



The Politics of the Solar Age: 1975-2015

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Abstract

A global transition is manifesting in sustainable technologies, policies and investment tools. We are moving beyond the Industrial Era. Crises in energy, water, food and ecosystem services are being met with many forms of renewable energy; United Nations, NGOs, World Bank and other global programs; and with creative investment opportunities such as green bonds. Paradigm shifts in science, academia, governance, leadership, finance, business, social norms, media, communications and network structures as well as the role of Earth-observing satellites have led to a greater focus on earth systems science. Stress is a basic tool of evolution, and breakdowns drive breakthroughs. While mainstream media operates on the commercial formula of "if it bleeds it leads," growing consciousness is accelerating the green transition to more equitable, peaceful, sustainable, knowledge-rich societies. This article explores key drivers of this transformation and the standards being developed to guide us into the Solar Age.

The global transition to sustainability is fundamentally based on the current transition from the fossil-fueled Industrial Era to the low-carbon, knowledge-richer, more inclusive economies, "green" technologies and infrastructure now underway worldwide as Ethical Markets tracks. I published *The Politics of the Solar Age* in 1981, outlining the struggle observed as a science policy advisor from 1975 through 1980* as incumbent industries in fossilized sectors fought to retain their tax advantages, subsidies and legislated rent-taking. I witnessed how the many viable technologies in solar, wind, geothermal, ocean systems as well as organic, low-till and halophyte agriculture were suppressed by money in political processes, lobbying, regulatory capture and cognitive capture of compliant commercial media. I reviewed these political processes in the USA, Brazil and worldwide in *Mapping the Global Transition to the Solar Age*.†

2015 is the year when all the issues of global sustainability are now mainstream and becoming key agendas in the politics of most of the 193 United Nations (UN) member countries. The global transition from fossil fuels and nuclear power to efficient use of renewable energy and materials is now accelerating, as we expected when Ethical Markets launched our Green Transition Scoreboard® (GTS) in 2009.

* From 1975-1980, the author served on the Technology Assessment Advisory Council to Congress and the US Office of Technology Assessment (OTA); the National Science Foundation's Research Applied to National Needs (RANN) and the Committee on Public Engineering Policy (COPEP) of the National Academy of Engineering of NAS.

† Hazel Henderson, *Mapping the Global Transition to the Solar Age*. ICAEW and Tomorrow's Company, 2014. Available for free download at <http://www.ethicalmarkets.com/wp-content/uploads/2014/02/tecpn12453-solarage-web.pdf> Foreword by Dennis Bushnell, NASA Chief Scientist, Langley, Virginia, co-published by the Institute of Chartered Accountants of England and Wales and Tomorrow's Company (London, 2014)

Anticipating the disappointments of the UN Climate Summit in Copenhagen, we identified the trends in private sector investing in all the new companies and technologies in solar, wind, efficiency, storage as well as geothermal, wave power and research in the \$1.2 trillion total worldwide in 2009. We projected that if the pace of at least \$1 trillion annually continues until 2020, the world's economies would shift into the more sustainable, cleaner, knowledge-rich technologies of the next era as described in the aforementioned *Mapping the Global Transition to the Solar Age*. This transition is well underway as evidenced by numerous reports from Financing the Transition, Long Finance;¹ Fiscal Policies and the Green Economy Transition,* and Greening China's Financial System.² Even the fall in oil prices is not derailing the transition to renewable energy and efficiency, especially in developing countries where solar is growing and oil accounts for only 1.5% of electricity generation in the key markets where solar is growing.³ These trends can address the needs of the 1.3 billion people lacking electricity, particularly when combined with information technologies like mobile phones and virtual financial services.⁴ Even the natural gas from shale in the USA can no longer change the direction of the transition to renewables, while its current role usurping coal in electric utilities' fuel mixes is leading to new risks and vulnerabilities.⁵

