



Sustainable City Futures (2004)

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Sustainable City Futures

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Based on a world centric^{†1} view, the sustainable development of our cities needs to be implemented with new thinking, facilitating the human progression of its citizens through the Spiral of Development^{‡2} and its evolutionary frames of reference. This requires intervention at all levels of the city, from its citizen's cultural memes to their ways of life and the resulting social system's products and processes. Currently, however, sustainable development is practiced within a milieu of competing systemic frames of reference, and this struggle is consuming our focus rather than achieving tangible outcomes. Causal layered analysis (CLA) is useful here, in that it is able to probe through these frames of reference (or systemic levels of reality) seeking causal linkages and contradictions. CLA will be used to posit the urban contradictions that exist in the achievement of sustainability at each level of urban reality. This paper shows that these contradictions within 'sustainability' at each level are interrelated and how these are resolved, creating future scenarios.

Introduction

The world's urban population reached 2.9 billion in 2000, and is expected to rise to 5 billion by 2030. Whereas 30% of the world population lived in urban areas in 1950, the proportion of urban dwellers rose to 47% by 2000 and is projected to attain 60% by 2030 (three out of five people). At current rates of change, the number of urban dwellers will equal the number of rural dwellers in the world in 2007.³ How this demographic shift from agrarian to urban ways of life is managed may be the most significant factor in determining whether global life conditions remain sustainable.

Today's dominant Western city paradigm and image is the urban sprawl of "Edge City"⁴ as described by Joel Garreau (1992) or "Technoburbs" as described by Robert Fishman (1987).⁵ The growth of the suburbs has extended into what is now referred to as the exurbs. This phenomenon is currently perceived to be unsustainable development, a problem that now requires intervention. If the developing countries of the world adopt

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† World-centric awareness means the mature adult meets the world on its own terms, as an individuated self in a community of other individuated selves operating by mutual recognition and respect. Using spiral dynamics this stage's meme espouses 'all of us' in unity in diversity.

‡ City transformations must have spiral congruence and respect spiral dynamic's prime directive being the health of the overall spiral, not the preferential treatment for any one meme level's reality.

Western urbanism's ecological footprint, the world may indeed overshoot the earth's ecological limits, and collapse.

This chapter explores the systemic contradictions — incompatible with sustainability — that exist within different levels of the city, using causal layered analysis. Johan Galtung uses contradictions focussed on unsatisfied human needs and how they are resolved to generate alternative futures.* Using this approach, the resolution of urban contradictions may well signpost the journey towards the sustainable city.

Firstly, sustainability will be defined so the reader has a framework to understand the urban contradictions that arise as a result. Secondly, CLA will be used as the futures tool to develop an epistemology of sustainable city futures. Finally, a critique of the present urban system is summarised and its four major systemic contradictions mapped to raise awareness, propose resolutions, and rally the revolution towards sustainable cities. As a significant driver of the future, the degree of diffusion of sustainability and sustainable technologies within society generates alternative scenarios for the future city.

Sustainability

The concept of sustainability needs clarification so that its use within causal layered analysis proceeds unambiguously. Sustainability, like democracy, is a concept that has objective as well as subjective meaning. A plastic product that is perceived by one person as being sustainable may be considered as only economically viable by another person, whilst empirically it is ecologically toxic and not biodegradable for a thousand years. Examining the litany about the urban problematique will reveal this spectrum of understanding. At the systems or empirical level, "Sustainability happens when we as Society create long term stable physical relationships with the 'whole' environment within which we reside".⁶

Sustainability can be achieved by the design and development of products, services and infrastructure that balance economic prosperity, environmental health and social equity using systems thinking. These three dimensions are represented by the triple bottom line approach to monitoring and reporting sustainability measures. In 1987, the Bruntland Commission defined the objective of sustainable development as being: "to meet the needs of the present without compromising the ability of future generations to meet their own needs".⁷ This is done by a dynamic process that enables all people to realise their full potential and to improve their quality of life in ways that simultaneously protect and enhance life's ecological support systems.

The Natural Step (TNS), developed by Dr Karl Henrik Robert⁸ and endorsed by the international scientific community, provides a framework to achieve sustainability through the application of its First Order Principles and Four system conditions. Simply put, The four system conditions relate to:

* Presentation to futurists and postgraduate students at Sohail Inayatullah's house, 14 April 2003. Galtung defines a contradiction as an objective systemic incompatibility that is not solvable like a problem, but demands change of the system. He outlines six phases of the natural history of contradictions, being (1) Consciousness formation as the contradiction forces awareness amongst its citizens; (2) Articulation as awareness is promulgated by innovators breaking through barriers of thought and speech police; (3) Mobilisation as change agents rally around the words of the innovators, themselves becoming leaders to mobilise the mainstreamers; (4) Confrontation, preferably non-violent, Gandhian and pedagogic struggle for systemic change; (5) Detachment as the system (establishment) releases itself from its limiting paradigms to accept transformation; and (6) Re-coupling as the system transcends former contradictions to deliver desired ways of life. Galtung's framework for the "systemic synchronised accumulation of contradictions" within a society is applicable to the study of the evolution of cities; as the city is a system (holon) within society and civilization.

