



**Update to the
Green Transition Scoreboard®**

**Ethical Markets Media
August 2013**

Green Transition Scoreboard®



This mid-year Update to the [Green Transition Inflection Point: Green Transition Scoreboard® 2013 Report](#) provides a succinct summary of the Green Transition Scoreboard® and delves into specific trends. The 2012 mid-year Update looked closely at the Corporate R&D sector. This report investigates the trends growing the Renewable Energy and Green Construction sectors and looks forward to the 2014 report in which the Green Transition Scoreboard® team will expand and refine its sectors.

Overview

Since 2007, the Green Transition Scoreboard® has tracked private investments in creating cleaner, greener economies globally. If we continue to invest at least \$1 trillion per year until 2020, we will be leaving the fossil fueled industrial era and entering a technologically advanced solar age¹ based on principles of equity, efficiency, sustainability and biomimicry.² This green transition is happening at an extraordinary rate, accelerated by international agreements in 2012 by the G-20, Rio+20, OECD, UNDP and the United Nations General Assembly. This update to the [February 2013 report](#)³ focuses on the green transition driven by these trends: the write-down of fossil fuel assets; the inevitable wave of nuclear plants due to be retired; the exposing of hypothetical forecasts of 100 years of shale gas⁴; and the decline of large, centralized electricity generation identified by earlier Green Transition Scoreboard® reports.

As of July 2013, \$5.2 trillion has been privately invested in a greener, global economy since 2007, jumping from \$4.1 trillion reported in February 2013. The Green Transition Scoreboard® (GTS) tracks investments in Renewable Energy, Efficiency, Green Construction, Smart Grid, Corporate R&D and Cleantech.

INVESTMENTS IN GREEN TRANSITION	
2007-2013	
Sector	US \$
Renewable Energy	\$2,382,615,994,240
Efficiency	\$1,329,931,563,718
Green Construction	\$879,514,652,000
Corporate R&D	\$377,659,379,436
Cleantech	\$235,250,088,873
TOTAL	\$5,204,971,678,267

¹ Henderson, Hazel. *Politics of the Solar Age*, Doubleday, 1981, 1988.

² The discipline of biomimicry studies nature's best ideas then imitates ecological designs and processes to solve human problems. Benyus, Janine. *Biomimicry: Innovation Inspired By Nature*, William Morrow, 1997.

³ "Green Transition Inflection Point: Green Transition Scoreboard® 2013," Ethical Markets Media, February 2013.

⁴ Powers, Bill. *Cold, Hungry and in the Dark*, New Society Publishers, 2013.

One hundred ninety-one governments and some institutional investors are increasing their focus on growing greener economies since Rio+20 in 2012. We recommend investing at least 10% of institutional portfolios directly in companies driving the global Green Transition. This provides a way to update strategic asset allocation models both as opportunities and as risk mitigation. This transition strategy is recognized in the 2012 report by Mercer which suggested 40% of portfolios should be in Green Transition sectors.⁵ This validates GTS research and other models indicating that investing \$1 trillion annually until 2020 can scale wind, solar and other renewables,⁶ efficient energy and material, green construction, cleantech, R&D, sustainable land-use, smart infrastructure, transport and urban re-design to accelerate the Green Transition globally, support innovations and reduce costs.

GTS data sources include the highly respected Cleantech, Bloomberg, Yahoo Finance, Reuters and many UN and other international studies and individual company reports. Companies, organizations and the sources of financial data included in the GTS are screened by rigorous social, environment and ethical auditing standards. They can be found in indexes such as Calvert, Domini and Pax World, the PowerShares Cleantech Portfolio, Dow Jones Sustainability Indexes, London's FTSE4GOOD, NASDAQ OMX Green Economy Global Benchmark Index, ASPI Eurozone, and the many newsletters from around the world we post daily at www.ethicalmarkets.com.

