Contours of the Possible: Global Scenarios and Great Transitions*

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"I am optimistic about the possibilities, pessimistic about the probabilities."
Lewis Mumford

Abstract. The premise of this paper is that civilization is in the midst of a fundamental historical transformation whose outcome remains profoundly uncertain. Some form of planetary society will crystallize over the coming decades as a result of interacting global factors – economic globalization, cultural influence, information technology, geopolitical and social fissures, and alterations of critical biogeochemical cycles. But depending on how conflicts are resolved, global development can branch into dramatically different pathways. Possible scenarios include *Market Forces,* where social and environmental concerns remain secondary, *Fortress World*, with elites in protected enclaves and an impoverished majority outside, and *Policy Reform*, with strong governmental interventionist for social and environmental goals. All are problematic: *Market Forces* would risk socio-ecological crisis, *Fortress World* would signal the failure of inclusive global development, and *Policy Reform* would need to overcome great technological and political hurdles to deliver change at the required pace and scale.

Great Transition scenarios envision the emergence of a new global development paradigm that would challenge both the viability and desirability of conventional values, economic structures and social arrangements. It would be rooted in the values that emphasize quality of life, human dignity, affinity with nature, and global solidarity. A *Great Transition* would involve multiple and synergistic sub-transformations in values, institutions, and technology. Various social agents would need to act in concert to drive such a transition, including global actors such as intergovernmental organizations, transnational corporations, and civil society. This shift would seem to require the emergence of a strong global polity of citizens engaged in a common project for new planetary compact based on pluralism, tolerance and global identification. To crystallize such a movement, the discourse on global sustainability and development would need to transcend the advocacy of better technologies, poverty alleviation, and incremental adjustments to market-driven development. It would need to bring the questions of human values, lifestyles, and institutions to the forefront of debate and action, and offer a positive vision of a civilized form of globalization for the whole human family.

Historical Transitions

Transitions are ubiquitous in nature. Many biophysical systems evolve gradually within a given state or organization, then enter a period of relatively rapid transformation

that can be chaotic and turbulent, and finally emerge in a new state with qualitatively different features. This broad pattern is found across the spectrum of natural phenomena: the forging of matter in the instant after the big bang, the phase shifts between different states of matter as temperature and pressure change, the epigenesis of individual biological creatures, and the evolution of life's diverse forms.

With the emergence of intentional proto-human beings a powerful new factor – cultural development – accelerated the process of change on the planet. Cultural change moves at warp speed relative to the gradual processes of biological evolution and the still slower processes of geophysical change. A new phenomenon – human history – entered the scene in which innovation and cultural information, the DNA of evolving societies, drove a cumulative and accelerating process of development. With the advent of historical time came a new type of transition, between the phases of human history that demarcate important transformations in knowledge, technology and the organization of society.

Naturally, the course of history is not neatly organized into idealized transitions. Real history is an intricate and irregular process conditioned by specific local factors, serendipity and volition. The historic record may be organized in different ways, with alternative demarcations between important periods. Yet, a long view of the broad contours of the human experience reveals two sweeping macro-transformations – from Stone Age culture to Early Civilization roughly 10,000 years ago, and from Early Civilization to the Modern Era over the last millennium (Fromkin, 1998). The premise of this essay is that a third transition is underway toward what might be called the *Planetary Phase* of civilization.

Historical transitions are complex junctures, which transform the cultural matrix and the relationship of humanity to nature. At critical thresholds, gradual processes of change working across multiple dimensions – technology, consciousness and institutions – reinforce and amplify, leading to a revised structure and dynamics of socio-ecological systems. Change radiates from centers of novelty slowly through the mechanisms of conquest, emulation, and assimilation. Earlier historical eras survive in physically remote and culturally isolated places. Today, an emergent planetary dynamism overlays modern, pre-modern and remnants of Stone Age culture.

Novel social organization, the economy, and communications features of these historical eras are shown in Table 1. Many other dimensions could be added, such as changing features of art, science, transportation, values, war and so on. But the schematic of the table at least suggests how various aspects of the socio-economic nexus cohere at different stages in the process of historical evolution. In the transition from one formation to another, each dimensions is transformed. Social organization becomes more extensive, the economy becomes more diversified, and communications technology becomes more powerful.

Table 1. Characteristics of Historical Eras

	Stone Age	*Early Civilization*	*Modern Era*	*Planetary Phase*
Organization	Tribe/village	City-state, kingdom	Nation-state	Global governance
Economy	Hunting and	Settled	Industrial	Globalization

	gathering	agriculture	system	
Communications	Language	Writing	Printing	Internet

Social complexity and spatial connectedness are not only increasing, but are doing so at an increasing pace. Just as historical transitions occur more rapidly than natural evolutionary transitions, historical transitions themselves are accelerating. The duration of successive eras decreases by roughly a factor of ten – the Stone Age lasted roughly 100,000 years, Early Civilization about 10,000 years and the Modern Era some 1,000 years. Curiously, if the transition to a Planetary Phase were to take of the order of 100 years this pattern would persist.

The Planetary Phase

The incipient planetary transition can be viewed through alternative windows of perception – disruption of the planetary environment, economic interdependence, revolution in information technology, increasing hegemony of dominant cultural paradigms, and new social and geopolitical fissures. Historical time seems to be accelerating and planetary space seems to be shrinking, as the pace of technological, environmental and cultural change quickens and the integration of nations and regions into a single Earth system proceeds. In our time, the very coordinates through which the historical trajectory moves – time and space – seem transformed.

Of course human activity has always transformed nature, while the tentacles of global connectedness reach back to the great migrations out of Africa, to the spread of the great religions, and to the great voyages, colonialism and international markets of the past. In the modern era, capitalism has had periods of rapid expansion and integration of regions on the periphery of world markets. It has also had phases of retraction and stagnation associated with economic, political, and military crises. Several times over, the international system and its institutions have been restructured and dominant nations have been displaced (Maddison, l991).

The claim that a planetary phase of civilization is taking shape does not deny the importance of economic expansion and interdependence in earlier eras. Indeed, the increasing imprint of human activity on nature and the expanding reach of dominant nations were necessary antecedents of globalization. The essence of the premise of a planetary transition is that the transformation of nature and the interconnectedness of human affairs have reached a qualitatively new stage. Growing human population and economies inevitably must butt up against the resource limits of a finite planet, while the increasing complexity and extent of society over hundreds of millennia have reached the scale of the planet itself.

Planetary dynamics operating at global scales increasingly govern and transform the components of the earth system. Global climate change influences local hydrology, ecosystems and weather. Globally connected information and communication technology penetrate to the furthest outposts, changing values and cultures, while triggering traditionalist backlash. New global governance mechanisms begin to supersede the prerogatives of the nation-state. The stability of the global economy becomes subject to

regional financial disruptions. Excluded, marginalized and inundated with images of affluence, the global poor seek immigration and a better global bargain. A complex mix of despair and fundamentalist reaction feeds the globalization of terrorism. All of these are signs that we have entered a new planetary phase of civilization.