1. What we Take;
2. What we Make;
3. What we Maintain; and
4. Are we Fair?

In a sustainable society, the application of the four system conditions ensures that nature is not subject to systematically increasing:

1. concentrations of substances extracted from the Earth's crust;
2. concentrations of substances produced by society;
3. degradation by physical means; and, in that society,
4. human needs are met worldwide.

This means that the four TNS system conditions can be used within CLA's systems level to locate the urban contradictions that exist around what we take, make and maintain for our cities, and whether we are being fair in these ecological, social and economic transactions, by meeting human needs.

Causal layered analysis (CLA)

CLA will be used as the futures tool to develop the epistemology of sustainable city futures. The most significant urban sustainability contradictions will be selected within the litany, systemic, world-view and myth/metaphor levels of urban reality (perception). The purpose of this exercise is to analyse the obstacles and reconstruct resolutions towards systemic change.

Litany level analysis about cities

The litany is the official public description of the issue and is encapsulated for urban sustainability by the following piece in National Geographic: "As new home seekers look for breathing room in the burbs and the lands beyond, the dream has been displaced by all too familiar worlds — places plagued by traffic jams, high taxes and pollution: the irony of Urban Sprawl"⁹

The essential urban contradiction at the litany level is that the promised land of suburbia, offering landscape amenity and liveability away from the city core, is in fact delivering social isolation, unaffordable infrastructure costs and environmental degradation. The Western dream has been publicly shattered and exposed, and yet the urban system still rolls out the marketable settlement pattern — sprawl versus higher density consolidation.

The main actors behind this litany defending the status quo are the supporters of economic growth, typically the urban development industry, and political leaders/advocates of the free market within local government. The development and construction and property services industries are a significant employment sector within Western economies and, as such, are sacred cows when unemployment also exists in these economies. The main actors lobbying against urban sprawl are environmental and rural activists who advocate protectionist policies such as urban containment boundaries. Here lies the litany of the moderate alternative to 'sprawl', 'growth management' (for example, Peter Calthorpe's "New Urbanism". The balance sought here is still framed by the paradigm for economic growth). A more revolutionary litany exists which calls for empirically measured 'sustainable development' advocated by ecologists, urban sociologists, TNS and doomsayers (for example, Paolo Soleri's "Arcology", or Richard Register's "Ecocity"). Beyond the revolutionary lies the litany of the visionary, and here solutions (utopian habitats) that rely on technological competency mastered by humanistic wisdom (for example, the floating ocean cities of "The Venus Project", or Buckminster Fuller's floating geodesic sky cities) are offered.

Returning to the litany of this major urban contradiction begs the following question. Is it possible to develop sustainable urban sprawl? If it were, then the four system conditions of TNS would have to be satisfied at the systemic realm below.

The Systems level analysis about cities

- **System Condition 1** focuses on “What we Take” from Nature. Its application means substituting certain minerals that are scarce in nature with others that are more abundant, using all mined materials efficiently, and systematically reducing dependence on fossil fuels (oil, gas, coal) and heavy metals such as cadmium and lead.

The urban contradiction that exists in this condition is that cities (and urban cultures) are more resource consumptive, compared to rural cultures, and are major consumers of non-renewable energy sources (fossil and nuclear fuels). For example, the ecological footprint* of Australia (one of the most developed countries in Oceania with approx 74.1% of the population living in urban areas) is 9.4 hectares per person, compared to Bangladesh (one of the least developed countries in Asia with approx 37.5% of the population living in urban areas) at 0.6 hectares per person. Bangladesh’s low ecological footprint is linked to its unacceptable poverty. The fourth system condition requires equitable environmental management and quality of life, so the contradiction needs resolution: How to develop without growth (increasing consumption)?

- **System Condition 2** focuses on “What we Make” within Nature. Its application means systematically substituting certain persistently harmful and unnatural compounds (for example, Dioxins, PCBs, CFCs and HCFCs, and PVC) with others that are normally abundant, or break down more easily in nature, and using all substances in the production cycle.

The urban contradiction that exists in this condition is that cities are the major producers of entropy (pollution) on the planet, as they are based on closed linear systems of production not open ecological (cyclic) systems. For example, some linear outputs include greenhouse gas emissions from urban systems, materials used for infrastructure/architecture, and the disposable products of urban culture such as fast food plastic gimmicks/toys. The contradiction that needs resolution is: How can we build cities (physically and culturally) without pollution.