The GTS focuses on private sector investments, excluding government funded projects and initiatives. Sustainable technologies are disruptive of incumbent sectors and interests. Disinformation and media campaigns by fossil fuel interests and companies miscast the some 5% of energy subsidies to renewable energy, while 95% go to fossil fuels, e.g., over \$500 billion worldwide in 2012, up from \$409 billion in 2011.^{7,8} To bypass the continuing political conflicts over the allocation of subsidies, the GTS purposefully omits government funded projects and initiatives. GTS research indicates that onshore wind and solar PV now can compete with centrally generated coal and nuclear energy in spite of these subsidies and tax breaks. When government funding is part of a larger project, the GTS research team has removed, in as far as is transparent, the portion of investments from government funds.

Our definition of 'green' is quite strict. Therefore, certain sectors and technologies are omitted. Despite arguments claiming nuclear energy is a sustainable option, EROI from mining, enrichment, processing, transportation, and waste disposal and decommissioning costs are rarely

⁵ "Through the Looking Glass: how investors are applying the results of the climate change scenario study," Mercer, LLC, New York, 2012.

⁶ Budischak, Cory, et al. "Cost-minimized combinations of wind power, solar power and electrochemical storage, powering the grid up to 99.9% of the time," *Journal of Power Sources*, 225(2013) 60-74.

⁷ *Renewables Global Futures Report*, REN 21, Paris 2013.

⁸ Sills, Ben. "Fossil Fuel Subsidies Six Times More than Renewable Energy," Bloomberg News, Nov. 9, 2011.

included. A new study calls for retiring most US nuclear plants, citing age and safety issues.⁹ We omit coal carbon sequestration (CCS) due to its major government subsidies, huge costs, decreased efficiency of power plants and still unproven technology. Optimistic views of 100 years of US shale oil and gas have been re-assessed by industry experts. Biofuels are omitted (though appropriate for local, small farm use and other traditional uses) as too much is invested in industrial-scale facilities, as well as in genetically modified microbes to produce fuels – dubious propositions for long-term sustainability. Exceptions are made for biofuels from algae grown on seawater and halophyte plants for desert-based saline agriculture. The GTS recognizes that organic matter deemed as “waste” should not be extracted from the essential lifecycle of returning nutrients to the soil as all phases of plant growth and decay are essential to local biota.

Several subsectors have been purposefully omitted from GTS because of controversy or lack of consensus that they will make a long-term contribution to sustainability. For example, 3D printing is exploding yet uses plastic and other feedstocks un-assessed for their safety. Nanotechnology may be appropriate in particular projects if further research concludes they are sustainable, made from natural materials and without detrimental effects to life.

Renewable Energy – profiting from fossil fuels’ decreased investments, retiring infrastructure and unrecoverable resources

There has been \$2.38 trillion invested globally since 2007 in **Renewable Energy**. Investments in **Renewable Energy** include private technology development, equipment manufacturing, project finance and M&A activity. The sector is divided into current investments by year of funding and future commitments.

While this investment is already the highest sector monitored by the GTS, we expect it to grow significantly in the next several years as traditional investors move away from fossil fuels. [Goldman Sachs](#) cautions that coal mining and infrastructure “projects will struggle to earn a positive return,” based on environmental regulations discouraging coal-fired generation, energy efficiency improvements and strong competition from gas and renewables, for example, recognizing onshore wind power as a mature technology.¹⁰

While divestments in fossil fuels, doubt about nuclear’s future, reassessments of reserves of shale gas and the decline of profitability of centralized utilities drive renewable energy growth, the US Bureau of Land Management held the first coal lease sale in Wyoming, in August 2013, which received no bids. [Cloud Peak Energy](#) which holds the current lease passed on the estimated 149 million mineable tons adjacent to the company’s existing Cordero Rojo Mine,

⁹ Cooper, Mark. “Renaissance in Reverse: Competition Pushes Aging US Nuclear Reactors to Brink of Economic Abandonment,” Institute for Energy and the Environment, Vermont Law School, July 18, 2013.