In the past, new historical eras emerged organically and gradually out of the crises and opportunities presented by the dying epoch. In the planetary transition, reacting to historical circumstance is insufficient. The rapidity of the planetary transition increases the urgency for vision and action lest we cross thresholds that irreversibly reduce options – a climate discontinuity, locking-in to unsustainable technological choices, and the loss of cultural and biological diversity. With the knowledge that our actions can endanger the well-being of future generations, humanity faces an unprecedented challenge – to anticipate the unfolding crises, envision alternative futures, and make appropriate choices. The question of the future has moved to the center of development and research agendas.

Global Scenarios

If a transition toward a planetary phase of civilization has been launched, but not yet completed, a critical question becomes: What form might it take? As the new realities are refracted through the prism of political and philosophical predilections, the full spectrum of worldviews is revealed – technological optimists and pessimists, market celebrants and Cassandras, social engineers and anarchists. Each worldview sees the future through its own cloudy crystal of interpretation, fear, and hope. In truth, each has a plausible story to tell, for diverse and contradictory forces are at play that could drive global development toward some form of conventional globalization, barbarism, or a great historical transition. Fundamentally different worlds could crystallize from the complex and turbulent state of the planet, depending on unfolding events, serendipity and human choice.

Three types of uncertainty make attempts to predict the global future futile – ignorance, surprise and volition. First, incomplete information on the current state of the system and the forces governing its dynamics leads to a statistical dispersion over possible future states. Second, even if precise information were available, complex systems are known to exhibit turbulent behavior, extreme sensitivity to initial conditions and branching behaviors at critical thresholds – the possibilities for surprise, novelty, and emergent phenomena make prediction inherently impossible. Finally, the future is unknowable because it is subject to human choices that have not yet been made.

In the face of such indeterminacy, scenario analysis evolved as a means of exploring a range of long-range possibilities. In the theater, a scenario is a summary of a play. Analogously, development scenarios are stories with a logical plot and narrative about how the future might play out. Scenarios include images of the future – snapshots of the major features of interest at various points in time – and an account of the flow of events leading to such future conditions.

Consider three broad classes of global scenarios – *Conventional Worlds*, *Barbarization* and *Great Transitions*. These are distinguished by, respectively, essential continuity, fundamental but undesirable social change, and fundamental and favorable social transformation. They correspond to archetypal social philosophies – the

evolutionary, the catastrophic, and the transformational. Evolutionists are optimistic that the dominant patterns we observe today, guided by wise policy, can deliver prosperity, stability and ecological health. Catastrophists fear that deepening social, economic and environmental tensions will not be resolved, with dire consequences for the world's future. Transformationists share these fears, but believe that global transition can be seized as an opportunity to forge a more sustainable and just civilization. In a sense, these represent three different worlds – a world of incremental adjustment, a world of discontinuous cataclysm and a world of structural shift and renewal.

Conventional Worlds assume that the global system in the twenty-first century evolves without major surprise, sharp discontinuity, or fundamental transformation in the basis of human civilization. The dominant forces and values currently driving globalization shape the future. Incremental market and policy adjustments are able to cope with social, economic and environmental problems as they arise. *Barbarization* foresees the possibilities that these problems are not managed. Instead, they cascade into self-amplifying crises that overwhelm the coping capacity of conventional institutions. Civilization descends into anarchy or tyranny. *Great Transitions* envision profound historical transformations in the fundamental values and organizing principles of society. New values and development paradigms ascend that emphasize the quality of life and material sufficiency, human solidarity and global equity, and affinity with nature and environmental sustainability.

To enrich this taxonomy of the future, we introduce two variants for each of these scenario classes, for a total of six scenarios. Two *Conventional Worlds* variants are *Market Forces* and *Policy Reform*. In *Market Forces*, competitive, open and integrated global markets drive world development. Social and environmental concerns are secondary. By contrast, *Policy Reform* assumes that comprehensive and coordinated government action is initiated for poverty reduction and environmental sustainability.

Barbarization scenarios are partitioned into *Breakdown* and *Fortress World.* In *Breakdown*, conflict and crises spiral out of control and institutions collapse. *Fortress World* features an authoritarian response to the threat of breakdown, as the world divides into a kind of global apartheid with the elite in interconnected, protected enclaves and an impoverished majority outside.

The two *Great Transitions* variants are referred to as *Eco-communalism* and *New Sustainability Paradigm*. *Eco-communalism* is a vision of bioregionalism, localism, face-to-face democracy and economic autarky. While popular among some environmental and anarchistic subcultures, it is difficult to visualize a plausible path from the globalizing trends of today that does not pass through some form of *Barbarization* on the way to *Eco-communalism*. In this essay, *Great Transition* is identified with the *New Sustainability Paradigm*, which would change the character of global civilization rather than retreat into localism. It validates global solidarity, cultural cross-fertilization and economic connectedness while seeking a liberatory, humanistic and ecological transition.

The six scenario variants are illustrated in Figure 1, which shows heuristic sketches of the behavior of each for selected variables. The scenarios are distinguished by distinct responses to social and environmental challenges. *Market Forces* relies heavily on the self-correcting logic of competitive markets. *Policy Reform* depends on government action to seek a sustainable future. In *Fortress World*, it falls to security forces to impose

order, protect the environment, and prevent a collapse into *Breakdown*. *Great Transitions* envision the emergence of new values, a revised model of development, and the active engagement of civil society.