- **System Condition 3** focuses on “What we Maintain” within Nature. Its application means drawing resources only from well managed eco-systems, systemically pursuing the most productive and efficient use both of those resources and of land, and exercising general caution in all kinds of modification of nature. It embodies best practice environmental management — for example, logging plantation timbers instead of old growth forests, avoiding dams, minimising monoculture agriculture and urban sprawl.

The urban contradiction that exists is that modern cities are the antithesis of biodiversity in that they rely on and create monocultures. Water harvesting in Western cities, for instance, is centralised and monopolised, using high impact dams instead of relying on a more diverse system of personal water harvesting methods and grey water recycling. The urban system also influences agricultural methods of production to feed its urban populations. Seventy per cent of water consumption in Australia is for agricultural use to irrigate vast monocultures. The contradiction that needs resolution is: How can urban

* The ecological footprint shows how much productive land and water we occupy to produce all the resources we consume and to take in all the waste we make. Extracted from the “Redefining Progress” NGO, at <http://www.rprogress.org/>

design enrich biodiversity, society and the economy, and how can cities integrate these systems rather than atomise them.

- **System Condition 4** focuses on “Are we Fair?” within the system. Its application means using all our resources efficiently, fairly and responsibly, so that the needs of all people on whom we have an impact, and the future needs of people who are not yet born, stand the best chance of being met. Currently, developed nations, which comprise less than 20% of the global population, consume over 80% of resources.

The urban contradiction that exists is that economic growth within cities does not provide fair distribution of resources (cultural wealth) or quality of life for the basic human needs of survival (shelter, food, clothing), well-being, freedom of choice, and identity (meaning with life). The most pressing challenges of our time remain poverty, underdevelopment, environmental degradation and social and economic inequalities within and among countries (and their cities, since they will house the majority of the world’s population by 2030).¹⁰ The contradiction that needs resolution is: How can urbanism and its spatial form create social justice — the equitable provision of housing let alone liveability, transport and accessibility, and community and cultural development.

The interactive dynamic of the above system conditions creates the urban objective reality — shaping ways of life and their quality of experience, modes of production and labour markets. As such, four alternative system paradigms (archetypes) can be extrapolated from the dynamism, each with a different *modus operandi* for sustainability:

1. Continued Growth.
2. Smart Growth & Back to the Past.
3. Zero Growth + Triple Bottom Line Development.
4. Civilizational Transformation = (zero growth plus holonic spiral development).

The “Continued Growth” paradigm is one in which the economic reality dominates decision making and the modernist’s industrial mindset believes that ‘growth’ equates to ‘prosperity’ or ‘development’. For example, the Continued Growth paradigm manifests the belief that urbanisation and suburbanisation are signs of progress and a booming economy, as the Gross Domestic Product (GDP) is boosted by housing production and sales which are also key GDP indicators. The economic reality continues its dominance into the “Smart Growth” paradigm, but is tempered by environmental and social management. The objectives of many world cities’ urban planning schemes — influenced by the United Nation’s “Agenda 21” programme during the last decade, or the emergence of the “New Urbanism” movement — are synonymous with the Smart Growth systems approach. “Smart Growth promotes pedestrian-friendly communities, a mix of housing types, and less dependence on the car”.¹¹ Smart Growth today denounces urban sprawl, and likewise espouses the virtues of master planned communities with higher standards of liveability, advocated by Ebenezer Howard during the “Garden City” movement of the late 19th century. Smart Growth or urban revitalisation movements, such as “The New Urbanism”, are described by advocate, Peter Calthorpe, in his book, *The Next American Metropolis — Ecology, Community and the American Dream*.¹² Calthorpe argues for the creation of community friendly habitats, in the form of sustainable urban villages, to counter the social plights of urban sprawl.

The paradigm shift occurs in the “Zero growth + Development”¹³ frame of reference as ecological, social and economic development operates within zero growth limits to deliver human well-being. The habitat solution offered by this alternative systems paradigm is the transformation of the entire world using the principles of sustainability. Cities would be the renewable spatial form manifesting a zero-emission society and economy. In Alan Atkisson’s systems view, civilization must transform itself toward “Development without Growth”, away from the current course of “Growth equals

Development’’. This is, in his view (which I share), the greatest challenge of our generation and must become humanity’s fundamental project for the 21st century.

