Paradigm Shift for Symbiotic Living and Genuine Quality of Life

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Abstract:

The fundamental challenges of our time can be summarized:

- Human activities now shape Earth's future.
- Our human family of 7.5 billion members must expand our awareness and take responsibility for our future.
- This requires new paradigms for human development in symbiosis with Earth systems and all other life forms and nature.

This paper explores these issues and ways that paradigms and concepts are shifting – providing new strategies, models, academic approaches and new institutions and enterprises in public, private and civic sectors worldwide.

Humans are changing Earth systems in many ways: from changing its climate, atmosphere, acidifying oceans, pollution affecting human and biodiversity health. Our still-multiplying 7.5 billion population may reach 10 billion by 2050 and now consumes almost 40% of the planet's biological production (photosynthesis). Our new era of human global intervention has been termed the Age of the Anthropocene best illustrated (Figure 1) by the space junk orbiting our planet and causing many collisions with still-functioning satellites relaying our information and observing Earth's daily change processes in real time. The billions that need to be spent to clear this space junk is a good illustration of faulty paradigms in economics and management models. Yet humans have capabilities to effect positive restoration of their damage: for example since the UN Montreal Protocol of 1997, the Earths' ozone layer is now recovering ("Atmospheric Healing," 2014).

Computer models are still uncertain about the timing and extent of human effects on Earth's climate and biosphere – as well as the projected growth of human populations. One computer model shows that

empowering the world's women with solar energy for lighting and cooking while providing micro-financing could result in 3 billion avoided births (Khosla, 2009). The shift to low-carbon technologies is accelerating as Ethical Markets reports in our Green Transition Scoreboard® with $5.7 trillion now invested in green sectors worldwide (Henderson, Sanquiche & Nash, 2014).

The IT Digital Age and pervasive automation of ever more sectors of industrial societies provides many opportunities: citizen participation, MOOCS, innovation, collaborative economy, small businesses, NGOs, sharing-caring, planetary awareness. There are many new challenges: fewer jobs, low wages, inequality, restructuring economy, managing the epochal shift from atoms to bits. Broadly shared goals: knowledge-rich, inclusive, equitable green economy designed on Life's Principles and Earth Systems Science, were agreed in Brazil at the UN Summit – Rio+20 in Rio de Janeiro. The UN Climate Summit in New York, September 2014, was met with 400,000 citizens demanding progress, with similar public demonstrations in many cities around the world.

Human societies are experiencing an accelerating shift from the fossil-fueled Industrial Era of the past 300 years to the Information Age powered by the IT revolution and based on more scientific knowledge and harvesting renewable energy from the daily free photons from the Sun. In *The Politics of the Solar Age* (1981 1988), I described the great transition of societies from the fossil-fueled Industrial Era to the information-rich Solar Age. My firsthand experience of this great global transition was as a science policy advisor at the US Office of Technology Assessment Advisory Council, the National Academy of Engineering and the National Science Foundation from 1974 until 1980. I learned that if the USA had subsidized efficiency, solar and renewables, at the same level that it subsidized coal, oil, gas and nuclear, the USA would have been powered 100% by renewable energy by the mid-1970s. The chief reasons for the perpetuation of the earlier, inefficient industrial processes and fossilized sectors were due to the increasingly powerful, entrenched corporations and financial interests. For example, in Korea's chaebol structure, there are risks these companies which dominate the Korean economy face with sudden restructuring due to internal conflicts, captive boards, lack of transparency, governance, as fully discussed in *Corporate Sustainability 2013 Korea*. These issues are present in most countries, in many

forms. These diverse, global, powerful industrial groups' influence and money which capture politicians and regulators are abetted by narrow economic theories which still allow external costs to the environment and societies to be ignored in business and government accounting models. Independent research groups, including Global Financial Integrity, Tax Justice, BankTrack, Transparency International, AccountAbility, RepRisk, Social Accountability International, now hold these large corporations accountable with reports in media. These drive UN agencies and others including the OECD and chambers of commerce to greater efforts.

The economics profession itself became too powerful, dominating academia and leading to devaluing of other disciplines and research vital to a fuller understanding of national development. An example of this has been the dominance of money-based indicators and GDP, now being corrected by broader measures (Figure 2 Moving to Correct GDPs). Narrow, special interest policies such as those of economists of the University of Chicago, emanated from the USA and distorted the development of many countries in Latin America, leading to coups of democratically elected leaders such as Salvador Allende in Chile and others documented by economist John Perkins in *Confessions of an Economic Hit Man* (2005). Korean economist Ha-Joon Chang documents in *Bad Samaritans* (2008) how the domestic policies of many countries were perverted by neoclassical economic ideologies at the World Bank, the IMF and other agencies.

The turning point in the energy transition occurred in 2012 as I documented in *Mapping the Global Transition to the Solar Age* (2014). Climate change realities became accepted by scientific evidence by 191 member countries at the UN Rio+20 Summit in Brazil. At the same time, the carbon trading regime set up in Kyoto in 1998, influenced by economists and global financiers, failed to reduce CO2 emissions and led to the "blame game" at the UN-FCCC Summit in Copenhagen in 2009. Ethical Markets Media released its first Green Transition Scoreboard® (GTS) showing that already since 2007, private investors had over $1.5 trillion in growing green sector companies. This was aimed to show the reality already occurring of the shift to the next energy basis of human progress as the renewable, knowledge-rich, green economies of the Solar Age (Figure 3 Annual Solar Irradiation). Beyond arguing about carbon

emissions, all countries could actually agree on the need to accelerate the shift by investing in low-carbon technologies, and our GTS showed that the private sector was leading the way. Governments began responding at the Rio+20 summit and pledged to phase out their subsidies of fossil fuels which total almost $500 billion annually. However, these subsidies are protected by powerful producers, and when cuts are made to consumers they can cause hardships to the poor and often result in protests and demonstrations.

The incumbent industries and their political allies fought back to keep their subsidies and their politicians in power. Abetted by the global financial sector and its huge investments in oil, gas, coal and nuclear, money poured into electoral politics in many countries, worst in the USA with the 2010 Supreme Court Citizens United decision which opened the floodgates. Regulatory capture was reinforced by cognitive capture by economics and the theory-induced blindness it caused among politicians, academia, mass media and misleading of public opinion with advertising. Control of media and news content by the over $500 billion spent annually worldwide by advertisers has led to the phenomenon of "mediocracies", e.g., media is predominant over whatever form of government (Henderson, 1996, e-book 2008). Meanwhile, the energy transition similar to earlier shifts from wood, waterwheels, windmills to whale oil, coal and petroleum was occurring at Seven System Levels (Figure 4). The information revolution and the Solar Age are simply the next phases of human evolution.

Korea has been a leader in envisioning the path toward growing the green economy in 2007 and shifting its policies with its "Green Growth" statement in 2009 (Presidential Commission, 2010). I was honored in November 2008 to address Korea's Green Ocean Forum which explored many of the advantages in the shifts to renewable energy: reduce carbon and other toxic emissions; reduce financial volatility, oil speculation, etc.; how energy efficiency stabilizes national economies, reduces waste and pollution; creates large numbers of domestic jobs and increases social/technical knowledge. Korea's progress since 2009 has been impressive: with 48.4 million people, there are 108% mobile phones; exports of IT at 72%; an Economic Freedom Index at 70.3. Korea is a leader in robots – doubled since 2009 (4th in the world). Korea's education is recognized worldwide: primary – 106%; secondary – 97%; tertiary –

103% (*Economist*, 2014). The basic problem is Korea imports 92% of fossil fuels as I discuss later in this paper. I was impressed by the focus on oceans often overlooked by many countries (Figure 5 Technologies for Green Ocean Energy). While Korea's national energy policy focuses on low-carbon green growth, its nuclear power output is scheduled to increase from 33% to 49% by 2024, even though public safety perception has fallen from 70% to less than 35% since Fukushima. Nuclear power is not carbon-free since uranium is enriched with coal and requires transportation while power plant construction is fossil-energy intensive and vastly more expensive than any other power source. And, Korea authorized eight new coal-fired plants in February 2013.

So why haven't Green Ocean Technologies been brought to market sooner? The same key problems holding back renewable, efficient energy also impede ocean energy. Obsolete economics still taught in many business schools excludes external costs of fossil fuels and nuclear power. Governments and politicians influenced by fossil fuel and nuclear industries, money and lobbying still support these industries; their advertising pays the media, resulting in subsidies and tax breaks already mentioned that created an un-level playing field. Capital requirements for wind and solar are up front, even though later the fuel is free. These fossil subsidies also distort international markets and finance, thus KEPCO's investments in renewables are low. For example, see Figure 6 (World Trade Subsidies).

Business leaders know that competition is always within frameworks of: cooperation, international law, protocols for coordinating shipping, airlines and designing infrastructure. Yet, business schools still teach mostly competition. Today's emerging era of global interdependence, caused by globalization of technologies and feedbacks, interactions and responses, has caused loss of national sovereignty and acceleration of irreversible changes. For example, Figure 7 (Vicious Circles) shows how narrow macroeconomic management of inflation, unemployment, deficits and interest rate indicators (already error prone) cannot possibly manage the globally inter-linked dynamic economies of today. Many Korean companies have gone beyond obsolete economics and improved their energy efficiency and report emissions as required by Korea's GHG Inventory.

Today, with the proliferation of digital payments systems and new currencies, we must dig deeper and examine the nature and role of money, a unit of account designed to track and keep score of human productive systems and planetary resources. Money became confused with real wealth (Figure 8 Evolution of Human Use of Money). This deeper view identifies the three modes of resource-use by human societies: information, matter and energy and why information is the most important for human evolution (Figure 9 3 Modes of Resources-Use in National Development). Basically, the new change models now being adopted by advanced research and policy making are summarized in Figure 10 (Emerging Change Models).