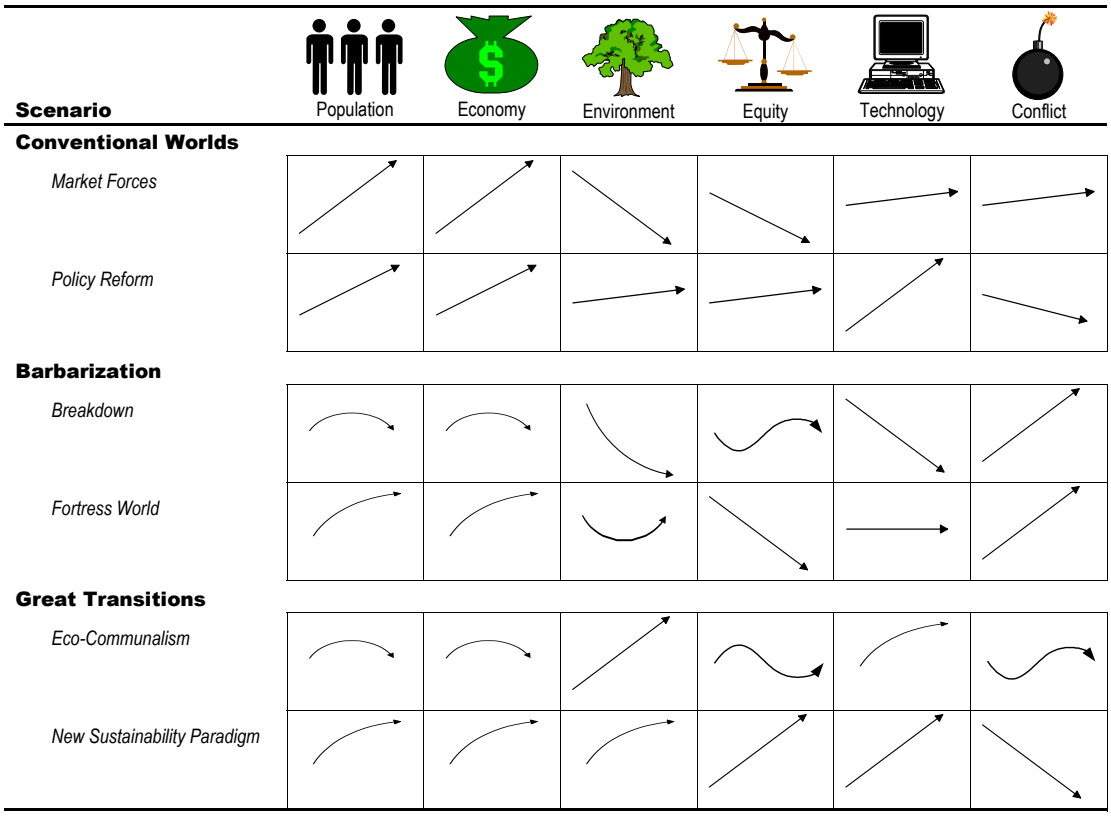

Figure 1. Scenario Structure with Illustrative Patterns

Source: Gallopín et al. (1997)

Market-driven Development and its Perils

In the *Market Forces* scenario, the dominant forces and trends driving globalization shape the character of global development in the coming decades. While this is the tacit assumption of "business-as-usual" scenarios, it should be underscored that, like all scenarios, *Market Forces* is a normative vision of the future. Its success requires policy activism, and it will not be easy. Comprehensive initiatives will be required to overcome market barriers, create institutional supports, overcome cultural fissures, and integrate the developing world into the global economic system. This approach constitutes the conventional development paradigm, the program of the IMF, WTO and the so-called "Washington consensus".

Figure 2 provides a thumbnail sketch of the possible behavior of selected global indicators in a *Market Forces* scenario. Between 1995 and 2050, world population increases by more than 50 percent, economic output more than quadruples, food requirements almost double, world hunger persists, and income inequality tends to

increase. The use of energy, water and other natural resources grows far less rapidly than GDP. This "dematerialization" is due both to structural shifts in the economy – from industry to the less resource-intensive service sector – and to market-induced technological change. But despite such reductions, the pressures on resources and the environment increase as the growth in population and human activity overwhelms the improved efficiency per unit of activity. The "growth effect" outpaces the "efficiency effect."

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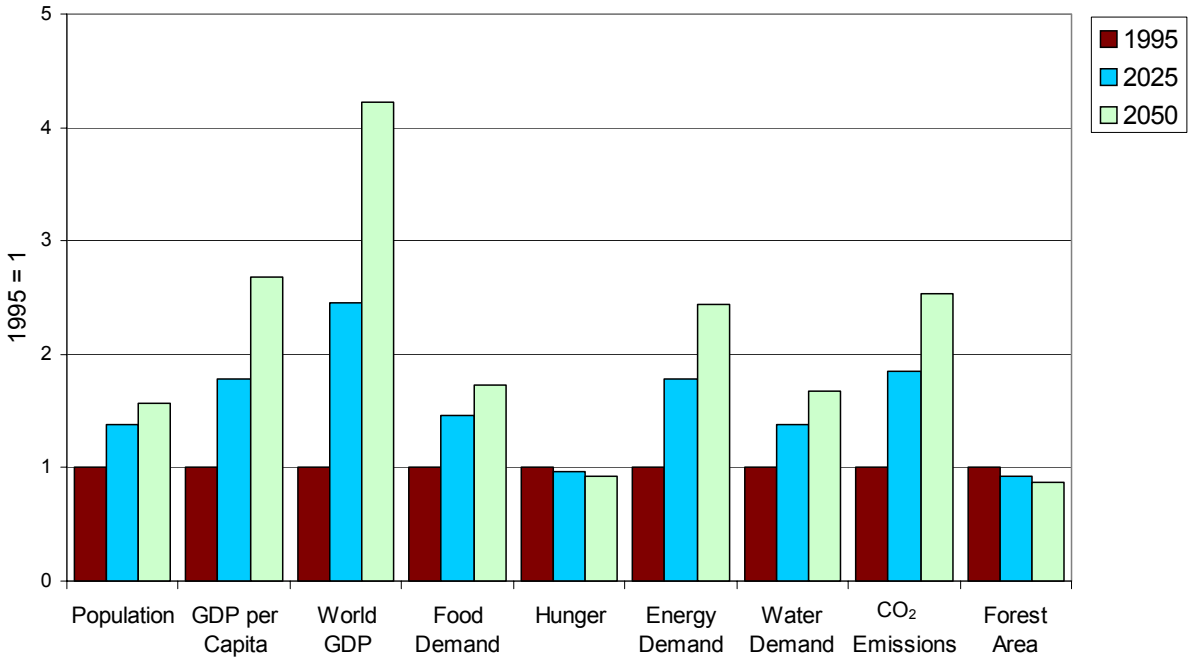
Figure 2. Global Indicators in *Market Forces* Scenario



Source: Raskin et al. (1998)

Significant environmental obstacles would lie along the path of a *Market Forces* future. The combined effects of growth in the number of people, the scale of the economy and the throughput of natural resources increase the pressure on the environment by human activity. Rather than abating, the unsustainable process of environmental degradation that we observe in today's world would intensify. The danger of crossing critical thresholds in global systems would thereby increase, triggering events that could radically transform the planet's climate and ecosystems. In many places, rising water demands would generate discord over the allocation of scarce fresh water both within and between countries – and between human uses and ecosystem needs. Forests and wetlands would continue to be converted to agriculture, and chemical pollution from unsustainable agro-industrial farming practices would pollute rivers and aquifers. Substantial expansion of built-up areas would contribute significantly to land cover changes. Precious ecosystems – coastal reefs, wetlands, forests and numerous others – would continue to degrade as a result of land change, water degradation and pollution. More intense climate change could further complicate the provision of adequate water and food, and the

preservation of ecosystem goods, services and amenities.

The social and economic stability of a *Market Forces* world also would be compromised. A combination of factors – persistence of global poverty, continued inequity among and within nations and degradation of environmental resources – could undermine social cohesion, stimulate migration and weaken international security. Oil would become scarcer, prices would rise, and the geopolitics of oil would permeate international affairs. Indeed, heightened social dislocation, environmental impact, and security risk could undermine a fundamental premise of the scenario – perpetual global economic growth.

So the *Market Forces* worldview embraces both an ambitious vision – to forge a globally integrated free market by eliminating trade barriers, building market-enabling institutions and spreading the Western model of development. It gambles that the global market will be able to cope with its internal contradictions – planetary environmental degradation, economic instability, social polarization and cultural conflict. The long-term stability of a *Market Forces* world is not guaranteed, although it could persist for many decades, reeling from one environmental, social and security crisis to the next.