The last systems paradigm, “Civilizational Transformation”, represents another developmental leap where spiritual and cultural well-being are integrated with the “Zero growth + Triple Bottom Line Development” paradigm. This paradigm is still on the fringe, yet is evident amongst today’s “Cultural Creatives”.*¹⁴

The main stakeholders at the systems level of urbanism are local government planners and policy makers, community and environmental groups and the urban development industry.

The world-view level analysis about cities

From the field of developmental psychology, I use ‘egocentric’, ‘ethnocentric’, ‘world–centric’ and ‘holistic’ developmental phases of consciousness, and their accompanying world-views/frames of reference, to posit the urban contradictions within this level of reality. This ontology is useful in that it is simple, is supported by empirical studies in psychology and is based on how self-identity influences seeing and relating to the world (world-view).

The egocentric world-view centres all things on self. It is narcissistic, in that a person’s feelings and morals are heavily centred on their own impulses, physiological needs and instinctual discharges to survive. Cities throughout history were not built as a consequence of the accumulated actions of egocentric behaviour, but rather required the emergence of ethnocentric or socio-centric consciousness. Cities in economic decline or extreme shock of war, however, may provide the conditions that trigger egocentric behaviour as evidenced by the lootings in Bagdad during the 2003 US military campaign to ‘liberate’ Iraq.

The ethnocentric world-view recognises the shift in consciousness that occurs when an individual has the cognitive capacity to understand the role and perspective of the other. This world-view is centred on the group (family, peers, tribe, nation), and typically an individual conforms to the shared view or perspective of that group. Ancient Greek city–states and medieval city–states within Europe operated within an ethnocentric world-view; the polis or city as a social group dominated human relations to maximise competitive advantage over other city–states. World cities today, as they compete in a global market and emerging cultural–creative economy, easily manifest an ethnocentric world-view. This is evident during the bidding process to host the Olympic games or during the civic efforts made to attract iconic development such as the revitalisation of industrial Bilbao with the Guggenheim Museum. The ethnocentric world-view also has a tendency to foster “Back to the Past” solutions, at the systemic level, where the focus is on recreating traditional values and life conditions. In the urban context, examples of “Back to the Past” strategies include protectionist policies such as urban growth boundaries, and cultural heritage regulations to moderate changes to the urban morphology. These are also recognised as Smart Growth strategies.

World–centric awareness emerges as the myths, conformist values and the ethnocentric biases of one’s peer group are subjected to scrutiny for the cause of universal care of all peoples, justice and fairness. Instead of treating the world and others as an extension of

* Cultural Creatives, identified by Paul Ray, are a cross–generational group of people whose core beliefs are formed by psychology, spiritual meaning in life, art and cultural expression, mastering new knowledge, being socially concerned, honouring women’s issues and ecological sustainability.

self, the mature adult of world–centric awareness meets the world on its own terms, as an individuated self in a community of other individuated selves operating by mutual recognition and respect.¹⁵ Ecological sustainability enters the urban agenda when the world–centric frame of reference is being used. Sustainability would not survive as a concept without world–centrism as a lens through which the world is interpreted. Both share the aims of intergenerational equity and social justice. For example, the city of Freiburg in Germany has consciously established itself as a world learning centre for sustainable development, being the home of the International Centre for Local Environmental Initiatives (ICLEI), which produces a database on environmental urban best practices.¹⁶

The holistic world-view is similar to world–centrism’s focus on all peoples, but has an added dimension for the care of all living entities as integrated systems. Through the holistic world-view, self is part of a larger, conscious, spiritual whole that also serves self. Complexity theory, where the behaviour of any element in a universe immediately impacts all the others, is respected over mysticism.¹⁷ Through the holistic world-view, ecological sustainability is the central concept of our age, necessary to transform urban cultures and development.

The urban contradiction that exists at this level of reality is that sustainability may only be understood and affected through world–centric and holistic world-views and thinking, but most of the world’s population is estimated to be thinking and living through the ethnocentric world-view. The “Agenda 21” meme, “act locally, think globally”, just doesn’t make sense to many people without prior education or best practice models, or in the context of a refugee camp in Rwanda where egocentric survival is the main agenda.

The main stakeholders at the world-view level of urbanism are environmental/social movements, sustainability innovators, futurists; visionaries and the cultural creatives.

The myth/metaphor level analysis about cities

The final causal layer or perspective in CLA is the myth/metaphor level Here, I add to Inayatullah’s original CLA framework by including Spiral Dynamic’s psycho–social “values meme” (MEMEs). These meta or systems memes, Beck and Cowan argue, act like attractors for the content–rich memes described by Dawkins and Csikszentimihalyi.¹⁸ MEMEs make sense of the cultural myths/metaphors that propagate, as they provide the self-replicating patterns of information which bind ideas into cohesive packages of thought. Each of the urban conditions at the litany, systems and world-view perspectives described above has an underpinning myth/metaphor and MEME that is responsible for its continued manifestation within reality (society).