¹⁰ “The window for thermal coal investment is closing,” Goldman Sachs Global Economics, Commodities and Strategy Research, July 24, 2013.

stating that “in combination with prevailing market prices and projected costs of mining the remaining coal, we were unable to construct an economic bid for this tract at this time.”¹¹

[Coal faces encroachment](#) from solar PV, hydroelectric, onshore wind, biofuels and geothermal which collectively, together with other renewables provide 20% of global power generation and are predicted to provide 25% according to the International Energy Agency, by 2018.¹² Whereas in the past there was a question of intermittency, renewable technologies, including [geothermal](#), are being designed to respond to systems operators’ need for flexibility without imposing significant cost.¹³ The need for utility grids is diminishing. [NRG Energy CEO David Crane](#) believes customers will move to distributed energy as quickly as cellphones supplanted landlines in US homes.¹⁴ The [FDA’s 26-megawatt microgrid](#) kept its White Oak facility running during hurricane Sandy and saves the US government \$11 million a year in electricity costs.¹⁵ Villages in [India](#) use microgrids, providing needed electricity, while connecting its northern and southern utility grids lag.¹⁶

Increasingly worldwide regulations are leaving fossil fuel investments as stranded assets¹⁷ with pension funds heeding the call to divest from fossil fuels and invest in green technologies. Dutch [Rabobank](#) will now refuse loans to companies involved in tar sands and shale gas, citing the long-term financial and environmental risks are too large.¹⁸ In July 2013, Storebrand, a major Norwegian pension fund advisor, excluded from its Energy Sector all 13 coal producers and the 6 oil companies with the highest exposure to tar sands “to reduce Storebrand's exposure to fossil fuels and to secure long term, stable returns for our clients,” says Christine Tørklep Meisingset, Head of Sustainable Investments. She adds that in light of climate change, “fossil fuel resources will become unburnable and their financial value will be dramatically reduced. Exposure to fossil fuels is one of the main sustainability challenges facing business, so for us it is a logical and necessary step to adjust our investments accordingly.”¹⁹

As investments in new fossil fuel projects dwindle, existing nuclear infrastructure faces demise, less due to the often mentioned safety concerns, but because many nuclear reactors face “[economic abandonment](#).” In the US, four nuclear reactors have been retired: one for lack of

¹¹ “Cloud Peak Energy Inc. Confirms It Did Not Bid on Maysdorf II North Tract LBA,” Press Release, Cloud Peak Energy, August 21, 2013.

¹² Marshall, Michael and Aldhous, Peter. “Our green future starts now,” New Scientist, July 6, 2013.

¹³ Trabish, Herman. “California Grid Operator Asks Geothermal to Help ‘Feed the Duck’”, GreenTechMedia.com, June 28, 2013.

¹⁴ Martin, Chris, et al. “Why the Electricity Grid’s Days Are Numbered,” BusinessWeek, August 26, 2013.

¹⁵ Ibid.

¹⁶ “Out of the gloom,” *The Economist*, July 20, 2013.

¹⁷ “Unburnable Carbon 2013: Wasted capital and stranded assets,” Carbon Tracker Initiative and Grantham Research Institute, 2013.

¹⁸ “Two big mainstream investors steer away from tar sands,” CorporateRegister.com, July 15, 2013.

¹⁹ Personal communication with Christine Tørklep Meisingset, Head of Sustainable Investments, August 2013; “Storebrand reduces carbon exposure in investments – 19 companies excluded,” Press Release, Storebrand, July 2, 2013.

competitiveness and three because of excessive costs of repair.²⁰ Another five have cancelled uprates (increasing power by tapping into the excess capacity designed into commercial reactors, requiring upgrades to non-nuclear equipment such as turbines, pumps, motors, generators and transformers).²¹

The promise of “100 years” of shale gas mentioned by US President Obama in the 2012 State of the Union is based on misrepresentation of recoverable shale gas, much of which is tallied as “prospective resources,” only potentially recoverable. The myth is perpetuated by Wall Street even as a closer look at production shows a plateau since December 2011. Further debunking the myth, major players BP, England’s BG Group and Canada’s Encana have taken write-downs on their assets.²² Industry expert Bill Powers, in *Cold, Hungry and in the Dark*, adds to these concerns: cheap gas, the increase in industrial, commercial and residential demand and the electric power industry’s switch from coal to natural gas as feedstock will send its price soaring leading renewables to “grow substantially as technology improves and gas prices rise.”²³ While lucrative sales of rights to hydrocarbons and redistributed revenue from taxes make shale appealing,²⁴ the [US military](#) is opting for solar over shale gas as often as possible, both as life-saving (deadly convoys), back-saving (solar cells embedded in backpacks) and cost savings (where solar beats shipped gas in Hawaii).²⁵