Implementation and Progress Toward Knowledge-rich, Sustainable Green Economies

Fundamental to the global shift has been the quiet expansion of understanding of national trends and measuring human development beyond economics, summarized in Figure 2 (Moving to Correct GDPs) and updated regularly by Ethical Markets in Beyond GDP. This fundamental expansion of national accounting in many countries is well-grounded in new research and scientific discoveries – all of which have now invalidated the core assumptions in economics and its textbooks (summarized in Figure 11 and Figure 12, New Science Invalidating Economics – Endogenous and Exogenous). I was honored to present a lecture on these issues at Kyung Hee University in 2001. In *The Politics of the Solar Age* (1981, 1988), I used a simplified visual (Figure 13, Total Productive System of an Industrial Society) to illustrate how economic theories had blinded policy makers and society about the two productive sectors undergirding all societies: the unpaid sectors of maintaining families, caring for children and elders, serving voluntarily in communities, growing food for use, building homes and workshops. This unpaid production is usually 50% of even industrial economies and often as much as 70% of traditional and developing societies – yet this “Love Economy” is ignored in economics, GDP and other money-based indicators. The other uncounted production underpins the whole human society: nature’s production of our food, fiber and life-support system. In 1995, the UN Human Development Index estimated all this unpaid production at $16 trillion ($11 trillion produced by women, $5 trillion by men) simply missing from the official global GDP that year of $24 trillion (United Nations, 1995).

Therefore, unnoticed by the “economism” mindset, since the 1980s when globalization of markets and technology was unleashed, these processes were unguided by any agreements other than acceptance of laissez-faire economics. All industrial societies began restructuring (Figure 14 Restructuring Industrial Societies) as the costs of fossil fuels and nuclear power constrained production and the pollution, waste and health effects became more visible. Gradually, these new social and environmental costs and challenges began to drive value changes and bring new ideas and models (Figure 15 Values Bifurcating in Post Industrial Societies). In North America and Europe, these new models were spearheaded by the movements of shareholders and church pension funds to divest from companies producing weapons, tobacco, alcohol and polluting the environment while treating workers unfairly. As an advisor to the Calvert Social Investment Fund from 1982 until 2004, I participated in the development of screening methods and new indicators of corporate performance on environmental, social and governance (ESG), now standard across the financial sector.

Many futurists like myself began exploring globalization and technological change processes, finding new markets and the largely unexplored opportunities beyond commerce and markets – in the global commons, which requires cooperation, agreements and new governance (Figure 16 Exploring the Evolving Global Playing Field). I identified new corporate strategies around developing common standards, familiar at national levels, such as Microsoft’s Windows and the UL standard on electrical equipment and earlier conforming of railroad gauges. The new standard strategies were global (Figures 17 and 18, Playing the Global Standards Game) and often developed with professional and scientific groups. Standards in the public sphere also proliferated mostly under the auspices of the United Nations and all its agencies, including the International Monetary Fund, World Bank and World Trade Organization. Humans began to see that beyond economic and technological globalization, it was desirable to share and shape a more democratic globalization, by pooling national sovereignty. Human rights could be globalized, along with environmental protection, arms control and such peace-keeping innovations as the UNSIA proposal (Kay& Henderson, 1995; Smith, 1995). As global complexity grew, more conflicts are now better approached through political means and negotiation than military violence.

Principles of World Trade (Figure 19) could be implemented for greatest efficiency and local development, as I described to the annual conference of SEBRAE, Brazil's national association of small and medium-size businesses.

Challenges Ahead in the IT Revolution and Further Digitalization of Industrial Sectors: Growing Inequality, Fewer Jobs at Lower Pay

Grim recent studies reveal the shocking increase in inequality globally, both between and within countries. Anti-poverty economic policies since World War II have done little, except for their notable success in China. Worldwide, the share of nations' productivity increases going to employees is shrinking – while the share to capital owners, financial firms, corporations and their top executives has mushroomed, as reported in *The Economist*, ("A Shrinking Slice," 2013). Global corporations avoid taxes by stashing money overseas, hoarding cash and buying back their stock. Samsung Group, for example, with its 74 companies' annual revenues of $387 billion and 369,000 employees, is undergoing closer press scrutiny ("Samsung: Waiting in the Wings," 2014). Finance minister Choi Kyung-hwan proposed to tax companies' cash piles which have doubled in the past year in the ten largest chaebols while the pace of salary growth has slowed ("A Tempting Target," 2014). Old economic textbook remedies for rising inequality still call for more growth. Yet economic growth is slowing in most mature economies. In still growing China, India, Brazil and other emerging countries, the growth remedies lead to greater inequality as well as destroying traditional livelihoods polluting vital common resources: air, water, forests and biodiversity. Growth based on fossil energy brings the additional and inter-generational inequalities of climate change and increasing weather disasters. The social costs of rising inequality are documented by Joseph Stiglitz in *The Price of Inequality* (2012); James K. Galbraith in *Inequality and Instability* (2012); Kate Pickett and Richard Wilkinson in *The Spirit Level* (2011). Unpacking "growth," which is part of nature, must specify what is growing, what is dying and what is maintained, as physicist Fritjof Capra and I clarify in *Qualitative Growth* (2009).

After decades of theory-induced blindness, a few courageous economists, including Thomas Picketty in *Capitalism in the 21st Century* (2013), are challenging textbook growth bromides and joining with many public intellectuals in targeting growing inequality in new ways. Addressing inequality beyond "economism" at last is focusing on jobless economic growth, as I do in *Building a Win-Win World* (1996, e-book 2008). I tracked automation since the 1960s, examining how machines displaced human labor since the start of the Industrial Revolution in Britain and the rebellions of displaced workers, led by Ned Ludd, smashing the new spinning machines. These Luddites were punished, their rebellion seen as slowing progress.

Fast forward to today's "post-industrial" stage in many "rich" economies where structural unemployment and jobless growth are accelerating inequality, forcing new debates. The economic textbook view claims that advancing industrial innovation, efficiency, productivity and progress as measured by GDP-growth would always create new industries and replace lost jobs with new ones. These macroeconomic theories are failing in the face of the facts of automation, robots, drones and information technologies' advances. Former Microsoft scientist and computer guru Jaron Lanier in *Who Owns the Future* (2013) takes the closest look at the evidence. Aghast at the speed of the digital information takeover of more sectors, particularly in music, entertainment, news, retailing, social media and finance, Lanier calls for new rules and laws remunerating every individual who contributes any information to online companies, banks, Facebook, Google, Twitter and all such platforms. Lanier forecasts the social costs of automating vehicles and eliminating human driving: deskilling, a loss of millions of entry-level jobs, which provide the unemployed, students, minorities a first step on the ladder in their lives. Deskilling is evident, for example, in fly-by-wire aircraft where pilots have crashed planes when auto-pilot systems fail (Carr,2013).

Debates from the 1960s have re-emerged: how can unemployed people get purchasing power to consume the growing cornucopia of goods and services? If these machines take your job, you had better own a piece of that machine, as advised by Louis and Patricia Kelso, in *Democracy and Economic Power* (1986), leading to the over 11,000 employee-owned companies of today and their employee stock ownership plans (ESOPs). Cooperative enterprises employ more people worldwide than all profit making

corporations combined (International Year of Cooperatives, 2012). Unions joined the debate with demands for living minimum wages, that employment and retraining must be assured by unionization, national priorities for full employment, now enshrined in the USA in the Humphrey-Hawkins Full Employment Act of 1946 and the dual mandate of the Federal Reserve to focus on maintaining a stable dollar and full employment. Even more fundamentally, why should access to money and purchasing power come mostly from jobs that are increasingly scarce and ill-paid – or by the luck of having wealthy parents, birth in an advanced society or some sinecure obtained through influence, politics or other power games?

I participated in that 1960s debate by forming with my late friend, Robert Theobald, a citizens committee to explore his ideas in *The Guaranteed Income* (1966). At a seminar in Britain at Windsor Castle in the 1970s hosted by Britain's famed author Charles Handy, a trade unionist exclaimed in our discussion of the envisioned post-industrial world "You're all mad! The people with the leisure won't have any money!" We were enthusiastic about information technology and believed that much boring repetitive work could be taken over by robots as was happening in Detroit's automating car factories. The United Auto Workers (UAW) leader Walter Reuther agreed and the UAW spearheaded 1960s' debates at their Automation House in New York City. All the new possibilities of creating "Leisure Societies" were examined: reducing work weeks, guaranteed incomes and evolving post-industrial societies toward education and human potentials by investing in people. Social innovation could match the technological innovation and automate drudgery! Japan, the USA and Korea embraced automation and lead in robotics. In the USA, many young people join the military in search of job security and education while culture changes produce new services in fitness, yoga, pet-grooming and childcare. In Korea, men spend $960 million annually on cosmetics, while able-bodied men must serve at least 21 months in military service in often oppressive conditions ("Blood, Sweat and Tears," 2014).

Just as Daniel Bell described in his *The Coming of the Post-Industrial Society* (1976), farm mechanization had released laborers to work in factories and their subsequent automation had then steered the workforce into white collar office jobs. A new economy beckoned, built on social innovations like the GI

Bill, Social Security, Medicare, government R&D in national labs, universities and the space program. We futurists envisioned investments in further progress in healthcare, focusing on prevention, satisfactory lifestyles beyond the heroic feats of consumption demanded by the old, money-based GDP growth model. We explored the secretive politics of money-creation itself as in *Future Work* (1987) and *Future Money* (2012) by James Robertson. Basic minimum incomes could, like healthcare, become a right, guaranteed by sharing the productivity of the Information Age more widely – creating millions of new jobs, also in greater leisure and expanding recreation sectors. Money-creation itself could be democratized with the budding local currencies, LETS system and community banks and credit unions!

Many parts of these scenarios have materialized. Societies' total pies did grow bigger, with Korea's advance a prime example. Tourism and hospitality are now the largest sectors of the global economy, along with movies, entertainment, sporting events and all the new industries based on the internet: from online shopping, dating, bartering and social media to banking, gambling, pornography, child trafficking and money-laundering. Local currencies, crowdfunding, credit unions, microfinance have mushroomed worldwide. All the technological advances of the information-communications revolution created all the possibilities envisioned in the 1960s, Information – The World's New Currency Isn't Scarce, as I documented in 1993.