To demonstrate this, in the following table, I draw the causal relationship between the system paradigms and their respective replicating and empowering myths/metaphor.

Table 1: System paradigms and their myth/metaphors

SYSTEM PARADIGMS	MYTH/METAPHOR
Continued Growth	Progenitor Myth & Land of Cockayne
Smart Growth	Arcadia & Garden City
Sustainable Development (Zero Growth + Transformation)	Spaceship Earth
Civilizational Transformation	Gaia

Progenitor myth & Land of Cockayne

The Land of Cockayne is a universal pagan folk legend of a land of peace, plenty and placation. It is a utopian world where human needs are effortlessly satisfied through strictly materialistic means. Variations include the legendary Celtic Island of Earthly Paradise, and the Greek myth of Elysium.¹⁹ Cockayne epitomises egocentrism or

narcissism — the material fulfilment of self. Using Thompson’s socio-cultural viability theory (S–CV),^{*20} Cockayne is a culture of individualists who believe in the myth that Nature is a skill-controlled cornucopia, and that human nature is stable. They are fundamentally self-seeking.

Related to Cockayne — in other than the spiritual dimension — are the Judaeo-Christian legends of the Garden of Eden and the prophesy of the New Jerusalem. The “Progenitor Myth” is a term I propose to describe the underpinning belief that humans, being the progeny of Adam and Eve, have the divine right to ‘go forth and multiply’, reordering Nature. It is a process of dominion, where humans, if they obey Yahweh’s Law, will enjoy abundant control of earth’s resources. Old Testament stewardship is ordained to the ‘chosen people’ and not shared equitably, yet the New Testament’s age of grace and evangelism allows a pioneering spirit espousing individualism, freedom and a bountiful sufficiency of the ‘Promised Land’.

This egocentric dream — to stake out one’s own plot of paradise, a dream shared by the cultures of Western countries, particularly America and Australia — has, I argue, fuelled the manifestation of the Continued Growth paradigm and its urban sprawl. Progenitor and Cockayne are myths that contradict the contemporary concepts of sustainability and drive the Continued Growth systems paradigm.

Arcadia/Garden City ideal

Arcadia is an isolated and unspoilt Greek land, all mountains with large fir forests and lush vegetation. The Arcadians are believed to be the oldest inhabitants of the Peloponnese. The Arcadian myth that developed in Europe during the Renaissance was of an agrarian/pastoral society, where people’s sociological desires were moderated and within Nature’s benevolence. This fostered a harmony between people of moderation and nature. “Arcadians tend to assume that, if the problems of material scarcity are resolved in a world of men of moderation, problems of sociological scarcity will also cease to exist”.²¹ Arcadia simplifies human needs and places stress on their satisfaction in a context of minimal governance or organisational perfection.

Again using S–CV theory, Arcadia is a culture of egalitarian autonomy whose inhabitants believe in the myth that nature is resilient, within accountable limits, and its cornucopia is freely available to those who seek to become one with nature. Therefore, the Arcadian myth recognises a traditional practice of sustainability due to its close relationship with Nature and transcendence of materialistic human nature.

The Garden City utopian vision owes its genesis in part to the Arcadian vision. The Garden City ideal has the underpinning belief that, “Life in the Suburbs provides the best of both worlds: Agrarian [Arcadian] aesthetics and health and functional [urban] amenity”.²² Ebenezer Howard’s ideal habitat was conceived in reaction to 19th century industrialism, which was characterised by high-density urbanism, poor public health, and loss of privacy and liveability. This model epitomises the discovery of the lost paradise, created using the master planning process. Through this process, satellite towns were designed and built, outside the inner ring of the choking industrial city. The Arcadian myth, reinterpreted by Ebenezer Howard in the Industrial City to create the Garden City vision, continues to drive the Smart Growth systems paradigm.

* Cultural theory is the study of viable ways of life (with their accumulated store of symbols, ideas and material products) in a social system and how they are produced, experienced and replicated.

Spaceship Earth metaphor

R. Buckminster Fuller's "The Spaceship Earth" metaphor developed at the same time as general systems theory and the US Apollo space missions. Spaceship Earth encapsulates the idea that human intellect needs to operate new thinking — synergy — to create a society capable of living on the planet indefinitely, and to continue the journey through the universe. "If we do not comprehend and realise our potential ability to support all life forever we are cosmically bankrupt."²³ Spaceship Earth recognises the fact that the planet is the unconscious store and technical craft of our collective human wealth that requires maintenance for "our coming generations and their future days".²⁴ Spaceship Earth therefore embodies the core principle of sustainability — inter-generational equity.