So far, the drivers of this global transition have been the 1) growing risks of fossil fuels and nuclear energy, unaccounted rising costs of resource-degradation, waste, pollution and health impacts (still "externalized" from company and government accounts); 2) pressure on water supplies, collapsing fish stocks, spreading desertification and loss of forests and biodiversity; and 3) the growing recognition of the benefits of the green transition to sustainability in public health and safety, environmental quality, more equitable decentralized technologies—all of which are available and when scaled could provide unlimited sustainable energy for all countries.[†] *Better Growth Better Climate*, the Synthesis Report of the Global Commission on the Economy and Climate, a global consortium of eight research institutes, documents that this green transition will also provide opportunities for jobs and boost sustainable global development.[‡]

Since 2009, the rising awareness of these new global possibilities grew worldwide among the grass roots, in academia and at last reached politicians and traditional financial centers. These crises of unsustainability humanity faces were seen more clearly as caused by limited perception of planetary processes and our place in its living biosphere. As we humans began accepting our role in these crises, including climate change, many became empowered to take responsibility to act in this new Age of the Anthropocene. Scarcities of water, arable land and forests which had fueled "resource grabbing" by multinationals and government sovereign wealth funds increasingly meet with local resistance. A report by *The Guardian* demonstrated the failure of such privatization models.⁶

* "Fiscal Policies and the Green Economy Transition: Generating Knowledge – Creating Impact," OECD Green Growth Knowledge Platform Third Annual Conference Report, Ca' Foscari University of Venice, The Energy and Resources Institute, United Nations Environment Programme, the Government of Switzerland, the Government of the Netherlands http://www.greengrowthknowledge.org/sites/default/files/Conference_report_design2.pdf.

† See for example the Green Transition Scoreboard® reports from 2012 and 2013.

‡ *Better Growth Better Climate*, Global Commission on the Economy and Climate, World Resources Institute, EDRI, Tsinghua University, Climate Policy Initiative, Global Green Growth Institute, Stockholm Environment Institute, CRIER, LSE Cities, September 2014.

1. Countries “grabbing” land outside their borders⁷

The tipping point was in 2012 where 50,000 civic leaders met with leaders of 193 UN member countries and many enlightened businesses and investor groups at the UN Summit Rio+20 in Rio de Janeiro, Brazil.* Our GTS was presented at this summit in many venues with our 2012 total at \$3.3 trillion. Corporations and institutional investors signed The Natural Capital Declaration and Roadmap which has since then added hundreds of organizations.† Pension funds, particularly in Europe, joined the transition.⁸

The alarming weather events and natural disasters of 2013 and 2014 finally brought widespread recognition of anthropogenic climate change and the growing debate about mitigation and inevitable adaptation to rising sea levels and security risks. Global Insights on ESG in Alternative Investing were provided by Mercer and LGT Capital Partners. Many pension fund managers who formerly cited financial risks in divesting from fossil fuels now cite the risks of “stranded assets.”

Thus, defensive, rearview mirror responses gave way to more proactive approaches. Forward-looking financial groups promoted the wide range of new investments and the need to shift portfolios from fossil fuels and “stranded assets” to market reforms, including carbon taxes and writing down “proven reserves” which clearly could not be exploited without increasing global warming beyond 2°C. While solar PV and thermal CSP, wind and efficiency became increasingly attractive and prices, particularly of solar PV, continue to fall, even *The Economist* acknowledged the new circumstances in their special report “Let There Be Light”. All this was made even more attractive by the drop in oil prices below \$50 a barrel by January 2015, allowing governments to withdraw costly subsidies to consumers. Unfortunately, subsidies to producers have largely stayed in place. However, London’s FTSE launched its ex-Fossil Fuels Index series, and the UN’s \$53 billion Joint Staff Pension Fund has seeded two low-carbon exchange-traded funds (ETFs).⁹ As carbon assets are downgraded in portfolios, we recommend that these be repriced as “*in situ* chemical feedstocks reserves” to soften the blow.