So why instead are we still stuck with jobless economic growth, rising inequalities, a lost generation of young people, many burdened with un-repayable student debt, unable to find jobs, and millions of homeless people and empty foreclosed homes, and many employees losing pensions and mired in stagnant wages? The dismal "economism" paradigm maintained control through creating scarcity as described in Ethical Markets TV program The Money Fix and engendered fear, competition, hoarding – all reinforcing our reptilian brains. This psychological model still underlies banking, finance, asset accumulation, risk and corporate management. Societies do change, but slowly and nostalgia for the past is strong everywhere, including Korea where the movie *The Admiral* on Yee's defeat of the Japanese navy 400 years ago attracted 17 million viewers.

Another answer is that social innovation never kept pace with all that technological innovation. Investments in new infrastructure and in people lagged behind. Capital investments went global, and as more and more jobs fell to automation, millions more moved offshore, looking for cheaper, unorganized labor and unprotected workplaces and environments. Pushed by corporations and their economists, political allies claimed that trade agreements like NAFTA in the 1990s between the USA and Mexico would create up to half a million new jobs. The reality is today's estimated loss of one million jobs as US companies moved to Mexico and then to China. Today, as Chinese workers demand and get higher wages, jobs move to Vietnam and Cambodia in the now familiar global race to the bottom. The TransPacific Partnership trade negotiations are led by corporate lobbyists and their politician allies in the USA, Canada and these Asian countries. Rearview central banks continue printing money and buying toxic assets to bail out incumbent industries of the past instead of investing in the future. There is nothing wrong with creating money, but it should remain a public function with democratic oversight and withdrawn from private banks, as now proposed by many regulators and NGOs. Britain's former top financial regulator, Lord Adair Turner agreed in a speech at London's Cass Business School – available on www.ethicalmarkets.com (Turner, 2013).

The economic textbooks' dead hand still holds sway over the debate: claiming that the greater efficiency of manufacturing and the unemployment it brought can be eased by new jobs created elsewhere and that retraining of workers is the best remedy. Private sector innovation and investment promised to trickle down to create new jobs, while public investments must be cut, so as not to "crowd out" private companies, entrepreneurs and those job-creators. This story is best debunked by Mariana Mazzucato in The Entrepreneurial State (2013) and my "Beyond Austerity and Stimulus" (2013). By 2012, this "economism" view had prevailed and restored the financial sectors with taxpayer bailouts and imposed its austerity regimes in Europe and in the budget-cuts in the USA. High-frequency, computerized trading (HFT) has taken over on stock exchanges colonizing the new electronic platforms developed by taxpayers: the internet, satellites and other communications, R&D and infrastructure. Betting on which countries' bonds will default became today's quadrillion dollar credit default swaps (CDS) and derivatives market, and its perverse financial "innovations" are setting up the next bubble. Market-based restraints

include imposing financial transaction taxes of less than 1%, now allowed under European Union rules, and new exchanges such as IEX designed only for real investors which are transparent and shut out HFT speculators.

Open challenges have been led by radical political parties of both the old left and right. New movements in Hong Kong, Europe and the USA like Occupy Wall Street, as well as the World Social Forum, the Barcelona Consensus, have reclaimed the earlier debates of the 1960s between the 1% and the 99%. They call for social innovations based on the vast new productivity and opportunities of the Information Age: guaranteed minimum incomes, local currencies, public banking and public sector innovations in education, health and redesigning cities and infrastructure. Global public goods (i.e., health, education, infrastructure) are the focus of UN agencies and its Millennium Development Goals, now targeting sustainability as the Sustainable Development Goals (SDGs). Shifting from fossil-fueled, polluting sectors to renewable energies has become imperative as climate disruption affects millions worldwide. At the 2012 UN Summit Rio+20, 191 countries pledged to accelerate transitions to green economies, and companies and investors signed a Natural Capital Declaration as a roadmap to a green economy ("Natural Capital Declaration," 2014). Efficiency based on Nature's circular models is now ushering in the next stage of human evolution: the knowledge-rich economies of the emerging Solar Age.

The taboos slowly are falling on acknowledging how human activities are breaching the nine key planetary boundaries and changing the climate (Stockholm Environment Institute; Wijkman & Rockstrom, 2012). Even *The Economist* reported more on such planetary news along with their findings on inequality that labor was losing out to capital. All this is obvious to those outside the economics profession not suffering its theory-induced blindness. Many now point to this growing global inequality as generated by faulty models of "economic" growth – rooted in unfair distribution due to powerful private interests, capture of governments, regulations, tax policies and even "cognitive capture" of their mindsets and worldviews. Philosophers have wrestled with the roots of liberal versus conservative polarization, relating it to brain research as does Joshua Greene in *Moral Tribes* (2013). The shift from economism and its anthropocentrism toward understanding how our planetary life-support system functions has turned to

real-time visual data imaging from the 120 geostationary satellites of many countries and NASA's Earth System Science, as I report in *Mapping the Global Transition to the Solar Age* (Henderson, 2014). Money is becoming seen as a useful unit of account – simply information tracking real human and natural resources and the productivity of Nature, as in the Principles of Ethical Biomimicry Finance® (Figure 20).

While in the USA and Europe guaranteeing minimum incomes is still taboo, such incomes were initiated as "Opportunidades" in Mexico and "Bolsa Familia" in Brazil, where these direct or conditional cash payments (CCTs) brought millions out of poverty. Others followed the success of Alaska's Permanent Fund which directs a portion of oil revenues to every citizen. *The UN: Policy and Finance Alternatives* (Cleveland, 1995, 1996) I co-edited called for taxing all commercial uses of the global commons, with fines for abuses including a financial transactions tax to curb speculation. Since petroleum is a natural resource, not human-made, these ideas are espoused by two policy analysts in their "Petroleum to the People" (2013) in the conservative journal *Foreign Affairs* as a way to prevent further inequality in African countries. Entrepreneurs Paul Polak and Mal Warwick recount many successes in addressing poverty worldwide in their *The Business Solution to Poverty* (2013), while Amy Cortese cites the rebirth of local business models in *Locavesting* (2011).

A longer historical view by Princeton economist Angus Deaton in the *Great Escape* (2013) finds the origins of inequality in the technological revolution as private innovation always races ahead of social innovation and how economic elites capture political power. This is also the thesis of Daron Acemoglu and James Robinson in their *Why Nations Fail* (2012). Two MIT economists Erik Brynjolfsson and Andrew McAfee in *The Second Machine Age* (2014) buck their profession by documenting the job losses and inequalities in both technological innovation and the prevailing economic model of globalization. Brain scientist Bruce Lipton in *The Biology of Belief* (2005), endocrinologist John Coates in *The Hour Between Dog and Wolf* (2012) and psychologist Rob Williams' PSYCH-K method are introducing us to why we cling to outdated theories and allow our subconscious fears to overcome our best plans and highest goals. Ethical Markets Exploratorium MOOC now focuses on ways to accelerate learning among

global citizens and activists – particularly in financial sectors and for asset managers, free to students and lifelong learners.

The new paradigms in human development are at last emerging into politics and those 1960s visions of abundant post-industrial societies are alive – beyond ideologically-imposed scarcity regimes and fossil-fueled early industrialism. The Solar Age is now visible in the advance of green, knowledge-rich economies based on harvesting the free daily photons from the sun, as we track in our Green Transition Scoreboard® (Figure 21) and daily updates at www.ethicalmarkets.com. Our research shows that continuing the $1 trillion annual private investments between now and 2020 will have scaled renewable technologies and the world will have entered the Solar Age.

In our TV show on PBS "The Transformation of Work" www.ethicalmarkets.tv, I cover all these issues and interview Patricia Kelso on their approach: employee stock ownership plans (ESOPS) now over 11,000 US companies are employee-owned. Milton Friedman in the 1960s called for a 'Negative Income Tax', which was tested in a small experiment under President Nixon. It foundered on the "no workee-no eatee" ideology! Friedman also advocated stimulating the economy out of recessions, not by printing money to give to big banks, expecting it to trickle down, as Paulson and Bush did, but rather to take the bags of new cash up in helicopters and throw the money out the windows, so that people could grab it and pay off their debts, buy food, etc., and bring up aggregate demand to end the recession. An article advocating this bottom-up approach, "Print Less but Transfer More" by Mark Blyth and Eric Lonergan appeared in *Foreign Affairs* (2014). Jaron Lanier in *Who Owns the Future* proposes requiring all Silicon Valley social media giants: Amazon, Google, Facebook, LinkedIn, Twitter, whose business models take users' freely posted information and sell it on to advertisers and data-brokers, make data-brokers pay for each and every bit. This could provide a second income to their users. Peter Barnes' approach is more viable in his *With Liberty And Dividends For All* (2014) (see my review on www.seekingapha.com): provide these second incomes to all citizen-owners of common property resources, as in the Alaska Permanent Fund and Norway's Sovereign Wealth Oil Fund. Fees should be collected on all uses of these commons, including for polluting air, water, and auctioning access to the electromagnet spectrum, etc. Building on

his *Capitalism 3.0* (2006) and his decades of experience as a successful entrepreneur of companies in solar energy and telecom sectors, banker/economist Barnes addresses today's structural problems of unemployment, crumbling infrastructure, widening inequality and the disappearing middle-class. Unlike Thomas Piketty in his best-seller *Capitalism in the 21st Century* (2013) which rarely ventures outside economic orthodoxy, author Barnes re-conceptualizes the US economy beyond economics, as a dynamic, complex system governed by feedback loops. He identifies pieces of its source-code which continue to drive and amplify all these current problems. Korea's path toward a knowledge-rich green economy is based on such new models.