Gaia hypothesis/metaphor

James Lovelock's Gaia hypothesis is named after the Greek Earth Goddess. Gaian theory is based on planetary system dynamics, and suggests that the earth behaves functionally as a self-regulating single super-organism.²⁵ Life has existed on the planet for a large fraction of the time since its formation — despite the incredible odds against it, mainly the second law of Thermodynamics. Lovelock and his collaborators formulated a hypothesis: Life maintains conditions favourable to the existence of Life on Earth.²⁶ The significant proposition of difference between Gaia and Buckminster Fuller's Systems Spaceship is that Gaia's ecological self-regulation operates consciously — as if alive. Gaia theory reveals the Earth to us as our symbiotic living spaceship and ecological partner travelling on a physical and metaphysical journey through universe (one song).

Spaceship Earth (operated correctly using systems thinking and synergy) and Gaia theory share the same underpinning belief that humanity is on a journey of evolving consciousness. Humanity's collective consciousness is mutually interdependent upon the nature of Earth. It is a dynamic systems relationship, where humans have reached a level of spiritual consciousness and technological skill to choose to tread lightly on the limited resources of the Earth, or suffer civilizational collapse. This relationship also generates the ecological imperative for sustainable development. Spaceship Earth aligns with the empirical and technical prowess required to achieve the systems paradigm of Sustainable Development, whilst Gaia drives the spiritual revolution needed for the systems paradigm of Civilizational Transformation.

Actors within urbanism's causal layer of myth/metaphor include wisdom elders, writers, Indigenous groups, spiritualists and visionaries. Spiral Dynamics can be used as a frame of reference to explain the reasons why the above cultural myths/metaphors persist.

Cultural myths are born in the Purple ^vMEME [Kin Spirits (tribal)] with its basic concern for group safety. The subsequent ^vMEMEs as they emerge with the changing life conditions, however, reinterpret these myths within the new frame of thinking and reference.

The blue/ORANGE ^vMEME [TruthForce(purposeful) exiting with StriveDrive (strategic-materialistic) peaking] is responsible for the continuation of the Progenitor myth and the Land of Cockayne.

The orange/GREEN ^vMEME [StriveDrive (strategic-materialistic) exiting with HumanBond (sensitive-humanistic) peaking] nurtures the dreams of Arcadia and the Garden City ideal.

The green/YELLOW [HumanBond (sensitive-humanistic) exiting with Systemic (integrative-ecological) peaking to full YELLOW ^vMEME peaking advocates the planetism of Spaceship Earth.

The TURQUOISE/coral ^vMEME [GlobalView (holistic) peaking with the next yet unknown developmental phase entering] is exploring the meaning and facts about the Gaia hypothesis.

As Spiral Dynamics proposes that 'MEMEs coexist and remain present within minds and cultures — either in a dormant or active state, (just as latent DNA combinations still remains in the double helix spiral code) — the opportunity exists for the above myths/metaphors to continue to resurge and regress as peoples move through the cyclic developmental spiral of human conscious and thinking.

Synthesis using CLA (trans-layer scanning)

The process of causal layered analysis conducted in this paper around the issue of sustainable urban development and its contradictions, provides a rich tapestry of what exists today. In brief, an urban ontology of contradictions is abstracted. By visioning how these different urban contradictions are resolved, individually or collectively, at each layer, an epistemology of city futures or an urban teleology develops. Here, the resolution, rather than mechanical causes, becomes the goal or purpose that drives the future urban order of reality. For example, four city futures are abstracted in Table 2 by envisioning different inter-level resolutions.

Techno City is the place where all the urban contradictions above remain unresolved. Potentially, it is the cultural antecedent to ecological and social collapse and the monumental legacy to mark our ruin, just as the Easter Island statues stand today to mark the ecological and social collapse of their makers' unsustainable way of life.

Smart City is a place where the inhabitants are seeking to resolve the urban contradictions of sprawl, and its systemic impacts, through growth management. However, Smart City is still blinkered by a world-view that is mainly ethnocentric. The well-being of the planet and its biodiversity stills comes behind the well-being of the city and its region.

Table 2: City futures and sustainability

<i>Scenario</i>	TECHNOCITY	SMART CITY	ECO CITY	GAIAN CITY
Driver				
	Up to 25% (Cultural creatives are early adopters)	Up to 50% (Mainstreamers start adopting)	75 % adoption (Laggards and Reactionaries persist)	Saturation (Sustainability is the way of life for all)
Causal Layered Analysis				
Litany	Sprawl	Growth Management	Sustainable Development	Utopian/Visionary
Systems Perspective	Continued Growth	Smart Growth & Back to the Past	Zero Growth and Development	Civilizational Transformation
World-view	Egocentric	Ethnocentric	World-centric	Holistic
Myth/metaphor	Progenitor/'Land of Cockayne'	'Arcadia'	Spaceship Earth	Gaia
About sustainability:				
About the City:	Perpetual colonisation	Garden City Ideal	Arcology	Holonnic ecologies
Underlying 'MEMEs	Blue/ORANGE	ORANGE/Green	Green/YELLOW	TUR-QUOISE

Eco City is a place where the inhabitants are intent on reconstructing their ways of life to resolve all urban contradictions through a systems policy of sustainable development (Zero Growth + equitable TBL development). Social justice is pursued through a world-centric view of reality.