Looking ahead, this acceleration of the green transition is powered by fundamental shifts in human perspectives leading to paradigm shifts in science, academia, governance, leadership, finance, business, social norms, media, communications and network structures. The role of space and Earth-observing satellites led to a greater focus on exploration of earth systems science.[‡] The computerized digital revolution and social networking underlie all these shifts as efficiency in energy, manufacturing, urban redesign, transport, healthcare, finance and many other sectors of post-industrial societies are digitized and dis-intermediated. Harvard physicist Mara Prentiss links efficiency advances and renewable energy to show how the USA can be 100% powered by these cleaner, healthier systems in *Energy Revolution* (2015).¹⁰

While we are seeing ourselves anew as one confused, troubled human family, trying to adjust to each other’s differing experiences, beliefs and cultural practices, we are also

* Report of the United Nations Conference on Sustainable Development, UNCSD, Rio de Janeiro, Brazil, June 2012. Available at <http://www.uncsd2012.org/>

† The Natural Capital Declaration and Roadmap, UNEP and GCP, 2014.

‡ NASA at <http://science.nasa.gov/earth-science/> and EthicalMarkets.com at <http://www.ethicalmarkets.com/category/earth-systems-science/>

acknowledging the globalization and technologies we have created which we must now address and manage if we are to survive. As we deal with the resulting conflicts, inequality, social fragmentation and mindless violence, humans are learning and survival strategies are emerging. We recall that stress has been a basic tool of evolution in all species, including our own.

Breakdowns drive breakthroughs. There is much good news, submerged in mainstream media, still operating on the old commercial formula: violence, sex, scandal as weapons of mass distraction—“if it bleeds, it leads.” In *The Better Angels of Our Nature* (2011), Harvard psychologist Steven Pinker tells the more hopeful story based on millennial historical trends including the feminization of societies, “gentle commerce”, expanding reason and sympathy and social order. Charles Johnston, MD, sees these trends as leading toward cultural maturity in *Hope and the Future* (2014). Even in the face of rising sectarian conflicts in the Mid-East, similar reports from *Business Week* and *New Scientist* document how humans are “changing the juice we use to run our civilization” and “witnessing a complete transformation of the world.”^{11,12} Even US populations are beginning to see climate change as a threat and surveys now show bipartisan support for government regulation of greenhouse gases and majorities now favor solar energy.* †

Key drivers in 2015 accelerating the green transition to more equitable, peaceful, sustainable societies are knowledge-intensive, paradigm shifts—new source codes now steering social, political, financial, corporate and academic decisions and changes:

- Beyond quantitative economic models to qualitative growth, systems approaches to human development, wellbeing and happiness
- Beyond short-term gain to long-term sustainability
- Beyond competition to collaboration and cooperation

These more inclusive systemic paradigms are re-shaping:

- Markets and commons in new global agreements
- MOOCs revolutionizing academic-based learning¹³
- Beyond scarcity economics to abundance and embracing earth systems science
- Beyond mining the Earth for energy to harvesting the Sun’s free photons—that safely sited nuclear power 93 million miles from Earth

These new source codes are now pervading our organizations, new strands of cultural DNA deep in our operational hard drives, leading to new strategies, assumptions and decisions:

- Accounting and internalizing all social and environmental costs into public and private balance sheets (beyond GDP and “externalizing,” toward full-spectrum, truthful accountability and circular economies).¹⁴

* Polling the American Public on Climate Change, Environment and Energy Study Institute, April 2015.

† U.S. Homeowners on Clean Energy: A National Survey, SolarCity, Clean Edge and Zogby Analytics, March 2015.

