellular phone system itself, not the visibility of the towers, which threatens to destroy place.

## THE NETWORK SOCIETY AND RESISTANCE IDENTITIES

Manuel Castells is an expert on the influences of information technology on culture. He describes an emerging global "network society" characterised by virtual reality, rapid information, blurred social spaces, dissolution of the idea of time, accumulation of wealth by the few, and social arrhythmia in the familiar cycles of human life. In this new world, power is being reorganised from the "space of places" to the "space of flows".<sup>12</sup>

But Castells also notes the emergence of many powerful social resistance identities, each rallying around a particular value such as religion, state, region, neighbourhood, tribe, family, sexual orientation or environment. Resistance identities do not fit logically together, nor do they act in consort; in fact, many are totally unrelated to one another or even diametrically opposed. Resistance identities are all communal: they define exclusive communities of resistance to the perception or action of external oppression from the dominant social structure – a process that Castells describes as "the exclusion of the excluders by the excluded".

For the first time, a world of subjects (that is, social actors constructing an identity) is being shaped by deliberate, voluntary spatial decentralisation, while the dominant technical paradigm races toward consumerist homogeneity and corporate economic concentration. If globalism is so widespread and so inevitable, why don't more people embrace it overtly? I quote Castells: "There is no such thing as a citizen of the world".<sup>13</sup>

## WATERSHEDS, FOODSHEDS AND OTHER “NECESSITY-SHEDS”

Watershed organisations, local advocacy groups and self-defined bioregions, therefore, are certainly a significant form of resistance identity in the best sense of Castells’s definition. There appears to be something among the world’s people that does not want to become ‘one’.

One of the most fundamental life place organisations is the watershed stewardship. Nearly every stream or river in North America now hosts its own conservancy, stewardship or volunteer conservation group. With the coming of the big rollover in energy supplies, there will be added impetus to recognise the possible re-localisation of the geography of necessities other than water. Already there is a fairly strong “foodshed” movement.

Other physical entities can be considered and analysed in terms of their spatial collection and distribution ‘sheds’. Energy is the most obvious. California produces only about 50 percent of its electrical energy from power plants or fuels within state borders; the rest comes from elsewhere. Only 16 percent of its natural gas is local; the remainder comes from Texas, New Mexico, Wyoming or the Canadian Rockies.

It may be useful to think of many other types of ‘sheds’ in terms of scale and re-localisation: timber, dairy, meat, aggregate, textiles and so forth. Less energy is embodied because of reduced shipping distances, and as long as economies of productive scale are considered, the contractions in the provision of necessary material goods will be an output measure for the sustainability of the city region. Shorter and more compact ‘necessity-sheds’ will mean that sources and end uses of goods and materials will be closer to home and will provide more direct visual feedback to local populations on the conditions of supplies of renewable resources and the landscapes that provide them.

## HOW WILL CITY REGIONS RESPOND TO THE BIG ENERGY ROLLOVER?

### *Energy efficiency must be accelerated*

If anything will force more efficient use of energy, it is a steep spike in energy costs. Regions that strive to internalise energy costs and modernise energy delivery systems will reap increasingly valuable rewards. Energy audits and localised conservation programmes will benefit, as the concept of a ‘negawatt’ – a thousand watts of energy from conservation rather than a new source ... will achieve significant meaning.

### *Renewable energy must be utilised*

Renewable energy sources will never provide the same global per-capita consumption as non-renewables have done previously, but increasingly they will

make up the bulk of city region supplies. Wind farms, biomass conversion plants, and photovoltaic production of electricity from building surfaces are the best renewable energy-source prospects.

*Source-to-end-use matching must shrink shipping distances*

When costs to ship goods, especially bulky ones, skyrocket, new, closer-to-home sources for goods will be exploited, and substitute goods will be found.

*More local products must be consumed per capita*

As fuel costs rise, the value of 'the local' will rise with it.

*The scale of city regions again becomes important*

With the finer-grained scale born of increased energy, transit and shipping costs, the city region again becomes a critical scale for the marketplace of "exchanging natural values", as the author refers to it in *LifePlace* (see note<sup>1</sup>). 'Marketplaces', instead of being globally ubiquitous and invisible, may once again actually become 'places'.

*City regions must look toward import replacement*

With energy at a premium, low value-added but high-bulk volume necessities such as water, food, fibres, and aggregates will need to be obtained as close to markets as possible. Replacements of former imports from distant locations may be found by the improvisation of supplies from local venues.

*'Out of sight, out of mind' will no longer be possible*

Re-localising regions will be forced to confront the impacts of their own resource, energy, technology and water demands more openly. By necessitating local exploitation and conversion of resources, critical economic processes which once occurred far away may now take place in people's backyard.

A new relationship between supply, demand, consumption and impact may become a visible hallmark of the regional landscape. This anti-NIMBY (not in my back yard) tendency will force the 'visibility' issues of landscape and infrastructure out into the open, and may change the meaning of certain industrial or technological processes. While it may still be possible to disguise cell phone towers as Monterey pine trees, it will become more difficult for regions to pretend that they do not need mines, mills, farms, factories, dairies, power plants, water and waste treatment facilities and so forth. Infrastructure, which was either ignored, disguised or forgotten in the past, will become a necessary part of the landscape. When the process of re-localisation of economic necessities accelerates, a new phase will begin in the acceptance of 'regenerative' technologies as part of the landscape. We may begin to allow such things as wind energy plants, agricultural biomass conversion facilities, and photovoltaic surfaces on urban buildings into our everyday 'viewsheds'.

A trend toward re-localisation of such physical life necessities is inevitable; it will no longer be feasible for ships full of automobiles, coal, wood, or oil to pass each other going in opposite directions in the middle of the Pacific Ocean.