Barnes also pinpoints all the familiar policy bromides: more job creation, training, education, stimulus, innovation, and why these focus on symptoms rather than identifying the economic system's 80-20 power-law distribution discovered over a century ago by economist Vilfredo Pareto (1906). Stimulus, whether fiscal, monetary or QE pump-priming, fails to reach its targets and often leads to asset bubbles and wider inequality. Job-creation can no longer provide access to the middle class since automation, globalization are reducing the need for workers even in China and Korea, while the top ten growth occupations in the USA are all in lower-paying service industries like home health care, food service, retail, etc. Education as a panacea is a logical fallacy: the fallacy of composition (i.e., what works for a few will work for all). Increasing the supply of college grads neither increases demand or pay rates for them, but will lead to falling wages for all graduates and more of the better-educated janitors and taxi drivers we see today in the USA. Innovation, the favorite US panacea, is now simply driving the automation and further digitization of sectors of the economy, from manufacturing and retail to the former white-collar professions in medicine, law and financial market trading and mediation.

I join Barnes' call for redesigning the plumbing of US capitalism and adding the new pipes he describes so thoroughly in this book, opting for widening distribution models beyond jobs, wages, unemployment and welfare. Barnes reviews all the additional distribution mechanisms to provide the necessary purchasing power to sustain aggregate demand in today's high production efficiency economies: from Milton Friedman's negative income tax (and stimulus for economies from those helicopter drops of cash!)

to the employee stock ownership plans (ESOPs) of Louis and Patricia Kelso, implemented widely today; the direct cash transfers which have brought millions of Brazilians into the middle class and the unconditional guaranteed minimum incomes now being advocated in Europe and by US policy analysts Erik Brynjolfsson and Andres McAfee.

Barnes joins me in going beyond all these remedies for more balanced, sustainable economies that might also reduce resource depletion – most of which are government-initiated. Instead, as an enthusiastic successful capitalist, Barnes offers market-based solutions based deeply in private property traditions. He examines the role of rent, and how it has generally been extracted in many ways through manipulating tax codes, rules, subsidies, monopolies, as well as the externalizing of costs to taxpayers, society and in environmental depletion. Barnes then shows the other use of rent: recycled to sovereign wealth funds, as in Norway's oil revenues and Alaska's Permanent Fund. Instead of capture of publicly owned resources such as our electronic spectrum by telecoms and broadcasters, the user-fees from open auctions of such resources should go not to governments but returned to their rightful owners: citizens as dividends. Such models include those to charge fees for emitting pollutants into the public's air and water supply. Barnes estimates that recovering such user fees could augment US wages with some $5000 annually, as non-labor dividends due to all citizens from such commonly owned resources. This income from ownership could stabilize the US economy with reliable purchasing power and aggregate demand, obviating the need for QE, stimulus and other often ineffective government programs in job creation and education. If companies are exploiting our commonly owned resources: air, water or the electronic airwaves, we must charge proper fees for this use and fines for abusers and introduce new models, including Intergenerational Finance (IFG)™. But rather than trust governments to collect our fees – they can be disbursed regularly as dividends. Such fees and fines on all commercial uses of our global commons were proposed by the Global Commission to Fund the UN in The United Nations: Policy and Financing Alternatives (which I co-edited with Harlan Cleveland and Inge Karl, 1995, 1996, Elsevier Science UK).

Reforming Markets, Metrics and Capitalism

Now that Wall Street and all financial markets are being dis-intermediated and asset managers and traders are sidelined by computers, HFT and algorithms as I pointed out in Global Finance Lost in Cyberspace – socially responsible investors have led since the 1980s in reforming financial models for sustainability and long-term performance. As Michael Lewis reminds us in Flash Boys (2014), investors no longer need all today's unnecessary financial intermediation and complexification. By-passing Wall Street to invest in homegrown local communities is the way back to real economies. Today in North America and Europe these are major trends.

Markets are based on trust and cannot operate without it, while former US Fed Chair Paul Volcker often admitted that banking is a confidence game. As billions of retail investments were withdrawn from Wall Street after the "flash crash" of May 2010, the shift back to longer-term investing in real companies, community development and green infrastructure led to billions reinvested in green bonds and sectors worldwide. At the company level, new metrics on ESG, SRI, ethical and "impact" investing include protocols beyond old accounting standards based on money measures and material production. Information age economies are 80% of GDPs in the USA, Europe, Japan and Korea.

Accountants began valuing "intangible" assets: information, intellectual products, patents, copyrights and brands. New accounting standards developed by groups in the International Integrated Reporting Council (IIRC) and the Global Reporting Initiative (GRI) based in Europe and the Sustainable Accounting Standards Board (SASB) in the US and many in other countries are redefining capitalism and the nature of capital. IIRC measures six kinds of capital: financial, intellectual, human, social, manufactured and environmental as assets and measures corporate performance on how their value is enhanced or destroyed. The new rush in financial circles toward green sectors shows that new valuations and new, more accurate risk assessment is now shifting billions out of fossil fuels. The new fossil fuel-free portfolios such as that of the Sierra Club's mutual fund and others show no loss of performance. Even members of the Rockefeller family announced they would divest their foundation's portfolio from fossil fuels, joining many other foundations, college endowments and cities' pension funds. Britain-based Carbon Tracker and CDP (formerly the Carbon Disclosure Project) provide research on the risks of

retaining investments in “proven reserves” that may never be lifted out of the ground or burned. As climate change concerns produce carbon taxes and more regulations, these fossil reserves will become stranded, toxic assets and written down. These fossil fuels: petroleum and gas, are much more valuable left in the ground where they might be more useful as chemical feedstocks than being burned in wasteful polluting vehicles. Updates on all these issues and new financing of green sector are posted daily at www.ethicalmarkets.com.

Assessing Technology

As a US science policy advisor, I was honored to participate in developing principles, models and rules for assessing the social, environmental and future impacts of technological choices and science policy. As an advisor to the Congressional Office of Technology Assessment (OTA), I saw how the influence of industry, academia and government drove the direction of technological change – with little input from citizens and even the consumers – assumed to be dominant in economic theories.

Technology assessment is more relevant today than when OTA was founded in 1974. Its research into exemplary innovations in rural towns across the USA covers newly vital areas: efficient buildings; renewable energy; organic food; farmers markets; preventive healthcare; resource recovery from municipal wastes; community-owned hydro, wind and solar energy and enhancing productivity of small farms. Many are now highly relevant to today’s concerns: decommissioning nuclear power plants; ocean thermal energy conversion (OTEC); community planning for mass transit; electronic computerized stock markets; effects of offshore oil drilling; the feasibility of rural broadband; medical information and privacy; alternatives to internal combustion engine vehicles and more. Yet, all these prescient studies were ignored by politicians, policy-makers and academics for over three decades. OTA was opposed by many politicians cognitively captured by orthodox economics theory which held that consumers in the market determined and chose the paths of technological development. This ideological view, ignoring the power of corporations, advertising and government programs, won out in 1996 when Republicans took over Congress and shut OTA down.

I served on the founding Technology Assessment Advisory Council (TAAC) of the OTA from its inauguration in January 1974 until 1980. I was a colleague of British economist E.F. Schumacher, author of *Small Is Beautiful* (1973), and helped arrange his first lecture tour in the USA in 1975, when he also met with President Jimmy Carter. Later Schumacher wrote the foreword to my first book. In those days, technology was an elite field almost devoid of women and focused on military and other "big bang," macho approaches to societies' development – all measured by now-obsolete economics and GDP-measured growth. Rural areas and small towns bypassed by President Eisenhower's interstate highway system fell into decline. They were off the radar of Washington and the elites of that time who were promoting "Atoms for Peace," promising electricity too cheap to meter and the wonders of spin-offs from the space program such as Teflon and freeze-dried foods. Inner cities were hollowing out as white populations escaped to suburbs made possible by all the new highways.

The US Senate in 1975 had one female member, Margaret Chase Smith (R-ME), widow of her former senator husband. The House had nine female members, two of whom I knew: Barbara Mikulski (D-MD), now a senior member of the Senate and Patricia Schroeder (D-CO) from Colorado. We women endured the misogyny and sexism of this male club and their elite technocrats and colleagues – knowing that time was on our side. All TAAC meetings were open to the public, and I used these to develop my own tactics learned during my time as a community organizer and co-founder of the New York-based NGO Citizens for Clean Air. Our now legendary public service ad campaign in the late 1960s was supported by many New York media moguls and the crusading FCC Commissioner Newton Minow.

At OTA, my views were "small is beautiful" advocacy of decentralized community-owned solar panels, wind generators, small low-head hydro power and electric vehicles. Citizens for Clean Air encouraged these which were ubiquitous on New York City streets since the early 1900s. We pointed out that General Motors in the 1950s had bought up all the light-rail networks connecting California's towns in the Los Angeles basin in order to sell cars. Miami and Los Angeles since 1900 had homes which used ubiquitous roof-mounted solar water heaters from the Day and Night Solar Heating Company and others

– all put out of business when formerly flared-off cheap natural gas was piped in. We arranged for our Senator Robert Kennedy (D-NY) to take a helicopter ride to see New York City's air pollution sources, explaining that we advocated correcting GDP, which counted all these "bads" as useful production. We wanted those pollution "bads" to be subtracted from the goods measured in GDP. Senator Kennedy agreed, and in 1968 made his now famous speech at the University of Kansas on the idiocy of GDP (Kennedy, 1968).

I had conducted an unorthodox personal campaign to secure my appointment to the TAAC, largely composed of notables, including Nobel-prizewinner Dr. Fred Robbins and scientists Jerome Weisner, president of MIT; Harold Brown, later appointed Secretary of Defense; as well as the presidents of Dow Chemical and Texas Instruments, and my one dependable ally Dr. Eugene Odum, the preeminent ecologist. I had garnered NGO support for the legislation setting up OTA and decided after consulting with my environmental activists colleagues, including Ralph Nader, that I should apply for the slot designated for a "public educator." I mailed out about 200 letters to these colleagues, asking them to write in support of me to Senator Clifford Case (R-NJ) (I lived in New Jersey) since he controlled these appointments along with five other senators and six members of Congress. As a naturalized American citizen since 1961, I was enthralled with the US democratic process in my NGO activities. I had testified before Congress in support of the Clean Air Act of 1970 and even been invited to the signing by President Johnson at the White House.