- Transforming finance beyond short-term, money-based fossilized asset allocation still mispricing energy and risk¹⁵ to long-term value creation standards based on use of six forms of capital: human, intellectual, financial, social, built and natural (IIRC, SASB, GRI and Ethical Markets' Principles of Ethical Biomimicry Finance[®])*.
- Market-based reforms—pollution taxes (including carbon);¹⁶ democratizing financial services; reforming electronic markets and trading;¹⁷ crowdfunding,[†] cellular phone banking, revival of public banks, time banking, credit unions, cooperatives, worker-owned companies, hybrid social enterprises and the rise of shareeconomies and the circular economy.¹⁸
- Focus on inequality, technology-based unemployment and the globalized power-law race-to-the-bottom; new forms of distribution of purchasing power, aggregate demand, guaranteeing minimum basic security, incomes, contingent cash transfers.^{19, 20}
- Focusing on technological threats—artificial intelligence (AI), cybercrime and terrorism, synthetic biology, geo-engineering, nanotechnologies, space race for helium-3 and other minerals, gene driving;²¹ beyond the unsustainable animal protein diets to plant protein, more insect-based foods for energy and resource efficiency and human health.
- Designing and financing urbanization, efficient infrastructure,²² focusing more on “infostructure” (broadband, expanding internet access, online education, tele-democracy),[‡] public goods and services, mobility, food, cultural and environmental amenities.
- Beyond fresh water intensive glycophyte agriculture to salt-loving halophyte-plant foods, fiber and fuels (based on four underutilized, abundant resources: 40% desert lands, 97% seawater, 10,000 halophyte varieties and free photons).²³

These broadened approaches to sustainability are tracked in our GTS under our section: Life Systems, including technologies protecting nature, human wellbeing, food, water, education and quality of life. We continue to cover green infrastructure finance by green bonds²⁴ and purposes to which such funds are applied. Long-term sustainability requires redesign of major infrastructure from past eras—now no longer fit for purpose: from national electricity grids, urban infrastructure, obsolete dams, crumbling bridges, over-investments in roads and private vehicles versus rail, public transit, bike lanes and pedestrian malls to the massive global fossil fuels apparatus and trade facilities for shipping material goods in our increasingly digitized 21st century Information Age. All these system-wide transitions toward efficiency, information and communications technologies (ICT) are now digitizing many sectors of economies worldwide.

* IIRC at <http://integratedreporting.org/>; SASB at <http://www.sasb.org/>; GRI at www.globalreporting.org; Principles of Ethical Biomimicry Finance at www.ethicalbiomimicryfinance.com

† For more information see <http://www.ethicalmarkets.com/category/crowd-funding/>

‡ See for example, Hazel Henderson, Global Infrastructure Fund Conference, Tokyo, Japan, 1998.

2. System-wide Transitions

Systemic awareness of vital interconnections is now crucial, such as between energy, water, food and other tightly coupled systems of agriculture, forestry, ecosystem services, financial speculation and climatic changes (all monitored daily by 120 Earth-observing satellites of many countries cooperating through GEO and the International Space Station). For example, the Inter-American Development Bank is financing smart transportation solutions through new public-private partnerships.* Even California's drought is producing new approaches such as generating the electricity to run water and waste water system with solar energy.²⁵

The Global Infrastructure Basel conference has revealed its first selection of sustainable infrastructure between \$5 and \$400 million on May 27, 2015, allowing investors to connect with partners and opportunities including wind farms in Vietnam and Senegal, energy and water-saving projects in China, Tanzania; public transit projects in Accra, Mexico City and Fortaleza, Brazil.†

The rapid digitization of legacy industries, manufacturing, retail, traditional banking toward mobile-payments systems like Kenya's M-PESA, crowdfunding sites like Kickstarter and crypto-currencies like Bitcoin are now spreading to healthcare, legal services and the new "shareconomy" hybrids like Uber, airbnb, Couchsurfer and employment sites like Elance and TaskRabbit. While these new ICT services help consumers' budgets and provide casual work for struggling people in developed economies, they can also exacerbate inequality in countries applying austerity, cuts to public services, pensions and healthcare. In addition, electricity-gulping, inefficient server farms are at last being addressed by a consortium of IT industry leaders formed in 2007 in their Green Grid initiative²⁶ and a Power Usage Effectiveness (PUE) effort with EPA's Energy Star program.²⁷