## THE BIGGEST UNANSWERED QUESTION: OWNERSHIP AND IDENTITY

It remains to be seen whether there will be a concurrent re-localisation of ownership of the means of production. Current trends are toward industry consolidation and globalising ownership patterns, fuelled by the fact that currency, capital, and economic information are merely electrons and can be zipped anywhere in the world with little thermodynamic or entropic loss.

As resistance identities, life place or bioregional organisations are the only real antidote to the de-spatialisation of the network society. They hold the key to whether a local region can resist domination by globalised ownership, and flower as a more self-sufficient, self-directed life place. A bioregion or life place – or we could call it a natural city region – is perhaps the most appropriately scaled spatial unit for doing three things:

- 1 Enfranchising communal social identity.
- 2 Re-localising the economy and physical infrastructure.
- 3 Protecting environmental quality.

One Swedish scientist, Folke Gunther, believes that a concurrent “re-ruralisation” of agriculturally productive regions will accompany the big rollover after the Hubbert Peak in world energy supply. Gunther bases his arguments on the coming need to bring the energetics and economics of food production back into balance with future energy availability.<sup>14</sup> It is interesting to explore some of the energy balances inherent in agriculture.

EROEI is the “energy returned on energy invested”. In human EROEI terms, growing wheat translates to an EROEI of only 0.10, or one food calorie returned for ten energy calories invested. Considering that the development of agriculture thousands of years ago by humans must have necessitated an original EROEI of greater than one (for example, more calories obtained than invested), this does not particularly indicate ‘progress’ in any physical sense of the term. Basically, we are eating oil. Consider the ridiculous EROEI for beef. One pound of beef requires 2.9 litres, or 0.75 gallons of ‘embodied’ oil inputs,<sup>15</sup> or 160 million calories of energy input content while yielding 1,200 calories of food content – a 133,333-fold investment of input calories per output calorie, or an EROEI of 0.0000075, or 0.00075 percent.

We may say with some confidence that after the big rollover in oil depletion, a significant change is in store for the movement of physical matter through the landscape. It is also clear that manifestations of energy will take considerably different physical forms as the landscape responds to this reduction of fossil fuel and a lowering of per-capita oil consumption:

- Supply distances will shorten; distribution networks will be finer-grained.
- More goods will be produced locally.
- More locally grown crops and produce will be consumed.
- Air travel will become prohibitively expensive for all but the most well off.
- Boat travel may increase (as will the necessity for taking the time it requires).
- People will take holidays closer to home.
- The perceived size of the world, at least from the standpoint of perception of physical distance travelled and time expended, will expand for the first time in human history.
- 'Other places', which once seemed fairly close, will seem farther away.

These changes will come about regardless of the patterns of ownership of businesses and means of production. It remains to be seen, however, whether regionally based entities can capture political power from huge conglomerate holding companies with globally dispersed investors.

If the movement toward local control of these more localised production and distribution networks fails, then global capital networks will still be in control of the destinies of even the most local enterprises. In this situation, the outlook for the landscape is, in my view, somewhat bleak: large corporations with globally dispersed stockholders cannot be expected to care much about regional environments or local communities.

If, on the other hand, a region's natural identity gains significant traction in the hearts and minds of the residents, and if those who inhabit a particular region begin to vote with their dollars for the good of their own life place, there may be some hope for an increase in the autonomy and sustainability of the city region of the future.

The landscape implications of a truly re-localised city region after the big rollover might be:

- More compact cities and suburbs.
- Revitalised rural towns, with increased populations.
- A finer-grained utilitarian landscape, with more closely spaced transit hubs, neighbourhoods, utilities, farms and commercial centres.
- A physical identity for the region that differs from that of the larger nation or state, with deliberate regional design differentiation.
- Regenerative industries and waste-recycling capacities in plain sight and closer to communities, with less NIMBY-derived facility siting, and less placement of objectionable facilities off-shore.
- Sources of renewable energy dispersed throughout rural landscapes and in proxemic, visible urban locations (wind farms, photovoltaic panels and so on).
- Community-supported and region-supported agricultural systems in rural landscapes with local markets in population centres.
- Local labels and unique graphic identities for food, wine, beer, meat, water, fruits, vegetables.

- Non-food-producing amenities and ecological functions of rural lands fully understood and supported by the region's urban and suburban dwellers.
- Local networks of conservation lands interspersed with education and recreation nodes and corridors.
- Neighbourhoods connected directly by open-space linkages to rural productive, conservation and recreation lands.

These are not necessarily new ideas. They are planning and design concepts that have been vigorously promoted by farsighted planners and landscape architects. With the coming rollover in energy supply and price, however, these dimensions of the landscape will become even more critical, and absolutely essential.

The most logical land planning unit to prepare for this coming reality is the local life place. By anticipating the drastic changes ahead, each bioregion can begin to write its own sustainable future, rather than have a less successful outcome written for it. But, when one has lived his/her entire life in a physical world and economic system drugged by cheap oil, envisioning the inevitable contraction in the scale of regional landscapes after the downturn in fossil fuel is a very difficult task.

Landscapes of the 2050s, on the downside of the Hubbert Peak, will not just be mirror images of those we experienced in the 1950s on the upside. Although oil will have come and gone, information technology has irreversibly changed our constructions of reality and the way economies, cultures, governments and regions do business, for better or for worse. But no amount of electronic information can change the physical inevitability of the downside of the Hubbert Peak. With the "End of Cheap Oil", as *National Geographic* announces, comes the beginning of an entirely new geography, and a city-regional landscape that the world has never witnessed before.

And landscape architects will have a chance to help shape that new landscape.

#### NOTES

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