Amazingly, democracy worked, and I was summoned to Washington to meet Senator Case who told me that he had received so much mail on my behalf that he would appoint me! Those were the days before massive influxes of corporate money and the invasion of K Street and its army of lobbyists, culminating in 2010 with the appalling Supreme Court decision to open up the floodgates to corporate cash in its Citizens United and subsequent decisions. Back then, I could ride the underground Capitol train, conferring with Senator Ted Kennedy (D-MA) who chaired OTA's Congressional Board with House member Larry Winn (R-KS) of Kansas as vice chair.

At OTA, I crusaded for public participation in science and technology policy – unheard of at the time. Opposing arguments were that the magic of the market was more reliable in guiding the evolution of scientific research and technology. I countered that billions of dollars of corporate advertising and special interest subsidies drove the current path of science (mostly toward military programs) as well as promoting technologies. The social costs of many technologies were unidentified – until they appeared as air pollution, toxic wastes and health hazards. After all, this examination of social and environmental impacts of these choices and how to anticipate them was the stated purpose of OTA. The political battles were joined and efforts began to downplay OTA's research, cut its funding and pack its advisory panels with industry-funded academic research and those I termed "intellectual mercenaries." I was horrified to find that prestigious universities' corporate-funded academics began carrying titles bearing the name of their corporate sponsor. During my lecture tour in Japan in the late 1960s, I found an example of citizen participation in science policy conducted by Professor Takahisa Hanya of Tokyo Metropolitan University. He recruited Tokyo high-schoolers to research how a ubiquitous species of moth were growing their wings darker to match the soot-covered trees in the city. When Prof. Hanya visited me in Princeton, he also met with the leading atmospheric chemist, titled American Cyanamid Professor of Chemistry. Prof. Hanya observed dryly, "at least his intellectual product is properly labeled!"

I pursued these issues until OTA agreed to set up a well-funded, innovative program on Public Participation in Technology Assessment with its own Advisory Committee which I helped recruit, listed in the first of OTA reports which Ethical Markets will republish. Many other countries and jurisdictions launched research programs based on this OTA model and many flourish today. Later generations of researchers document the role of citizens in steering better technology outcomes. I had insisted that those citizens impacted by technological choices: those economically and politically disadvantaged, labor unions, consumers and environmental groups in both the public and private sectors must be represented and included in every report. Republicans in Congress saw OTA as a threat to their corporate constituencies. I relished the verbal repartee and continued my personal "PhD course" of intensive reading and studying the politics of economics, science and technology and how powerful interest groups engaged in cognitive capture of legislators, regulators, academics and the public through media

ownership and content control through advertisings' $500 billion annually. I learned the preeminent role of media and that we all live in "mediocracies," whether in totalitarian or democratic countries worldwide. In 2004, I founded the EthicMark® Awards for advertising that uplifts the human spirit and society as a way to raise the bar – now with many co-sponsoring groups and accepting nominations for its 9th Annual Awards. These are presented annually at the SRI Conference on Sustainable Responsible Investing before large audiences of asset managers and green company executives.

In the 1980s after my *The Politics of the Solar Age* appeared, technology assessment became incorporated into many NGO programs – so as to address impacts before, not after, they had occurred. Sadly, the OTA work I had fostered in the 1970s fell off the radar, since Google searches ignore most of such history prior to 1980. As information storage went from books and paper to the early computer formats, such as floppy discs, much knowledge has been erased or lost. Stewart Brand, founder of the *Whole Earth Catalog,* warned about this loss being like the burning of the great ancient Library at Alexandria in antiquity. In 2014, the UN Secretary General launched the Data Revolution for Sustainable Development, inviting all new researchers of new metrics to reform and re-direct capital markets (UN Data Revolution Group, 2014).

I share this concern about loss of information, such as these OTA reports, and how the digital revolution, with all its benefits, has led to what I call the "Alzheimer's Society" of today where wheels are continually reinvented, dissent is blinded, innovation has been trivialized and language "spell checked" and degraded. It is with hope of restoring this lost knowledge that Ethical Markets is republishing these OTA reports. Our library contains one of the few remaining collections of all of OTA's reports, along with Princeton University and University of Maryland. They illuminate today's debates and, we hope, show how this intellectual vandalism occurred along with the decapitation of OTA by the Republican Congress of 1996.

Slaying of messengers continues today with the demonizing of whistleblowers in the USA, whether at the NSA or the Veterans Administration. Yet dissent is vital to democracy. Social innovations like OTA,

despite retaliation by entrenched incumbent corporations and bureaucracies, are important messengers of alternative, contrarian views, suppressed research and new paradigms. Thomas Kuhn, author of *The Structure of Scientific Revolutions* (1962) and my Princeton neighbor, was asked at my dinner table how new paradigms advanced. Kuhn shrugged and answered, “they progress one funeral at a time!” Today, the human family is approaching “graduation time” on our home planet Earth, and we must accelerate our learning processes and the reintegration of human knowledge. Korea is an active participant in this vital endeavor. The silos are breaking open, and we humans are connecting the dots. There are even efforts to revive OTA, needed more than ever as we face out-of-control technologies: from computerized stock trading, GMO crops, nanotechnology, artificial intelligence and mechanistic brain research to the reckless proposals to “geo-engineer” our biosphere and the digital robotic takeover of whole sectors of our society. As our human future unfolds, Korea will continue being an important leader in developing new paradigms, concepts and progress toward symbiotic living and genuine quality of life.

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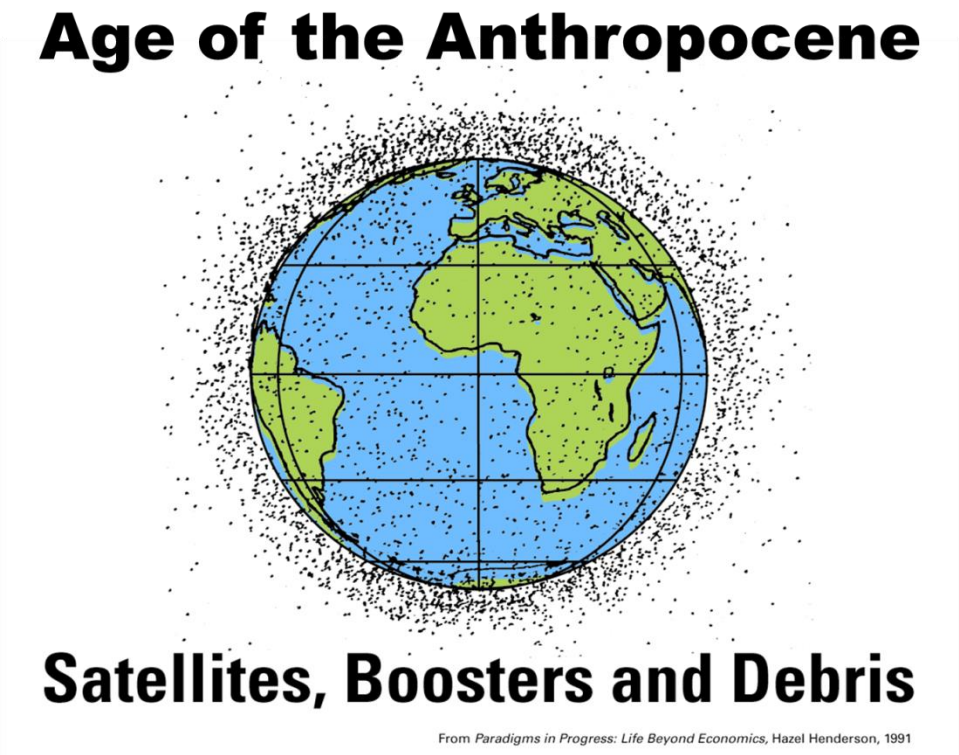
FIGURE 22 Growing the Green Economy – Korean cover

FIGURES

Figure 1



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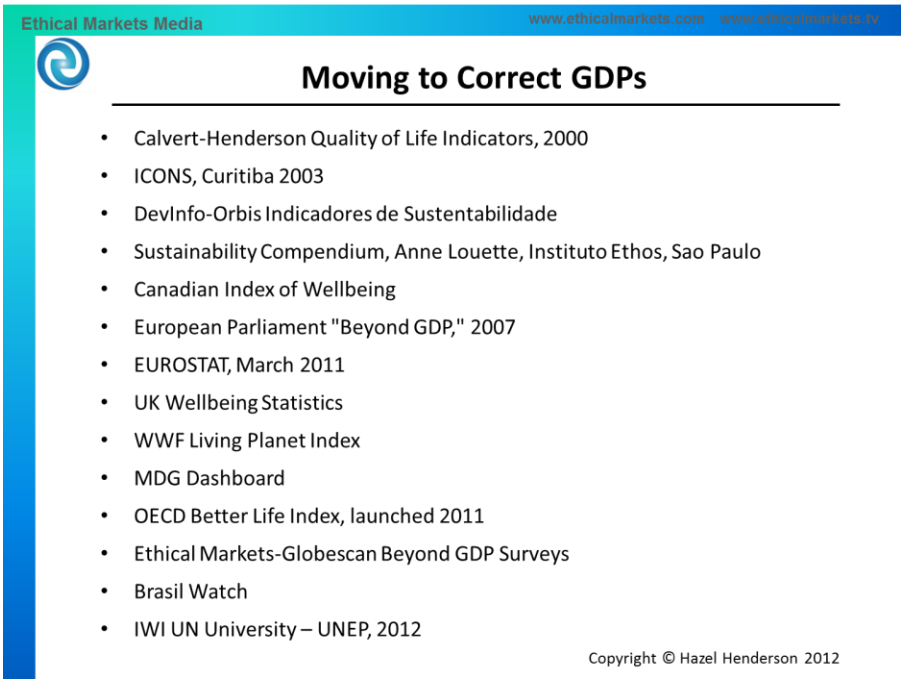