The International Telecommunications Union (ITU) has tracked these trends in ICT and how different countries provide infostructure: internet, broadband, fiber-optic cables, WiFi, phone services and how communications networks are provided and under what standards. For example, Scandinavian countries rank highest in providing standard access to this ICT infostructure while Finland defines such access as a human right. The World Economic Forum (WEF) in Davos, Switzerland, since 2001, has produced its Global Information Technology Report comparing progress in ICT across 143 countries because "ICTs have become key enablers of business and employment creation and of productivity growth." While "ICTs have significant potential for supporting inclusive grow... paradoxically, ICTs have opened up new digital divides."²⁸ This is seen both within and between countries, largely due to different standards and politics. ICTs can exacerbate inequality of access, condemning many rural and poor communities to structural poverty and unemployment.

In the USA, for example, access to internet and broadband falls behind many countries, where small cities can be stranded without minimum broadband speed for their

* Public-private partnerships offer smart transportation solutions for Latin America and the Caribbean, Economist Intelligence Unit, Inter-American Development Bank and the Multilateral Investment Fund, April 15, 2015.

† First Infrastructure Projects Announced, Global Infrastructure Basel, April 15, 2015.

small businesses and job creation. Left to the private market, large telecom and cable companies have duopoly or monopoly power and simply will not provide access. The Financial Times reported on how these policies deny service to millions of consumers and small businesses, and which US neighborhoods, small cities and rural areas do not have broadband connections.²⁹ The WEF report ranks the USA 7th behind Singapore, Finland, Sweden, Netherlands, Norway and Switzerland for networked readiness; 14th in access standards behind New Zealand, Britain, Canada and the United Arab Emirates (UAE); 12th on infrastructure and affordability and only 10th on business usage.³⁰

According to the US Federal Communications Commission, “High-speed Internet access has become fundamental to modern life. Broadband connectivity can overcome geographic isolation and put a world of information and economic opportunity at the fingertips of citizens... Forty-one percent of America’s rural schools couldn’t get a high-speed connection if they tried... Connectivity is only available at an unreasonably high price.” Yet, the Connect America Fund will invest \$20 billion in broadband through 2020, paid by small fees on consumer bills.³¹ Google, Facebook and new entrants into providing internet and broadband connectivity to all humanity are gearing up with new technologies. Google is developing globe-girdling balloons; Facebook has launched its internet.org and will provide access to basic services in tandem with several governments in Africa and hopes to develop solar-powered drones. OneWeb, a Florida-based start-up, aims to provide fast connectivity to all with swarms of cheap, low-flying satellites.³² However, these innovations are unproven and years away. This huge underlying transition enabling smarter energy, water, cities, online education, waste recycling and more inclusive green growth is tracked in our GTS, currently totaling over \$876 billion.

This array of deeper issues is now emerging in thousands of top-level, global scientific conferences and is the subject of at least three major UN summits in 2015: 1) Financing for Development in Addis Ababa, Ethiopia, July 2015; 2) the UN General Assembly, New York, September 2015, to debate and ratify the new Sustainable Development Goals (SDGs) which build on the Millennium Development Goals (MDGs) which succeeded in advancing education, women’s and all human rights and reducing poverty; and 3) the Climate Change Summit in Paris, France, December 2015. The SDGs, launched in 2012 at Rio+20 placed all human goals within the framework of ecological sustainability and inclusive, equitable, low-carbon green economies in member countries and supported open working groups (OWG) in all these countries. A global Stakeholder Forum was initiated to review the goals. Its report on achieving a better balance between economic, social and environmental dimensions produced deeper research and clarification in a systems-based synthesis (OWG Outcome Document).³³ An inter-governmental negotiating session at the UN, New York, January 19-21, 2015, conducted a “stocktaking” in preparation for adoption of the final SDGs at the September General Assembly.³⁴