Barbarization scenarios explore the alarming possibility that a *Market Forces* future veers toward a world of conflict in which the moral underpinnings of civilization erode. Such grim scenarios are plausible. Indeed, for many who are pessimistic about the current drift of world development, they are probable. *Barbarization* scenarios assume that the conventional paradigm is ascendant but fails to rectify deepening environmental and socio-economic tensions, leading to a multi-dimensional crisis. The warning bells – environmental degradation, climate change, social polarization and terrorism – are rung, but not heeded as a coherent movement for sustainability and a revised development agenda fails to materialize.

If a general crisis were to unfold, a key uncertainty would be the reaction of powerful institutions – country alliances, transnational corporations, international organizations, and armed forces. In the *Breakdown* variant, their response is fragmented and insufficient to impose order. In *Fortress World*, powerful regional and international actors comprehend the perilous forces leading to *Breakdown*. They are able to muster an organized response in order to protect their interests, and prevent the corrosive erosion of wealth, resources, and governance systems. The elite retreat to protected enclaves, mostly in historically rich nations, but in favored enclaves in poor nations, as well.

The stability of a *Fortress World* would depend on the organizational capacity of the privileged enclaves to maintain sufficient production as well as control over the disenfranchised. Although it could last for decades, this scenario may contain the seeds of its own destruction. An uprising of the excluded could challenge the hegemony of the minority, especially if rivalry opens fissures in the common front of the dominant strata. The collapse of the *Fortress World* might lead to a *Breakdown* trajectory, or possibly, to some new social form.

The Reform Path

Such a descent into polarization, conflict, and turbulence would be a tragic reversal of the aspirations for global society that crystallized over the course of the last century. Four broad goals – peace, freedom, material well-being, and environmental health – define a

powerful ethos for a sustainable world, expressed through new international governance institutions, such as the United Nations, and the articulation of formal agreements on human rights, poverty and the environment. The *Policy Reform* scenario visualizes a future in which achieving these ends becomes a priority at all levels of government. Its essential postulate is the emergence of the political will for mounting a comprehensive and cooperative program for sustainable development.

In a *Policy Reform* world, "growth with equity" becomes the prevailing philosophy of development strategies. A host of initiatives increase the incomes of the poor. Reinvigorated multi-national and bi-national livelihood programs build human and institutional capacity. The flow of investment toward the poorest communities and technological transfers accelerate. Market mechanisms for reducing global greenhouse gas emissions and other environmental goals provide additional revenue streams to developing countries, and contribute to the convergence of incomes between developing and industrialized regions. Also, population growth moderates as access to education and effective family planning programs expand.

Compared to *Market Forces* trends, actions taken to reduce poverty reduce the immense disparities between the rich and the poor that cleave the current social landscape. Beyond poverty reduction, greater equity in the distribution of wealth between and within countries promotes the social and environmental basis for a more peaceful global system. The environmental goals require substantial decreases in the impacts imposed by rich economies, while elsewhere impacts increase and then moderate, as poor economies converge toward rich country patterns. A constellation of policies promotes energy and water efficiency, on the demand side, and renewable energy, ecological agricultural and eco-efficient industrial systems, on the supply side.

Detailed analysis shows that a *Policy Reform* scenario could, in principle, achieve a broad set of social and environmental goals through the deployment of the immense technological and managerial potential that currently exists (Raskin et al., 1998). Where the *Market Forces* scenario would imperil its own stability by compromising ecological resilience and social coherence, *Policy Reform* could constrain market globalization within politically imposed social and environmental targets. The scenario brings the welcome news that deep social fissures and environmental degradation is not a necessary condition of future development, but rather are subject to policy choices.

But is the policy reform strategy sufficient for a sustainability transition? There are two types of concern. The first is the immense technical and managerial challenge of countering conventional development with a reform program. Recall that the *Policy Reform* vision assumes that the underlying values, lifestyles and economic structures of *Market Forces* endure. The required pace and scale of technological and social change is daunting, like climbing up a down escalator.

The second category of concern is that the scenario's plausibility rests on a strong postulate – the hypothesis of sufficient political will. For the reform path to succeed, an unprecedented commitment by government at all levels to achieving sustainability goals must arise. That commitment must be expressed through effective and comprehensive economic, social and institutional initiatives; but the necessary political will for a reform route to sustainability is today nowhere in sight. To gain ascendancy, the *Policy Reform* vision must overcome the resistance of special interests, the myopia of narrow outlooks

and the inertia of complacency. The correlation between the accumulation of wealth and the concentration of power erodes the political basis for a transition. The values of consumerism and individualism are not easily reconciled with a politics to prioritize long-range environmental and social well-being. Overcoming the dissonance between the logic of sustainability and the logic of the global market may require fundamental changes in popular values, lifestyles and political priorities that transcend *Conventional Worlds* assumptions.

To these pragmatic concerns about the technological and political feasibility of the reform path may be added a normative critique: is it desirable? It envisions a more crowded and engineered global emporium, albeit one where the environment continues to function and fewer people starve. But would it be a place of contentment, choice, and individual and social exploration? *Policy Reform* is the realm of necessity, seeking to mitigate environmental and social disruption, while the quality of life remains unexamined. Asking anew the question posed by Socrates – how shall we live? – takes us to *Great Transitions* visions, the realm of desirability.

Toward a New Paradigm

Much of human history was dominated by the struggle for survival under harsh and meager conditions where progress meant solving the economic problem of scarcity. Now that problem has been – or rather, could be – solved. The precondition for a *Great Transition* is the historic possibility of a post-scarcity world where all enjoy a decent standard of living. On that foundation, the quest for material things can abate and the concept of progress can be revised. The vision of a better life can turn to non-material dimensions of fulfillment – the quality of life, the quality of human solidarity and the quality of the earth. With Keynes (1972), we can dream of a time when "we shall once more value ends above means and prefer the good to the useful."

The compulsion for ever-greater material consumption is the essence of the growth paradigm of conventional worlds. But acquisition as an end in itself feeds a hunger that knows no satisfaction. For the affluent, the marginal satisfaction of profligate consumption must be measured against the costs of working to pay for them, learning to use and maintain them, and sacrificing the cultivation of other aspects of a good life – relationships, creativity, community, nature and spirituality. A *Great Transition* scenario would be galvanized by the search for a deeper basis for human happiness and fulfillment.