Other Sectors Growing Strong

By mid-2013 investments in **Green Construction** have grown to \$879 billion worldwide. Investments in Green Construction include new building construction and existing building retrofits. The sector is divided into current investments by year of funding. This is the most conservatively under-reported sector of this report. We are only counting green construction materials, not including labor. Green materials are increasingly finding their way into construction as solutions for ever-taller sky scrapers include lightweight elevator cables, increasing efficiency.²⁶ Other examples: new EV charging stations powered by solar have no need for foundation, trenching or building permits, and 20-year LEDs beat cost-benefit analysis of incandescent and fluorescent lighting.²⁷

²⁰ Cooper, “Renaissance in Reverse.”

²¹ “Power Uprates for Nuclear Plants,” US NRC, April 2011.

²² Powers, *Cold, Hungry and in the Dark*; Engdahl, F. William. “The Fracked-up USA Shale Gas Bubble,” Centre for Research on Globalization, March 2013.

²³ Powers, *Cold, Hungry and in the Dark*, 99.

²⁴ “Dash for cash,” *The Economist*, August 24, 2013.

²⁵ Evans-Pritchard, Ambrose. “Solar power to trump shale, helped by US military,” *Telegraph*, August 14, 2013.

²⁶ “The other mile-high club,” *The Economist*, June 15, 2013.

²⁷ “Envision Solar to Launch First Fully Mobile, Autonomous and Sustainable Electric Vehicle Charging Station,” Press Release, Envision Solar, August 15, 2013; Helman, Christopher. “The 20-year Lightbulb,” *Forbes*, June 10, 2013.

An under-reported sub-sector of construction is demolition of buildings and aging power plants, specifically nuclear and coal, which cannot be left standing “as is.” According to Navigant Research, demolition, disposal, salvage and remediation could garner more than \$5 billion in Western Europe and North America by 2020. Navigant’s figure does not include redevelopment, whether reclaiming urban land for condominiums or converting to other public spaces.²⁸

During the US recession, when the US construction industry at large shrank 17%, green building grew by 1700%, topping growths in other green industries such as food and non-food organics (33% growth), imports of Fair Trade foods (1442%) and SRI portfolios (27%). A sign of the times, “green” MBA programs grew by 300% from 2006-2011.

While **Renewable Energy** and **Green Construction** are the strongest green sectors, Efficiency, Cleantech and green Corporate R&D are growing apace. The **Efficiency** sector includes investments in energy, materials and water conservation efforts and initiatives and products focused on lowering energy needs or wasting less energy, materials or water than a comparable product. **Cleantech** is a broad sector including agriculture, air quality and environment, overall efficiency, lighting, infrastructure and storage, materials, recycling and waste, transportation, and water/wastewater. The need is urgent in these interlinked sectors as greater connection to the Information Age creates greater drain on resources. Data centers delivering IT services worldwide face challenges of availability, flexibility and scalability²⁹ without resorting to the huge energy waste of just bringing more servers online. Facebook uses hydroelectric centers in Sweden and EDF is deploying its Climate Corp program with DirectTV. Major interventions are needed as ordinary use of a cellphone can use as much energy as running two refrigerators, once electrically sourcing and data moving across networks are incorporated into the analysis.³⁰

The green **Corporate R&D** data collected by GTS is still the most comprehensive assessment of corporate green R&D performed to date, often receiving the biggest bump in January, after annual reports, sustainability reports and financial statements are released. Many corporate leaders feel stymied that government policy is not keeping up with innovation.³¹

The growth spurt in the green economy is also reflected in the many ILO-classified green jobs around the world: 7 million in the EU, 3 million in the US, nearly 3 million in Brazil (6.6% of formal employment). These figures do not include existing “green jobs” in natural resource management of forest, conservation or biodiversity protection, estimated at 14.6 million in the EU alone.³²

²⁸ Rahim, Saquib. “Billions stand to be made in coal plant decommissioning.” EnergyWire, August 7, 2013.