The report, “Sustainable Development Goals and Integration,” Stakeholder Forum 2015, by Amy Cutter, et al.,³⁵ identified cross-cutting issues and where some goals could be focused and integrated with others, for example, how **Goal 7**: “Ensure access to affordable, reliable, sustainable and modern energy for all” was related to **Goal 12**: “Sustainable consumption

and production patterns” (closely followed in our GTS). All the SDGs are related and may be further integrated into a smaller group as advocated by some economists and politicians. However, we agree with those who take a systems view beyond economics and money-based measures, such as Secretary-General Ban Ki-moon, Bill and Melinda Gates and others.³⁶ We have reported on **Goal 2**: “Promote sustainable agriculture”; **Goal 6**: “Ensure availability and sustainable management of water and sanitation”; **Goal 8**: “Promote inclusive and sustainable economic growth, full productive employment and decent work for all”; **Goal 9**: “Build resilient infrastructure, promote inclusive, sustainable industrialization and foster innovation”; **Goal 11**: “Make cities and human settlements inclusive, safe, resilient and sustainable”; **Goal 14**: “Conserve and sustainably use the oceans, seas, marine resources for sustainable development”; **Goal 15**: “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss”.

“We recognize that people are at the center of development and, in this regard, we strive for a world that is just, equitable and inclusive, and we commit to work together to promote sustained and inclusive economic growth, social development and environmental protection and thereby to benefit all.”

– The Future We Want

Ethical Markets supports all these and the other SDGs which relate to gender equity, human rights and social justice which are fully embraced in our Transforming Finance initiative and TV series, our Principles of Ethical Biomimicry Finance[®] and our EthicMark[®] Awards raising the ethical bar for advertising, our Quality of Life Indicators and the Caring Economy Indicators of our partner the Center for Partnership Studies.* We have promoted such goals since the launch of the Earth Charter and its 16 Principles of Human Responsibility at the 1992 Earth Summit in Rio de Janeiro which I have supported ever since.† Our coverage continues with daily updates on investments in quality-of-life access to basic needs, including water, healthier agriculture and food, as well as infrastructure: internet access, broadband, electronic education and political participation.

3. United Nations Sustainable Development Goals

The UN Secretary General Ban Ki-moon’s report “The Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet” synthesizes the widespread deliberations of the 193 country members of the United Nations in RIO+20, in Rio de

* Transforming Finance at <http://www.ethicalmarkets.com/category/transforming-finance/>; Ethical Markets TV Series at <http://ethicalmtv.wpengine.com/?s=transforming+finance&submit-2=go>; Ethical Biomimicry Finance at www.ethicalbiomimicryfinance.com; EthicMark Awards at www.ethicmark.org; Ethical Markets Quality of Life Indicators at www.ethicalmarketsqualityoflife.com; Caring Economy Indicators at <http://caringeconomy.org/newindicators/>

† The Earth Charter, Earth Charter International, San Jose, Costa Rica. <http://www.earthcharterinaction.org/content/>

Janeiro, Brazil in 2012, with the over 50,000 civic, business and investor groups, including us, also participating.³⁷ The global consultations since then led to these new SDGs to expand on the Millennium Development Goals' progress since 2000. The Rio Outcome document *The Future We Want* summary states, "We recognize that people are at the center of development and, in this regard, we strive for a world that is just, equitable and inclusive, and we commit to work together to promote sustained and inclusive economic growth, social development and environmental protection and thereby to benefit all."

"The stresses now occurring globally are largely due to limited perspectives, ancient ideologies and defunct economic models."

Secretary General Ban Ki-Moon masterfully synthesizes all these global debates and agreements into "A Universal Call to Action to Transform Our World Beyond 2015". It contains many of the proposals and new paradigm approaches, new metrics beyond GDP, new Principles and Standards for guiding ethical businesses and investors, cooperatives, NGOs, auditors, accountants and financial firms which we have produced and advocated, both in my books and papers since the 1970s, and those of our company Ethical Markets Media (USA and Brazil), a Certified B Corporation since our founding in 2004.