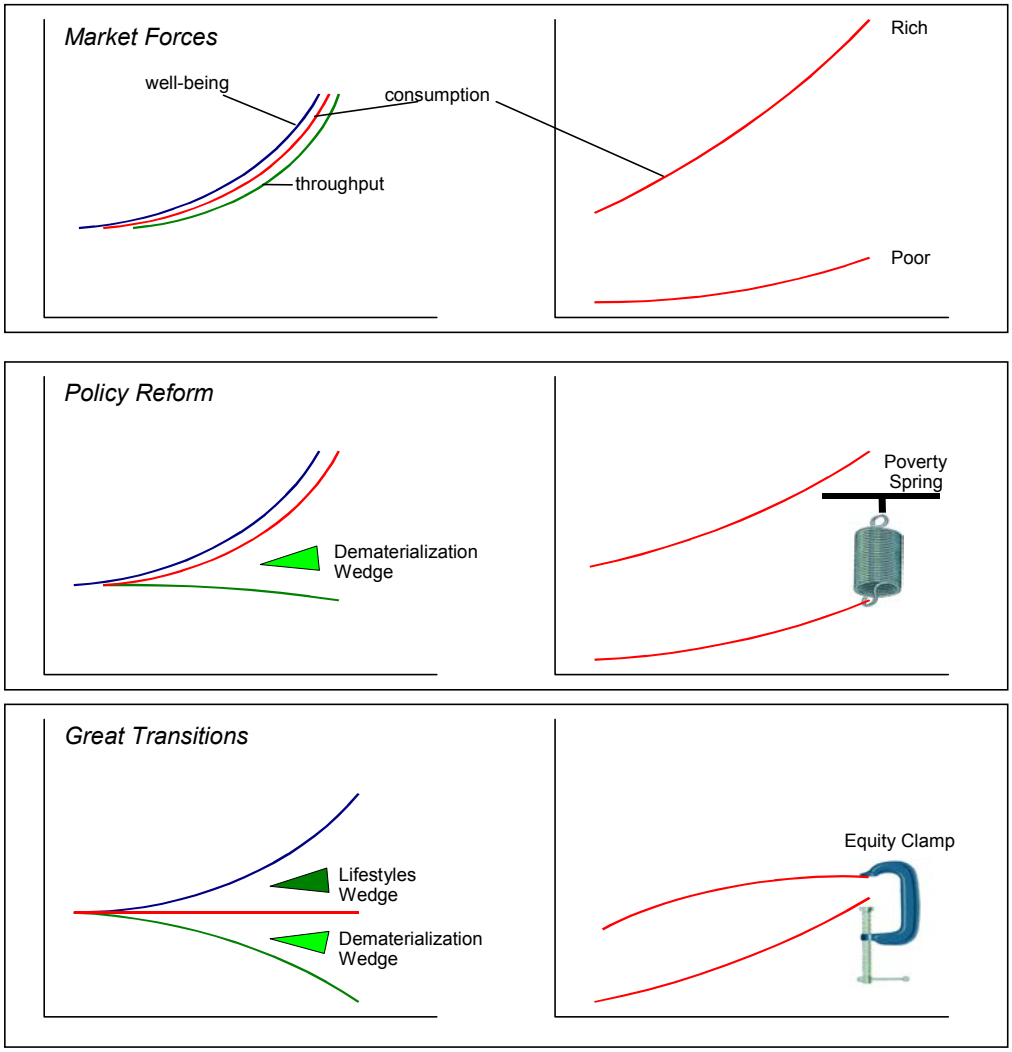
While *Great Transitions* approach to a sustainable civilization builds on the wealth-generating features of *Market Forces* and the technological change of *Policy Reform*, it transcends them, by recognizing that market-led adaptations and government-led policy adjustments are not enough. *Great Transition* scenarios add a third ingredient – a values-led shift toward an alternative global vision. Powerful additional opportunities for mending the global environment and forging more harmonious social conditions would then open. The new paradigm, including a range of lifestyle changes and greater social solidarity, expressed through diverse cultural, would become a central theme of human development.

Market Forces maintains the conventional association of human well-being with the level of material consumption, which, in turn, drives greater throughput of natural

resources and impact on the environment. In the *Policy Reform* strategy, the link between well-being and consumption is maintained, but consumption is decoupled from throughput (the "dematerialization wedge"). *Great Transitions* adds a second "lifestyle wedge" that breaks the lockstep connection between consumption and well-being. Environmental impacts may be decomposed into the product of human activity – miles driven, steel produced, food harvested and so on – and impact per activity. *Policy Reform* focuses on the second factor, introducing efficient, clean and renewable technologies that reduce impacts per activity. *Great Transitions* complements such technology improvements with lifestyles and values changes that reduce and change activity levels in affluent areas, and provide an alternative vision of development globally. These distinctions are illustrated in Figure 3.

A second critical difference between the scenarios concerns equity, as illustrated in the right-hand column of the same figure. In the *Market Forces* world, the economic growth of the poorer regions of the world is more rapid than the rich regions'; nevertheless, the absolute difference between rich and poor widens. At the bottom of the income pyramid, a billion people remain mired in absolute poverty. *Policy Reform* strategies substantially reduce absolute poverty through targeted aid and livelihood programs (the "poverty spring"). While the yawning gap between rich and poor is partially abated, global and national inequity remains a threat to social cohesion. Poverty eradication is a fundamental tenet of *Great Transitions*, of course. In addition to pulling up the bottom, however, great value is placed on urgently creating more just, harmonious and equitable social relations (the "equity clamp").

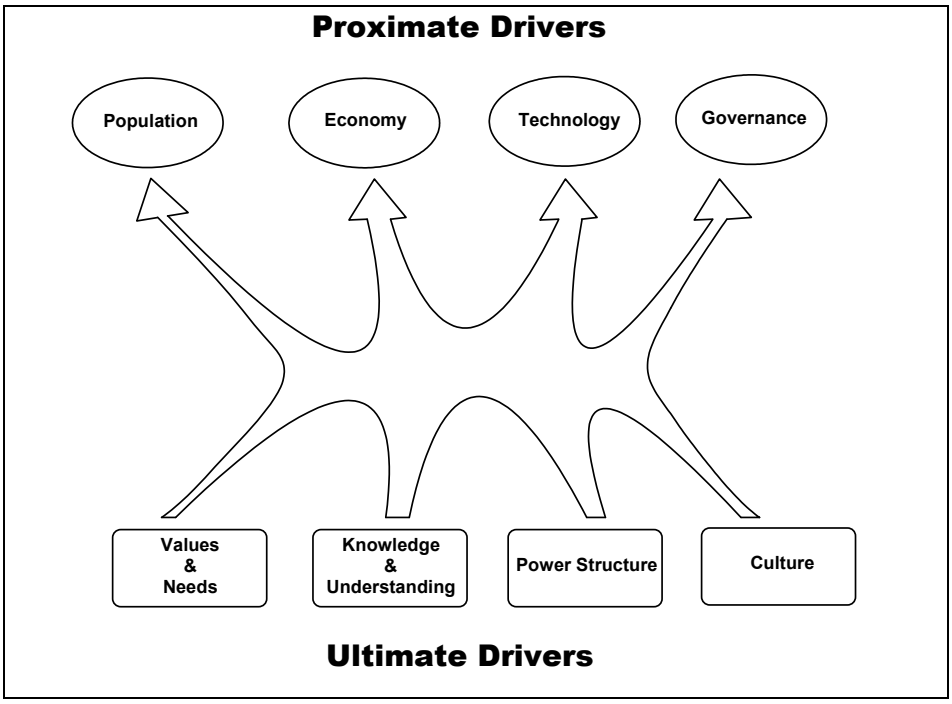
Figure 3. Tools for a Transition



Source: "Wedges" based on Robinson and Tinker (1996)

Conventional Worlds strategies operate on the direct levers of change that can influence economic patterns, technology, demographics and institutions. Mainstream development policy focuses on these proximate drivers. A *Great Transition* would go deeper to the root causes that shape society and the human experience. These ultimate drivers include values, understanding, power and culture (Figure 4). Proximate drivers are responsive to short-term intervention. The more stable ultimate drivers are subject to gradual cultural and political processes. They define the boundaries for change and the future. The *Great Transition* project would expand the frontier of the possible by altering the basis for human choice.