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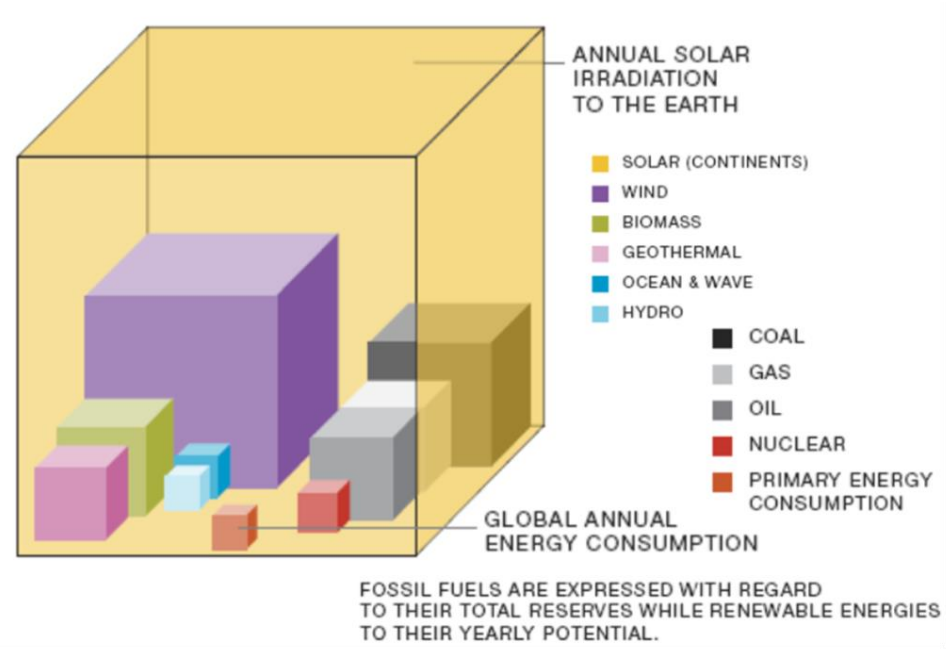
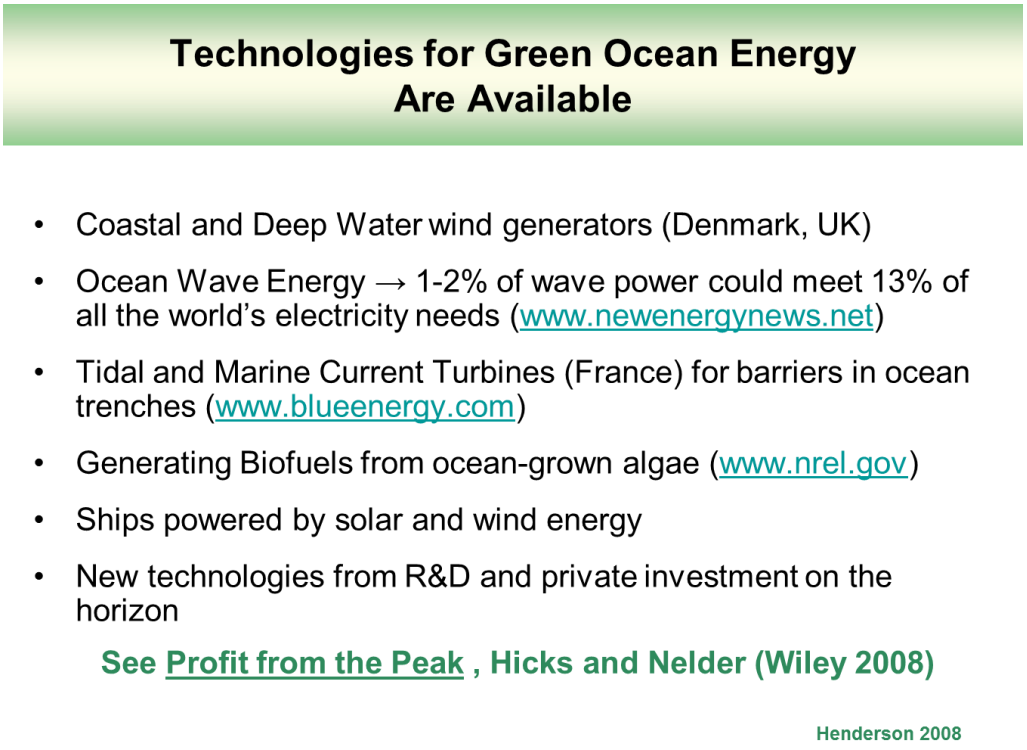


Solar irradiation versus established global energy resources
"Solar Generation 6," *EPIA 2011*

Figure 4

Figure 5



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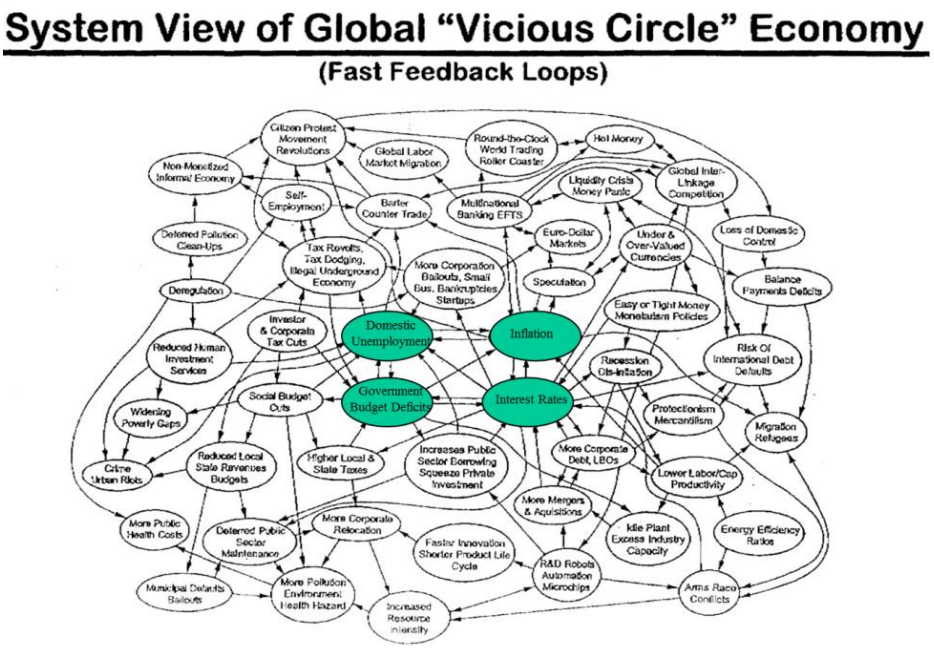

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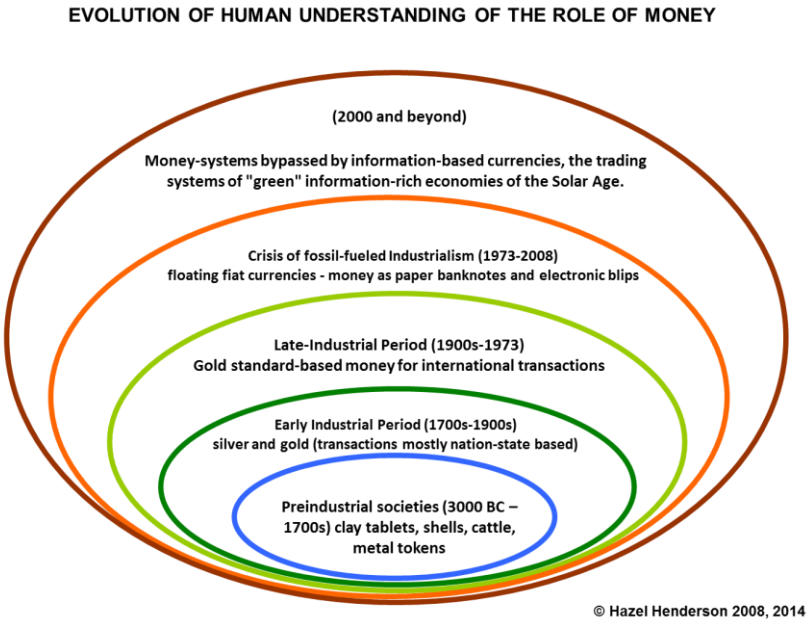

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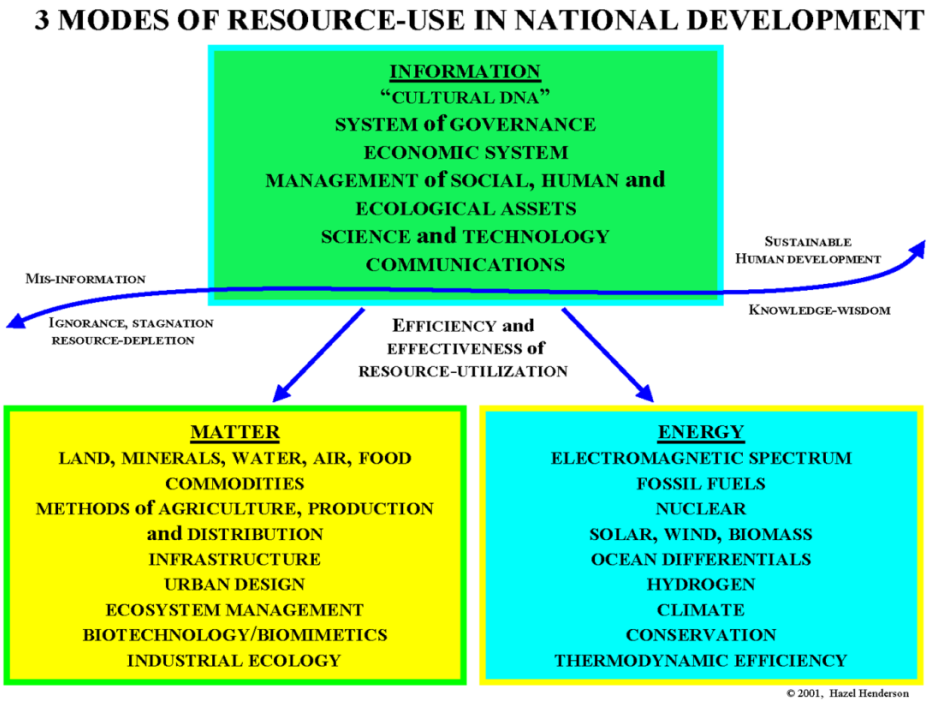