Thus, we intend to continue fully supporting these unfolding transformative processes, including the United Nations Environment Programme (UNEP) Inquiry on Design of a Sustainable Financial System and its 3rd Report "Pathways To Scale",³⁸ to which we contributed and posted, and continue reporting on them in our Daily Headlines, as well as our Green Transition Scoreboard®, our Ethical Money Directory, our Quality of Life Indicators, our Principles of Ethical Biomimicry Finance®, our TV series "Transforming Finance" distributed worldwide by www.films.com to colleges and libraries (free at www.ethicalmarkets.tv) and our EthicMark® Awards for Advertising that Uplifts the Human Spirit and our Future Potentials, now accepting nominations for our 10th annual Awards at www.ethicmark.org, as well as our MOOC: the Ethical Markets Exploratorium, free to students, lifelong learners and global citizen activists.

We believe that 2015 can be a year where these transformations are truly launched in academia, public, private and civic sectors worldwide, because the stresses now occurring globally are largely due to limited perspectives, ancient ideologies and defunct economic models. These transitions show that stress is evolution's tool and that breakdowns do drive breakthroughs! We favor the "cap and dividend" policies as more equitable and carbon taxes as preferable to carbon trading.³⁹

2015 will see the December Climate Change Summit to be held in Paris, France, focus on hammering out a set of agreements succeeding the earlier Kyoto Protocols (on which I commented in "From Rigged Carbon Markets to Investing in Green Growth", 2011).⁴⁰ Hopes lie in the US Obama administration's agreements with India's Prime Minister Narendra Modi and their compact with China's President Xi Jinping to reduce emissions and shift to more renewable energy use. The GTS focuses on this key shift from fossil fuels, carbon emissions and their huge subsidies to inclusive, knowledge-richer, green economies. As we show in this

latest GTS report, private investments are still leading in financing this global transition with our new total at \$6.22 trillion. Fossil-free portfolios now outperform those with coal, gas and oil, while MSCI, a well-known financial provider is launching a family of fossil-free indexes.⁴¹