Figure 4. Proximate and Ultimate Drivers



Dimensions of Transition

A *Great Transition* envisions a profound change in the character of civilization in response to planetary challenges. The transition in the structure of global society would entrain sub-transitions that change values, knowledge, social relations, economic and governance institutions, and technology (Speth, 1992). These dimensions would reinforce and amplify one another in an accelerating process of transformation.

With a new emphasis on quality of life, social solidarity and ecology, a *values transition* would counter consumerism, individualism, and the domination of nature. Prevailing values set the criteria for what is considered good, true and beautiful, what people want and how they want to live. Values are culturally conditioned, reflecting the social consensus on what is considered normal or desirable. Culture shapes how physiological, psychological and social needs are perceived (Maslow, 1954), and values mediate how needs are transformed into wants and how they are satisfied. The plausibility of a *Great Transition* rests with the possibility of an alternative suite of values gaining ascendancy that redefine wants, ways of life and behaviors.

A *knowledge transition* would highlight systemic approaches, expanding the ways in which problems are defined and solved. The fundamental units of analysis of a new sustainability science are socio-ecological systems, as they form and interact from the community to planetary levels. These are complex and non-linear systems with long time lags between actions and their consequences. A systemic framework is required to illuminate key problems such as the vulnerability of systems to abrupt change and interactions across spatial scales. The challenge is to develop appropriate methodologies and new institutional capacity to address integration, uncertainty and the normative

content of socio-ecological problems (Kates et al., 2001).

A *demographic transition* would stabilize populations and create sustainable communities. Acceleration of the trend toward population stabilization can enhance life quality and reduce pressure on the environment and reduce the ranks of the impoverished. This could be addressed through a commitment to reproductive health services in developing countries linked to education, particularly for girls, and job opportunities. A parallel demographic challenge is the transition to a new vision of urban settlements that unifies concerns with habitability, efficiency, and environment.

A *social transition* would ensure universal rights, eradicate poverty and celebrate diversity. The social transition envisions the realization in practice of the consensus for universal rights for people, children, indigenous cultures and nature, and a focus on the well-being of the poor, sustainable livelihoods and greater equity. In the *Great Transition* vision, new values and priorities reduce the schism between the included and excluded, opening the space opens for solidarity and peace to flourish.

An *institutional transition* in a *Great Transition* would make the economy a means of serving people and preserving nature and foster governance mechanisms that build governance partnerships between stakeholders at all levels. The system of production, distribution and decision-making would need to be harmonized with equity and sustainability principles, and changing consumption and life-style patterns, with specific structures evolving in a process of debate and adaptation. Enlarged international governance processes would set minimum sustainability standards such as basic human entitlements, environmental resource protection and human rights. But strategies for implementing such standards would be left to national and sub-national deliberations, and would take diverse forms depending on political cultures.

A *technology transition* would involve devising the capacity to develop and deploy biotechnology, nanotechnology, robotics, and other revolutionary innovations in the service of the goals of the new development paradigm. An immediate imperative is to reduce the human footprint on nature. The three pillars are efficient use, renewable resources and industrial ecology. Efficient use means radically reducing the required resource inputs for each unit of production and consumption. Renewable resources means living off nature's flows while maintaining its capital stocks – solar-based energy rather than fossil fuels, sustainable farming rather than land degradation and preserving ecosystems rather than liquidating them. Industrial ecology means largely eliminating waste through re-cycling, re-use, re-manufacturing and product life extension. The challenge is immense, but so are the technological possibilities if institutional barriers could be overcome.

Change Agents

The social actors driving the *Market Forces* scenario are global corporations, market-enabling governments and a consumerist public. In *Policy Reform*, the private sector and consumerism remain central, but government takes the lead in aligning markets with environmental and social goals. Civil society and engaged citizens become critical sources of change for the new values that would underpin a *Great Transition*. Three emerging global actors – intergovernmental organizations, transnational corporations and non-governmental organizations – move to center stage.

The formation of intergovernmental organizations has tracked the emergence of the Planetary Phase. The United Nations, in particular, although never given the authority to fulfill its lofty mission, remains the legitimate voice of the world's governments. In a *Market Forces* world, the UN would be relegated to a platform for high-minded rhetoric and crisis management, while in *Policy Reform* it would becomes a key venue for implementing environmental and social goals. In a *Great Transition*, a reorganized UN could express the international solidarity of the new development agenda as the dominance of the nation-state fades. While the ultimate source of value changes and political choices may lie elsewhere, intergovernmental organizations can at critical moments provide leadership and initiative for the transition.

The power of transnational corporations would continue to grow in *Market Forces*. *Policy Reform* requires that big business comes to understand sustainable development as a necessary condition for preserving the stability of world markets. The *Great Transition* process would transform the role of business. As the new values spread among the consuming public, forward-looking corporations seize the new reality as a business opportunity and a matter of social responsibility. In partnership with government and citizens' groups they establish tough standards for sustainable and socially responsible businesses, and innovative practices to meet them. While the aggregation of these adjustments does not guarantee a transition, sustainability-oriented businesses are an important part of the *Great Transition* story as they constructively respond to, and reinforce, new pressures from consumers, regulators and the public.

Civil society organizations are critical new social actors in global, regional and local arenas (Florini, 2000). The explosive growth in the their number and diversity has altered the political and cultural landscape. Using modern communications technology, they act to build public awareness and mount campaigns to influence policy and alter corporate behavior. At official international meetings, some are inside the building as active participants, and some are in the streets, challenging the drift of globalization and, in some cases, globalization itself. Global networks engage dispersed individuals and organizations in research, public outreach, advocacy, and protest on a range of sustainability issues (Reinicke et al., 2000).

Unleashing wellsprings of energy and activism, the new civil society is beginning to discover itself as a globally connected force for change, experimenting with different forms of alliance and networking. Yet, as a global movement, it remains fragmented and responsive, lacking a cohesive positive social vision and coherent strategy. A critical uncertainty for a *Great Transition* is whether civil society can unify into a coherent force for redirecting global development. This would require a coalescence of seemingly unrelated bottom-up initiatives and diverse global initiatives into a joint project for change. Such a force would entail a common framework of broad principles based on shared values.

The story of change in a *Great Transition* is a tale of how the various actors work in synergy and with foresight as collective agents for a new paradigm. If the many voices form a global chorus, it will herald a new sustainability paradigm. The underlying engine would need to be, it seems, an engaged and aware public, animated by a new suite of values that emphasizes quality of life, human solidarity and environmental sustainability.