Gaian City is a place of our dreams, where the current urban contradictions have been resolved, within a sustainable and holistic culture. This city is a holon, habitat for the physiosphere within the larger holons of biosphere, noosphere, theosphere and Kosmos (Gaia).²⁷

However, the sprawl of Techno City is not doomed. It, too, can be made sustainable by transforming the underlying 'MEMEs; myth, world-view and life systems. For example, by implementing a vision of sustainable suburbs using permaculture^{*28} principles, the Techno City can transform towards a form of Gaian city, which I call Permaculture Garden City. At the memetic level, psychosocial development is crucial to foster new thinking from StriveDrive to GlobalView. At the myth level, Permaculture is underpinned by a tripartite alliance of Arcadia, Spaceship Earth and Gaia, reinterpreted through a world-centric/holistic frame of reference. Permaculture Garden City's prime directive at the systemic level is to achieve sustainable development by promoting and facilitating cooperative, not competitive, ways of life.

Conclusion

In this chapter, the application of CLA has demonstrated the method's usefulness in developing an urban ontology of sustainability contradictions. The most significant urban sustainability contradictions were described within the litany, systemic, world-view and myth/metaphor levels of urban reality. The purpose of this exercise has been to analyse the urban contradictions so that the formulation of resolutions towards systemic change can be made. Here, CLA is useful as the first step in charting the epistemology of city futures or, in other words, its teleology — being a map of alternative urban futures based on different degrees of systemic/level resolution of the urban contradictions.

CLA as a futures method also demonstrated here that the degree of diffusion of sustainability and sustainable technologies within society is a significant driver of the future and provides the means to resolve urban contradictions to generate alternative scenarios for the future city. These alternative scenarios, represented by Techno City, Smart City, Eco City and Gaian City, may also be used as templates to categorise the many city visions that already exist. For example, Permaculture Garden City is a form of Gaian City, whilst Ebenezer Howard's Garden City is a form of Smart City and Paolo Soleri's Arcology is a form of Eco City.

Returning to the litany of today's urban problematique — that urban sprawl is unsustainable — using CLA I showed that it is possible to develop sustainable urban sprawl, but only if the four system conditions of The Natural Step (TNS) are satisfied at the systemic realm below, as Permaculture Garden City also demands them:

1. Urban cultures are to be no more resource consumptive compared to rural cultures and need to switch to renewable energy sources.
2. Cities can no longer afford to be the major producers of entropy (pollution) on the planet because of their closed linear systems of production. They must redesign their means of production based on open ecological (cyclic) systems.
3. Cities must be holons that maintain ecological biodiversity and not cause natural degradation by creating monocultures.

* “Permaculture (**permanent agriculture**) is the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems. It is the harmonious integration of landscape and people providing their food, energy, shelter and other material and non-material needs in a sustainable way.” An suburban model exists in “Village Homes”, Davis, California, a residential development that features solar orientation, water sensitive design/management, greenbelts and common areas for shared resources and food production.

4. Economic development within cities must provide fair distribution of resources (cultural wealth) or quality of life for the basic human needs of survival (shelter, food, clothing), well-being, freedom of choice, and identity (meaning with life). Basically, urbanism and its spatial form must create social justice.

The urban agenda becomes the sustainability agenda, as described by Dr Karl Henrik Robert, “When the global society is sustainable, pollution will no longer increase, nature will no longer be impoverished through physical degradation, and within that frame, human needs will be met globally”.²⁹

At the world-view level of urban reality, I used CLA to show that sustainability may only be understood and affected through world-centric and holistic world-views and thinking. However, developmental psychologists have estimated that most of the world’s population is thinking and living through the ethnocentric world-view. Education becomes critical in developing global equity and urban sustainability.

At the myth/metaphor level, I used CLA to show that Progenitor and Cockayne are myths that contradict the contemporary concepts of sustainability and drive instead the Continued Growth systems paradigm. Alternatively, Spaceship Earth and Gaia are metaphors that cultivate the diffusion of sustainability in society and its four TNS system conditions.