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Notes

1. Michael Mainelli and Chiara von Gunten, *Financing the Transition: Sustainable Infrastructure in Cities* (London: Z/Yen Group, 2015)
2. Zhang Chenghui, Simon Zadek and Mark Halle, *Greening China's Financial System: Synthesis Report* (Winnipeg: IISD, 2015)
3. Katie Gilbert, "The Bright Side," *Institutional Investor* March 2015
4. Peter Alstone, Gerhenson, Dimitry and Daniel Kammen, "Decentralized Energy Systems for Clean Electricity Access," *Nature Climate Change* 5, (2015):305-314
5. Jeff Deyette et al., *The Natural Gas Gamble* (Cambridge: Union of Concerned Scientists), 2015 <http://www.ucsusa.org/sites/default/files/attach/2015/03/natural-gas-gamble-full-report.pdf>
6. John Vidal, "Water privatization: a worldwide failure?," *The Guardian* January 30, 2015
7. Mark Fischetti, "This Land is My Land," *Scientific American* May 2015
8. Frances Denmark, "The Greening of European Pensions," *Institutional Investor* March 2015
9. Katie Gilbert, "Performance Anxiety," *Institutional Investor* May 2015
10. Mara Prentiss, *Energy Revolution* (Cambridge: Belknap-Harvard University Press, 2015)
11. Charles Kenny, "The Economic Power of Positive Thinking," *Bloomberg BusinessWeek* Jan. 12, 2015
12. C. Brathic, "Climate for Optimism," *New Scientist* Dec. 27, 2014
13. See for example, Kevin Carey, *The End of College* (New York: Riverhead/Penguin, 2015)
14. Fritjof Capra and Hazel Henderson, *Qualitative Growth* (London: ICAEW and Tomorrow's Company, 2009) <http://www.ethicalmarkets.com/wp-content/uploads/2009/10/Qualitative-Growth.pdf>
15. Hazel Henderson, "Fossilized Asset Allocation Still Mis-Pricing Energy And Risk," *Seeking Alpha* Jan. 22, 2015 <http://seeking-alpha.com/article/2840336-fossilized-asset-allocation-still-mis-pricing-energy-and-risk>
16. Hazel Henderson, "2015's Winning Coalition," *CSRWire* Jan. 7, 2015
17. Hazel Henderson, "Reforming Electronic Markets and Trading," *CSRWire* Nov. 19, 2014
18. Rosalinda Sanquiche, "Beyond Wall Street: the encouraging growth of new financial models," *The Guardian* Jan. 14, 2015 <http://www.theguardian.com/sustainable-business/2015/jan/14/beyond-wall-street-growth-of-new-financial-models-circular-economy>
19. Hazel Henderson, "Facing Up To Inequality: New Approaches Beyond Economism," *The Globalist*, Dec. 31, 2013
20. Hazel Henderson, "Reforming Money and Banking: Keys to Debt and Jubilee," *Tikkun* Jan. 21, 2015
21. *Global Risks 2015* 10th Edition (Geneva: World Economic Forum, 2015)
22. Hazel Henderson, Rosalinda Sanquiche and Timothy Nash, "Green Bonds Growing Green Infrastructure," Green Transition Scoreboard Update, *Ethical Markets Media* August 2014.
23. Hazel Henderson, Rosalinda Sanquiche and Timothy Nash, "Plenty of Water," Green Transition Scoreboard Report, *Ethical Markets Media* March 2014
24. Henderson, Sanquiche and Nash, Plenty of Water 2014.
25. Roy Hales, "A Partial Solution to California's Water Problems," *Sun Xtender* April 10, 2015.
26. "PUE to Become Global Standard for Data Center Efficiency," *GreenBiz* April 5, 2010.
27. Ryan Siegel, "New Server Technology Reduces the Power Required to Save Energy," *Just Means* April 9, 2015.
28. The Global Information Technology Report 2015 (Geneva: World Economic Forum, 2015).

29. David Crow, "Digital divide exacerbates US inequality," *Financial Times* October 28, 2014 <http://www.ft.com/cms/s/2/b75d095a-5d76-11e4-9753-00144feabdc0.html#axzz3bGYrXmhq>
30. *Global Information Technology Report*
31. Tom Wheeler, "Closing the Digital Divide in Rural America," *Official FCC Blog* November 20, 2014.
32. "Expanding the Internet: Sky-Fi," *The Economist* April 11, 2015
33. "Open Working Group proposal for Sustainable Development Goals," *United Nations* 2014 <https://sustainabledevelopment.un.org/content/documents/1579SDGs%20Proposal.pdf>
34. "First Intergovernmental Negotiation on the Post-2015 Development Agenda," *IISD Reporting Services* January 21, 2015.
35. Amy Cutter et al., "Sustainable Development Goals and Integration," *Stakeholder Forum, German Council for Sustainable Development* 2015.
36. "Economics of optimism," *The Economist* Jan. 24, 2015.
37. Secretary-General, *The Road to Dignity by 2030* (New York: United Nations, 2014).
38. Simon Zadek and Nick Robins. "Pathways to Scale," Inquiry: Design of a Sustainable Financial System *UNEP* January 2015. <http://www.unep.org/inquiry/AboutUNEPInquiry/tabid/794621/Default.aspx>
39. See for example, Catherine Kunkel and Daniel Kammen, "Design and implementation of carbon cap and dividend policies," *Energy Policy* 39(2010):477-486; and Peter Barnes, *With Liberty and Dividends for All* (San Francisco: Berrett-Kohler, 2014).
40. Hazel Henderson, "From Rigged Carbon Markets to Investing in Green Growth," *Real-World Economics Review* no. 57 (2011) <http://www.paecon.net/PAERreview/issue57/Henderson57.pdf>
41. "Fossil-Free Portfolios Outperform Those With Coal, Gas, Oil," *SustainableBusiness.com*, April 13, 2015.