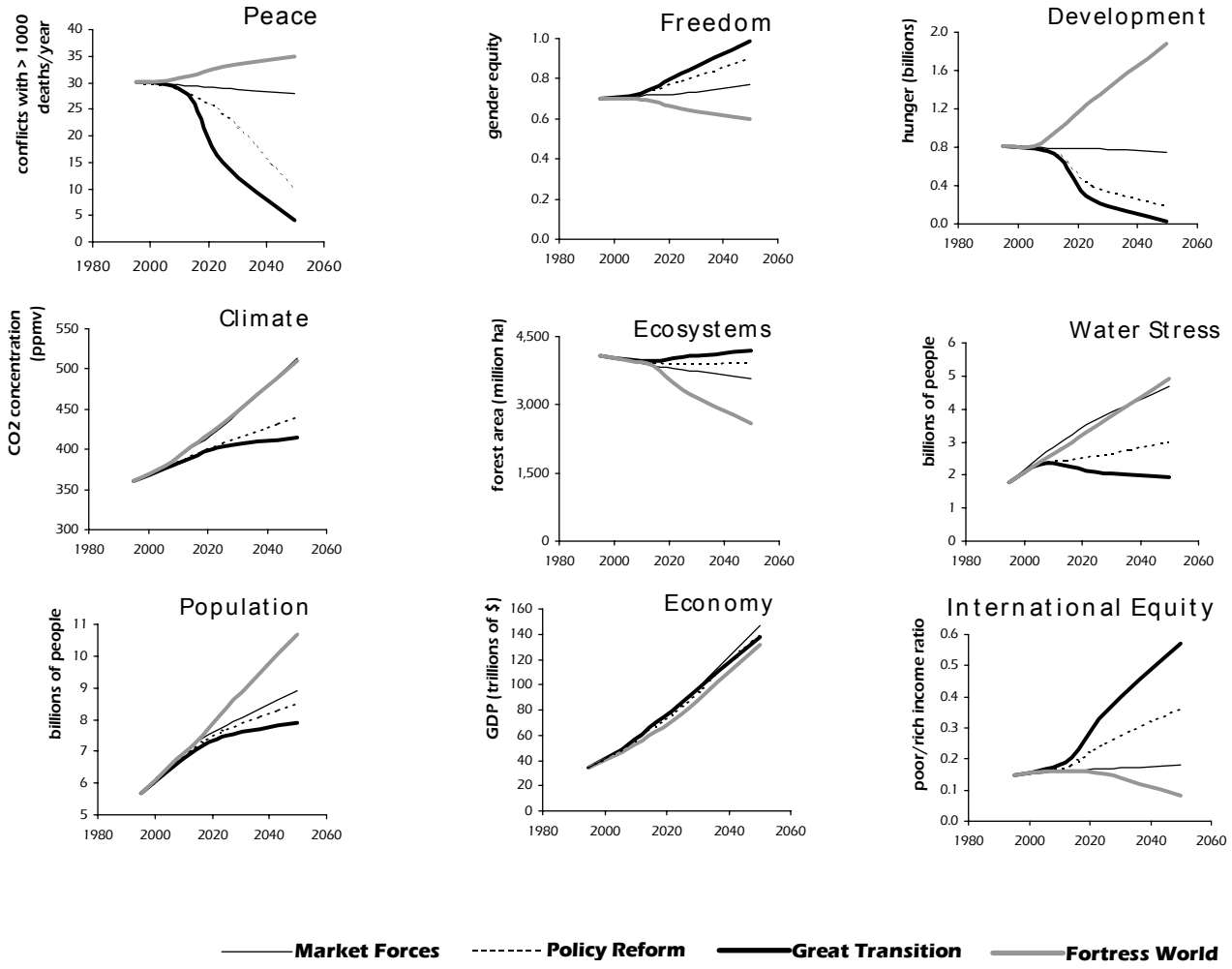
The Shape of Transition

Depending on how the uncertainties of planetary transition are resolved, the global future can branch into distinct paths. The scenarios discussed in this essay are alternative stories of the future, each representing a unique combination of institutions, values, and culture. The narratives can be further elaborated with a quantitative sketch of how key indicators unfold over time. We focus on four of the scenarios – *Market Forces*, *Policy Reform*, *Fortress World* and *Great Transition*.

All scenarios begin with the same set of trends that are now driving the world system forward. Social, economic and environmental patterns then gradually diverge as they are conditioned by different events, institutional change and value choices. Global patterns are compared in Figure 5 (Raskin et al., 1998; Kemp-Benedict et al., 2002). *Market Forces* risks, as we have argued, continued erosion of environmental health and persistent poverty. *Policy Reform* "bends the curve" through the rapid deployment of alternative technology and targeted programs to reduce poverty. *Fortress World* is a dualistic world of modern enclaves of affluence for the few, and underdeveloped areas of destitution for the many.

Great Transition includes the rapid penetration of environmentally benign technologies as well as a gradual shift toward less materially-intensive lifestyles. Resource requirements decrease as consumerism abates, populations stabilize, growth slows in affluent areas, and settlement patterns become more integrated and compact. At the same time, poverty levels drop, as equity between and within countries rapidly improves.

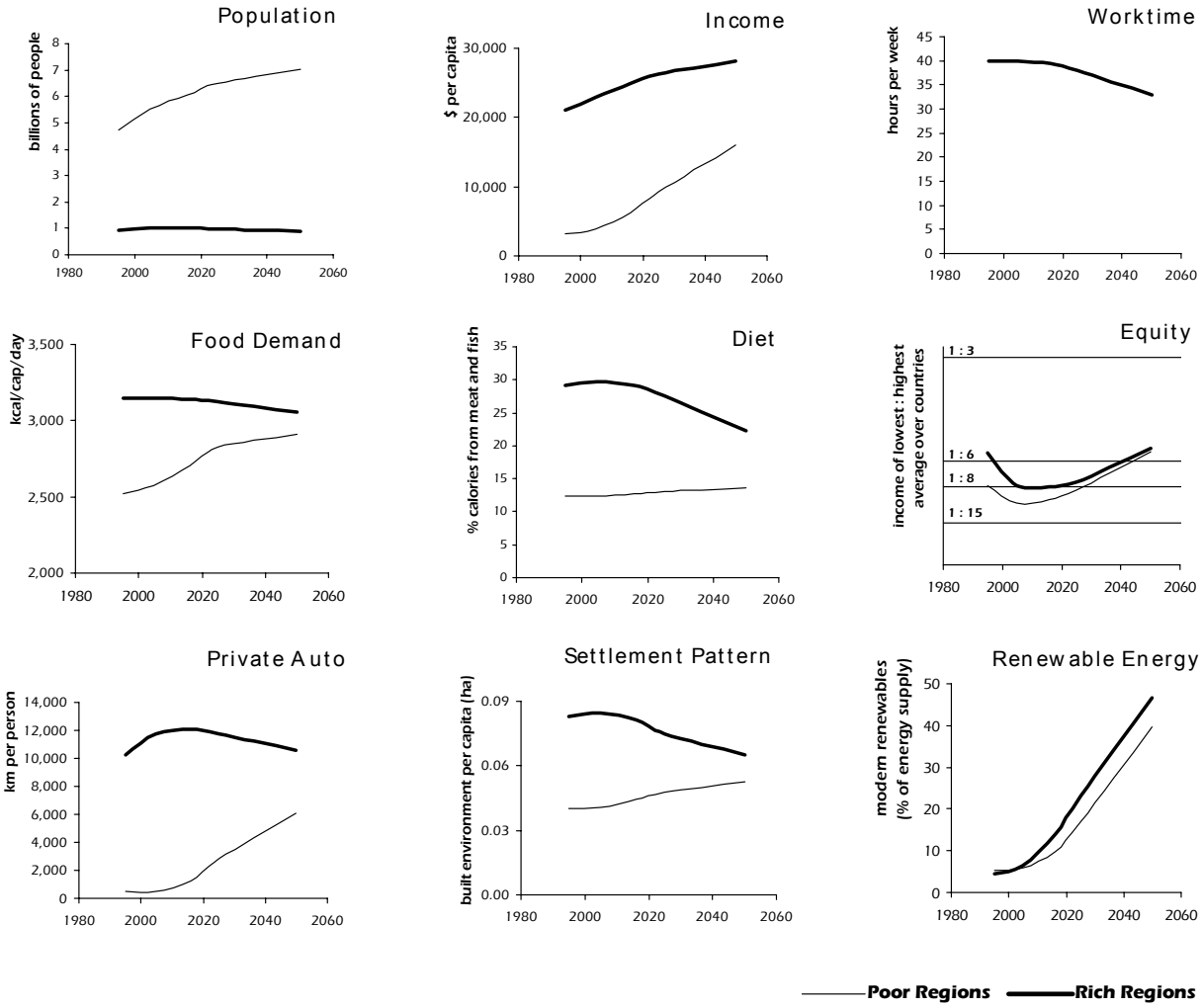
Figure 5. Scenarios Compared: Selected Indicators