Figure 10

Emerging Change Models

Earth System Science

Interdisciplinary: plate tectonics, biogeochemical and solar-driven processes, strato and meso-sphere (NASA Program on Global Change International Division, Wash., DC 20546

Catastrophe Mathematics

Models at least seven modes in which systems change their states, I.e., bifurcations (Rene Thom, *Structural Stability and Morphogenesis*, Paris 1972)

Cybernetic Models

Homeostasis and metamorphosis governed by feedbacks, negative and positive (Magoroh Maruyama, "Paradigmatology" in H. Henderson, *Politics of the Solar Age*, 1981)

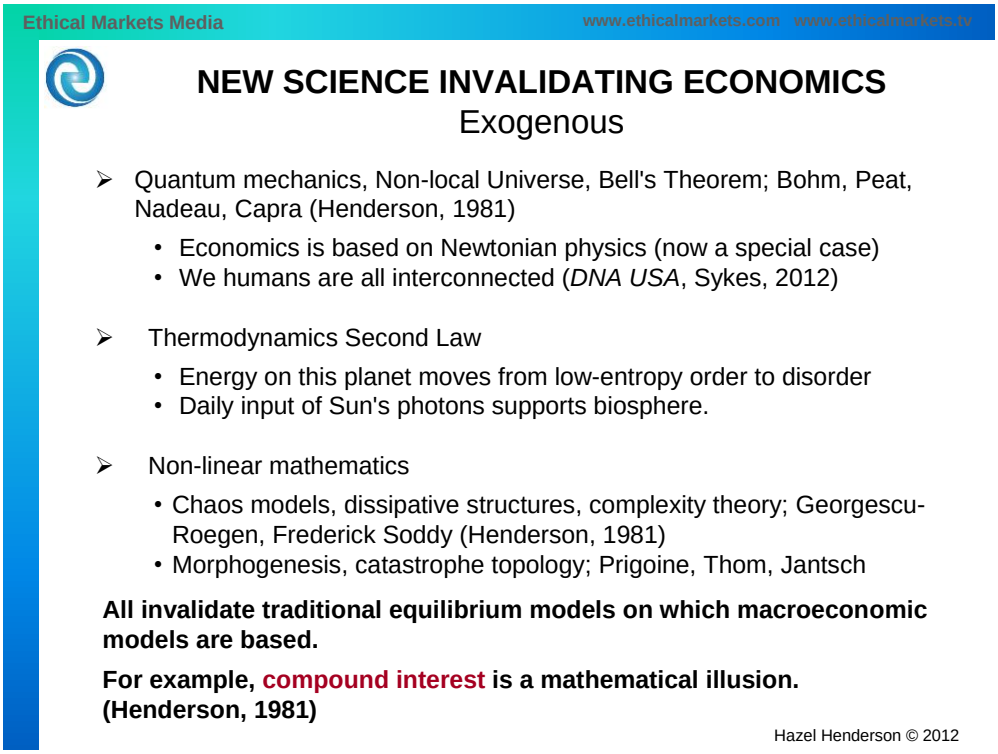
Order through Fluctuation Models

(Ilya Prigogine, from Being to Becoming, San Francisco, 1980)

Chaos Theory Based on Attractors

Point, periodic and chaotic Attractors can "magnetize" systems into new states (Ralph Abraham, Dynamics: The Geometry of Behavior, Santa Cruz, 1984)

Figure 11



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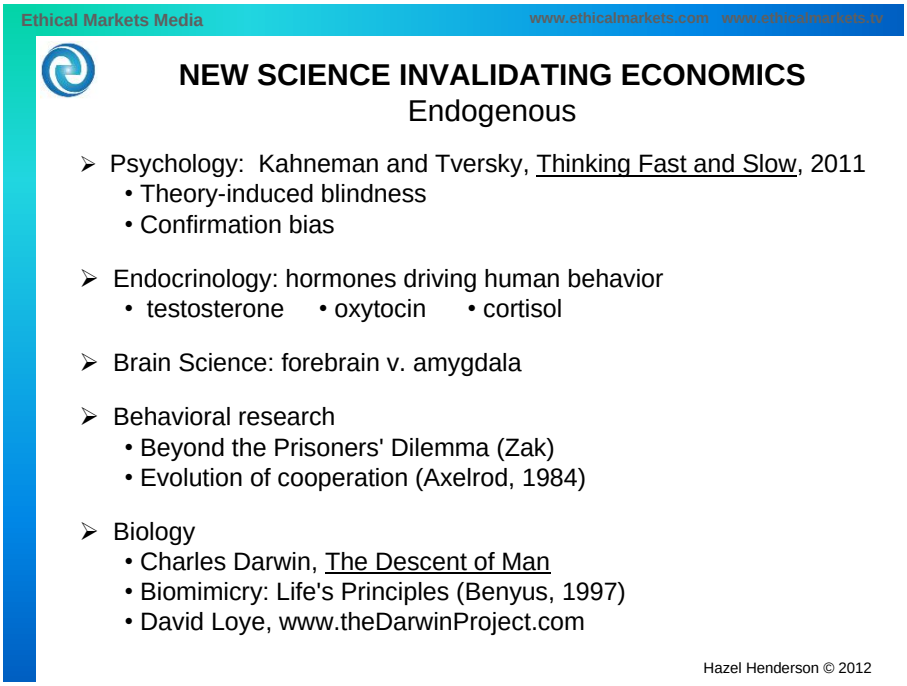

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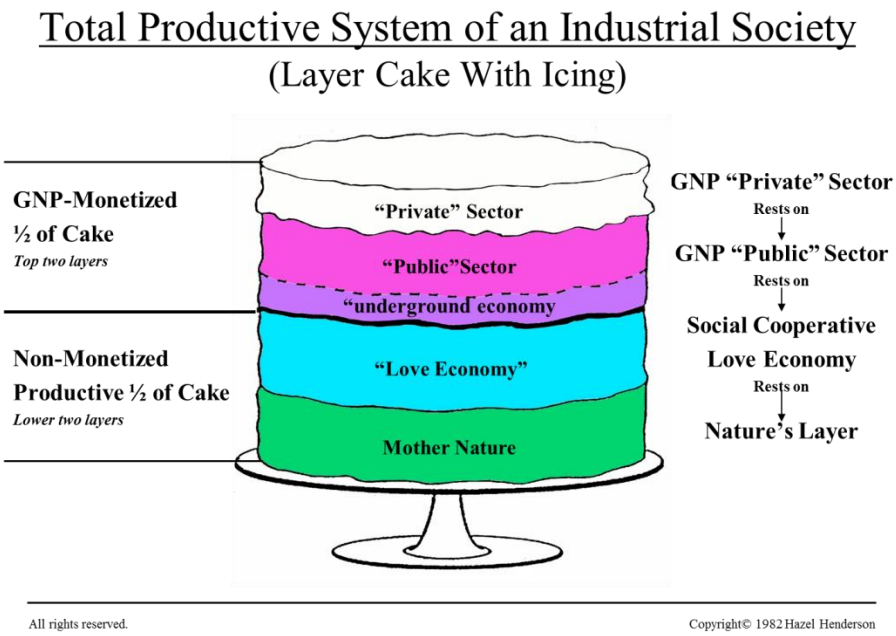

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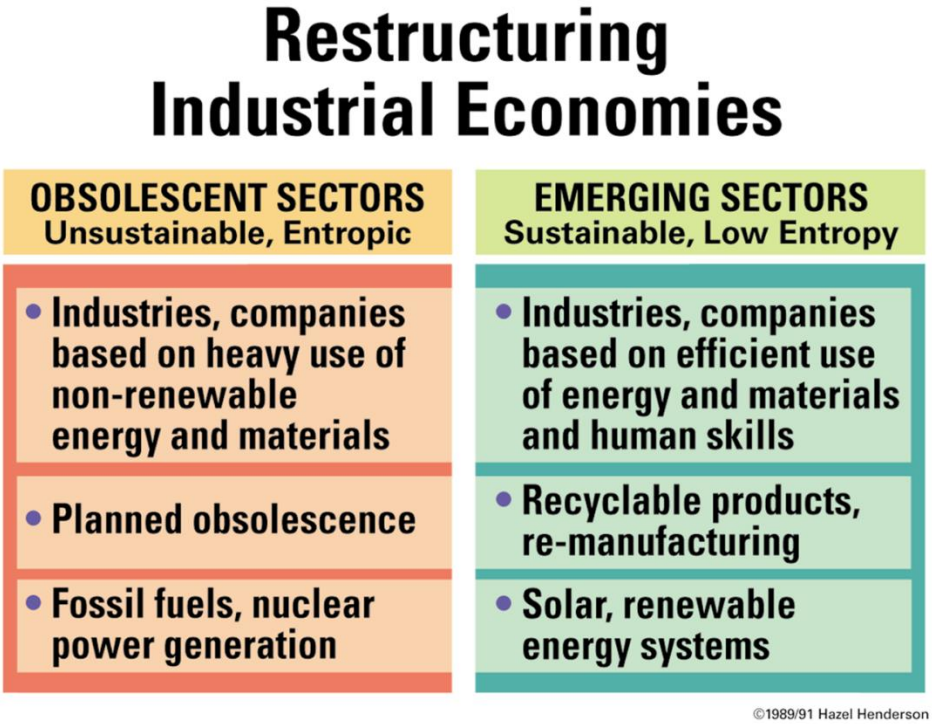