Finally, by using CLA to study the urban condition, my analysis supported a tenet of Spiral Dynamics — that “New life conditions (age) need new thinking”. In the context of urbanism, the application of this tenet was revealed by the need to resolve today’s contradictory urban life conditions, through the application of new thinking to create sustainable city futures. Urban creativity and the learning city are needed to inspire the transformation process of sustainable habitat innovation.

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- ¹ K. Wilber, *A theory of Everything: An integral vision for Business, Politics, Science and Spirituality*, Boston, Shambhala, 2001, 22 and 126.
- ² D. Beck & C. Cowan, *Spiral Dynamics — Mastering Values, Leadership and Change*, Cambridge, MA, Blackwell Publishers, 1996, 296 and 314.
- ³ *World Urbanization Prospects: The 2001 Revision*, United Nations Population Division. The Data Tables and Highlights are available at the UNEP web site, http://urban.unep.net/index.php?struct_id=gurbtrend
- ⁴ J. Garreau, *Edge City*, New York, Anchor, 1992.
- ⁵ Robert Fishman, ‘Beyond Suburbia: The rise of the Technoburb’, from *Bourgeois Utopias: The rise and fall of Suburbia* (1987), abstracted in Richard T. LeGates & Frederic Stout (eds.), *The City Reader*, 2nd Ed., Routledge, London, 2000, 77–86.
- ⁶ Dr Karl Henrik Robert (founder of the Natural Step) extracted from: The Natural Step short course programme, Global Institute for Learning & Development, Brisbane, 25 March 2003
- ⁷ G. Bruntland (ed.), *Our common future: The World Commission on Environment and Development*, Oxford, Oxford University Press Year, 1987.
- ⁸ Robert, *op cit.*
- ⁹ J. G. Mitchell (ed.), ‘Urban Sprawl’, *National Geographic*, July 2001, 49.
- ¹⁰ Political Declaration, United Nations World Summit on Sustainable Development, Johannesburg, South Africa 26 August–4 September 2002.
- ¹¹ Mitchell, *op cit.*, 65.
- ¹² P. Calthorpe, *The Next American Metropolis — Ecology, Community and the American Dream*, Princeton, NJ, Princeton Architectural Press, 1995.
- ¹³ A. Atkisson, *Believing Cassandra*, Victoria, Australia, Scribe Publications, 1999, 24–26.
- ¹⁴ N. Marsh *et al.*, *Strategic Foresight — The power of standing in the Future*, Melbourne, Crown Content, 2002, 105–106.
- ¹⁵ Wilber, *op cit.*, 22.
- ¹⁶ C. Landry, *The Creative City*, London, Earthscan Publications, 2000, 146.
- ¹⁷ Beck & Cowan, *op cit.*, 287–289.
- ¹⁸ *Ibid*, 30–31.
- ¹⁹ D. Suvin, *Science Fiction Studies #10 Vol 3, Part 3*, 1976. Extracted online, at www.depauw.edu/sfs/backissues/10/suvin10art.htm
- ²⁰ Michael Thompson *et al.*, *Cultural Theory*, Westview Press, Boulder, 1990.

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- ²¹ K. Dziamka, 'Jefferson's Arcadian Dream', *Nordlit nr. 5*, Universitetet i Tromsø, 7 November, 2000, 2. Kaz Dziamka quotes Davis JC from his book, *Utopia and the Ideal Society*, Cambridge, UK, The Press Syndicate of UC, 1979.
- ²² Ebenezer Howard articulated this ideal in *Garden Cities of To-Morrow*, 1898. Abstracted in LeGates & Stout, *op cit.*
- ²³ R. Buckminster Fuller, *Operating Manual for Space Ship Earth*, New York, Simon & Schuster, 1969, 87.
- ²⁴ *Ibid.*
- ²⁵ C. Moughtin *et al.*, *Urban Design — Method and Technique*, Oxford, UK, Butterworth Architecture, 1999, 90.
- ²⁶ James E. Lovelock, *Gaia*, Oxford, Oxford University Press, 1979; C. B. Jones, 'Cosmic Gaia: Homeostasis and Planetary Evolution', abstracted in J. Galtung & S. Inayatullah (eds.), *Macrohistory and Macrohistorians — Perspectives on Individual, Social and Civilizational Change*, Westport, CT, Praeger Publishers, 1997, 152.
- ²⁷ Wilber, *op cit.*, 97–98. Wilber explains the concept of Integral Ecology — situating the physiosphere (body), the biosphere (nature), the noosphere (mind) and the theosphere (soul/spirit) within Kosmos.
- ²⁸ B. Mollison, *Permaculture, A practical guide for a sustainable future*, Washington DC, Island Press, 1990, preface, ix.
- ²⁹ Robert, *op cit.*, 10.