Great Transition patterns are shown in Figure 6 for "rich" and "poor" regions, essentially the OECD countries and the rest-of-the world, respectively. Population growth moderates in response to poverty eradication, universal education and greater gender equality. In affluent regions, income growth slows as people opt for shorter formal workweeks to devote more time – an increasingly valued resource – to cultural, civic and personal pursuits. Rapid investment and transfers to poor regions stimulates rapid growth and international equity. The affluent reduce the fraction of meat in diets for environmental, ethical and health considerations. National equity in most countries approaches the levels currently seen in European countries such as Austria and Denmark. Reliance on automobiles decreases in rich areas, as settlements become more integrated and alternative modes of transportation more prevalent. The energy transition ushers in the age of renewable energy, the materials transition radically reduces resource throughput and phases out toxic materials, and the agricultural transition brings greater

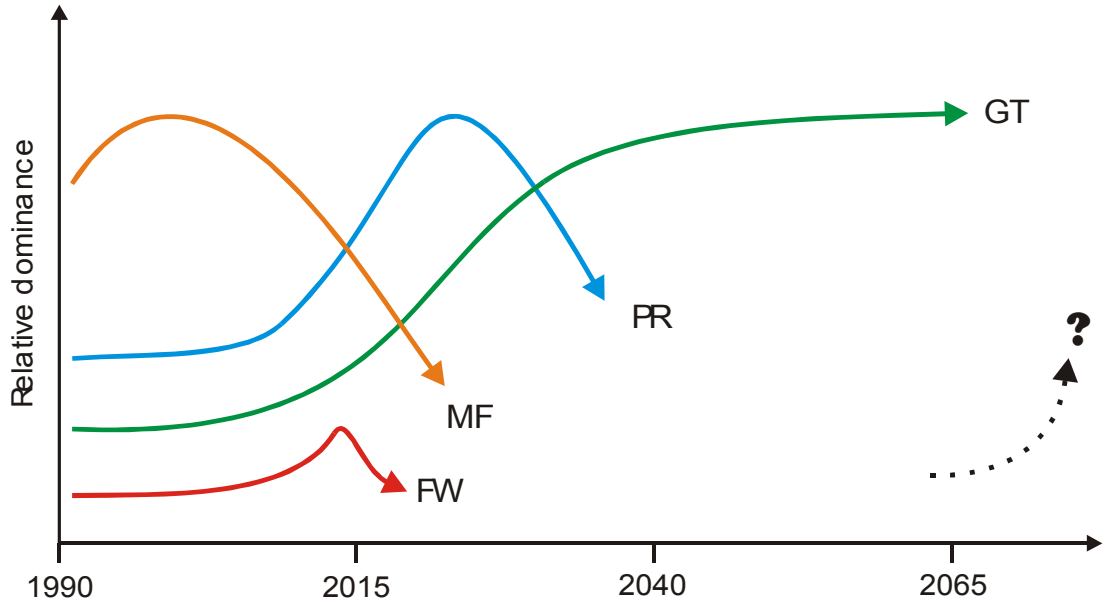
reliance on ecological farming.

Figure 6. Great Transition Patterns



It's all too easy to tell a compelling story of how a *Fortress World* scenario might evolve from contemporary patterns. Imagining the pathway to a *Great Transition* is a more challenging and complex tax, a "history of the future" in which opportunities are seized and choices are made at critical branch points of global development (Raskin et al., 2002). The world system unfolds in a mixed state of various tendencies competing for dominance. Figure 7 illustrates the overlay and sequence of scenarios in a hypothetical phased emergence of a *Great Transition. Market Forces* dominates until its internal contradictions lead to a general global crisis, *Fortress World* forces surge briefly and ineffectually, *Policy Reform* ascends in the wake of the crisis, and eventually a *Great Transition* era begins as the long-brewing popular desire for fundamental change surges.

Figure 7. Overlapping Tendencies in a Great Transition



MF = *Market Forces*, PR = *Policy Reform*, GT = *Great Transition*, FW = *Fortress World*

Civilizing Globalization

The evolving interconnectedness of the Planetary Phase is the precondition for a *Great Transition*. Globalization forges expanded categories of consciousness – seeing humanity as a whole, its place in the web of life, and its links to the destiny of the planet. Globalization also distributes systems of production and participation, creates potential roles for corporate and civil society and makes possible greater equity. For those who aspire to a more humane, sustainable and desirable future, simply being "against globalization" is not satisfactory. Rather, the struggle is over the character of globalization in the coming decades. If its promise is to be realized and its perils avoided, globalization must be reshaped. A *Great Transition* both needs globalization and needs to deal with its discontents.

Is such a vision possible? It does not seem promising judging by the global scene today, so full of antagonism, inequity and degradation of nature and the human spirit. The momentum toward an unsustainable future can be reversed, but only with great difficulty. The *Great Transition* assumes fundamental shifts in desired lifestyles, values and technology. Yet, even under these assumptions, it would take decades to realign human activity with a healthy environment, make poverty obsolete, and bridge the deep fissures that divide people. Some climate change is irrevocable, water stress will persist in many places, extinct species will not return, and lives will continue to be lost to deprivation.

Yet, the cunning of history is sure to bring surprises. While some, no doubt, will not be welcome, a planetary transition toward a humane, just and ecological future is still possible. But the curve of development must be bent twice. A radical revision of

technological means would begin the transition, but a reconsideration of human goals will be needed to complete it.

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