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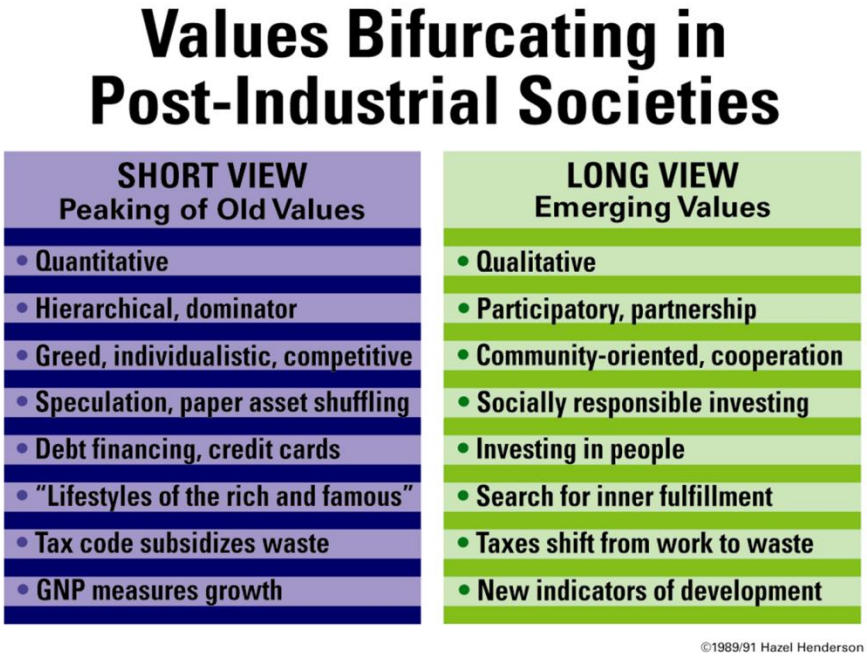
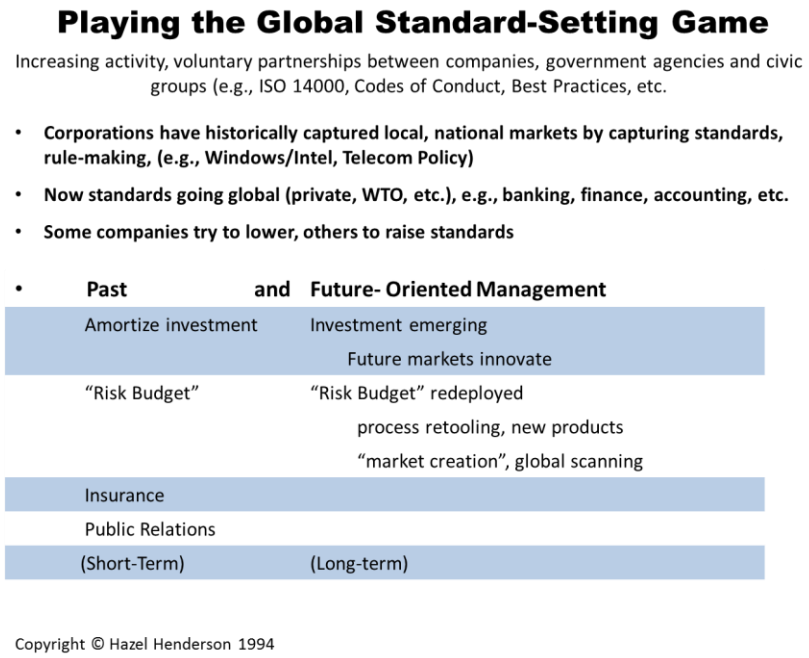


Figure 16

Figure 17



Playing the Global Standard-Setting Game

Increasing activity, voluntary partnerships between companies, government agencies and civic groups (e.g., ISO 14000, Codes of Conduct, Best Practices, etc.

- **Corporations have historically captured local, national markets by capturing standards, rule-making, (e.g., Windows/Intel, Telecom Policy)**
- **Now standards going global (private, WTO, etc.), e.g., banking, finance, accounting, etc.**
- **Some companies try to lower, others to raise standards**

• Past and	Future- Oriented Management
Amortize investment	Investment emerging Future markets innovate
"Risk Budget"	"Risk Budget" redeployed process retooling, new products "market creation", global scanning
Insurance	
Public Relations	
(Short-Term)	(Long-term)

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Figure 18

Playing the Global Standards Game
Corporate Strategies

Defensive	Transitional	Pro-Active
Past-Oriented Short-Term	**Present Ad Hoc Reactive**	**Future-Oriented Long-Term**
Amortize Past Investment **Risk Budget:** • Lobbying to lower standards • Advertising/Public Relations denying issue or problem • Consumer/Stakeholder reassurance problem • Increase liability insurance coverage • Contribute money to friendly politicians	• Overview company's assets, facilities, product lines, etc. for sustainability within global standards • Re-vision company's mission. Create company's transition plan. Identify products which should be phased out (i.e. toxic, cannot meet expected global standards.) • Join and participate in relevant global standards organizations • Appoint a vice president of global standards. **Risk Budget** Reassess for redeployment	Re-deploy investments Acquire new assets Divest obsolete products, Facilities, write offs Scan for innovations **Risk Budget** • No increase in lobbying • Re-design products, services • Re-tool production processes • Capture "waste" for re-use • Move toward low-risk, non-toxic, low emissions. Re- manufacturing Support higher standards

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Figure 19

Figure 20 EBF

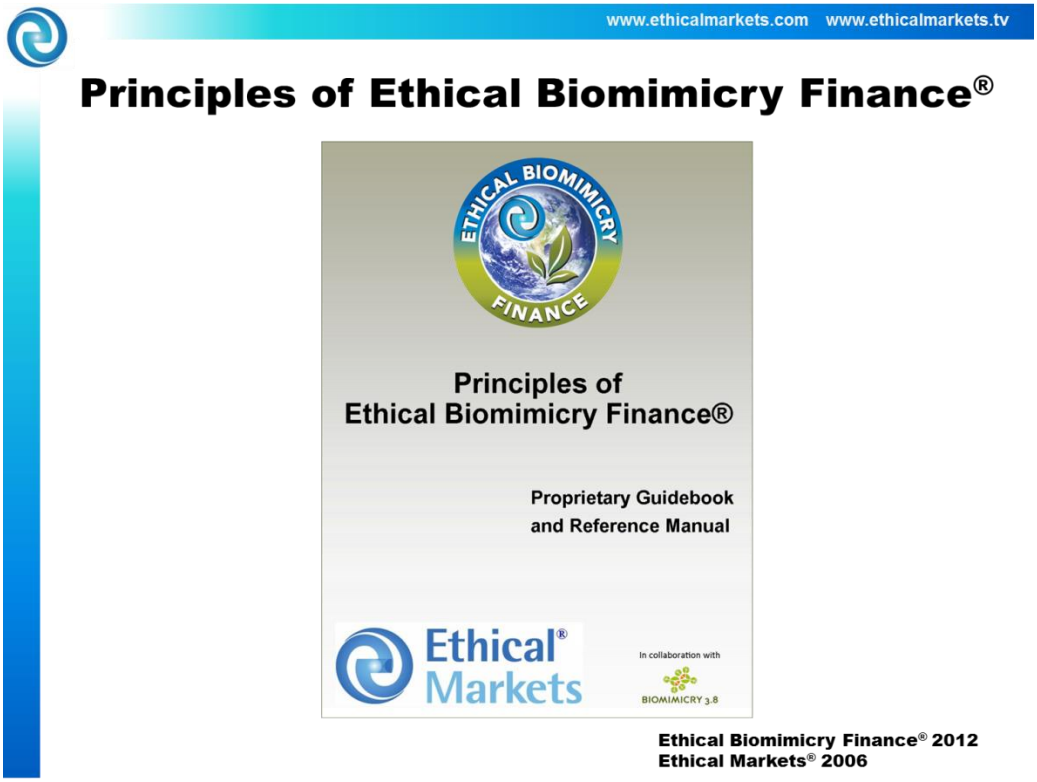

Figure 21

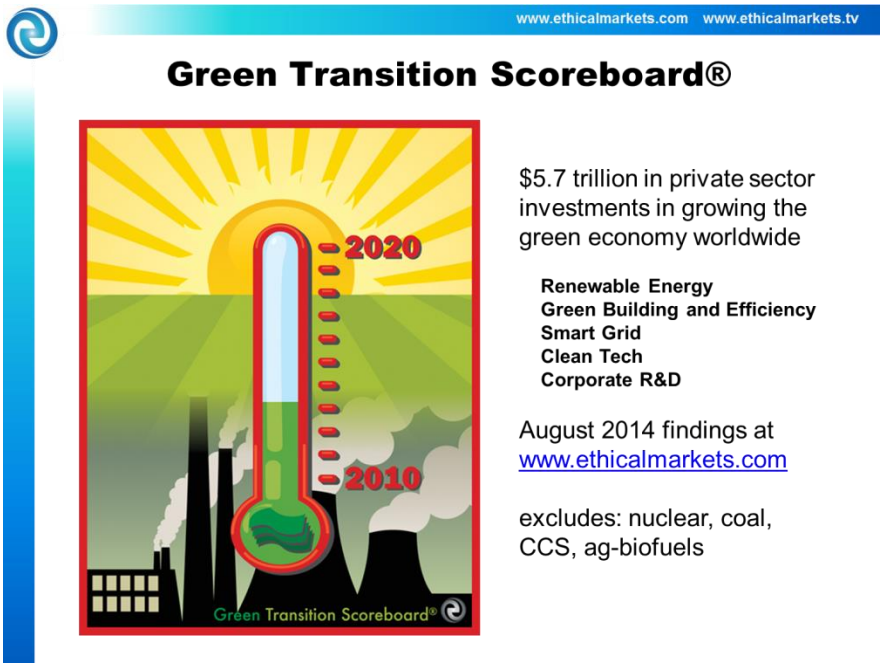

Figure 22