²⁹ “Data center operational efficiency best practices,” IBM Global Data Center Study, April 2012.

³⁰ Fang, Janet. “Can one phone use as much energy as two refrigerators?” SmartPlanet, August 25, 2013.

³¹ AtKisson, Kristina and Alan AtKisson. “Green Economy 2013: A Strategic Briefing on the State of Play in Global Transition,” AtKisson Group Sustainability Intelligence Unit, April 2013.

³² Ibid.

Conclusion

Transitions move us **from** one place **toward** another. This update to the [Green Transition Inflection Point: Green Transition Scoreboard® 2013 Report](#) shows us moving from the fossil-fueled Industrial Era to a technologically advanced Solar Age.³³ To see this shift requires new lenses and new metrics able to detect deeper, long-term trends, whether they be the slow demise of coal and nuclear economics or the rise of renewable energy. What are we moving toward?

We have entered the Anthropocene Age of undeniable, significant human impact on the Earth's ecosystem. This age is rarely mapped by conventional economics and finance, but by such new lenses as provided by NASA's twelve geosynchronous satellites, hourly mapping the processes by which planet Earth utilizes the daily flow of photons from the Sun. These new mapping processes also track innovation for which we must be vigilant. Without ethical compasses, innovations in artificial life and 3D printing can be used to make weapons from toxic "goop" as easily as affordable housing from cellulose.

The ethical compass moving forward must be directed by human ethics and Nature itself. Using Life's Principles, detailed by Janine Benyus and our partners at Biomimicry 3.8, we see wonderful examples of Nature informing design, production and construction. Biomimicry 3.8 has a project increasing wind turbine blade efficiencies using streamlines modeled on whales; MIT is working on an artificial leaf that converts sunlight to energy under the same conditions as plants; architect Mick Pearce designed the mall at Eastgate Centre cooling system in Harare, Zimbabwe, based on the self-cooling mounds of African termites without using conventional air-conditioning; Milwaukee manages waste disposal by producing and selling Milorganite, a fertilizer from sewage.

To quote Hazel Henderson, "as we transition to the green economy, we are not flying blind."³⁴ The Green Transition Scoreboard® stands at \$5.2 trillion mid-year, providing evidence of the shift. The Principles of Ethical Biomimicry Finance™ which Ethical Markets developed with Biomimicry 3.8 provides the guide to asset managers and investors to continue the momentum. Innovation based on Nature and Earth Systems Science must inform every industry, including finance. As each industry accepts responsibility for innovating in harmony with nature, the Anthropocene Age can also represent a cleaner, greener, more equitable, knowledge-rich economy worldwide.

³³ Henderson, Hazel. *Mapping the Global Transition to the Solar Age: from Economism to Earth Systems Science*, Institute of Chartered Accountants of England and Wales, Tomorrow's Company, London, September 2013.

³⁴ Ibid.

Green Transition Scoreboard® is proud to be endorsed by:

Ashok Khosla, Chairman, Development Alternatives and pioneer social entrepreneur

“No leader, from the CEO of the smallest of corporations to the president of the largest of nations, could do better than internalizing the principles of Ethical Markets and always keeping a sharp eye on the Green Transition Scoreboard.”

Don Tapscott, author of the bestsellers *Wikinomics* and *Macrowikinomics*

“Because it enables tracking of the global macro-shift from the Industrial Era to the emerging sustainable economies of the 21st century, The GREEN TRANSITION SCOREBOARD® is an important innovation. Check it out!”

Carson E. Beadle, former CEO of Mercer

Daniel Kammen, PhD, Distinguished Professor of Energy, University of California-Berkeley

Matthew Kiernan, Founder, Innovest; CEO, Inflection Point Capital Management

Joel Makower, Chairman and Executive Editor, GreenBiz Group Inc.

Dennis Meadows, Co-author, *Limits to Growth*

And Many Others!

Green Transition Scoreboard® Research Team:

HAZEL HENDERSON, D.Sc.Hon., FRSA, Founder and President, Ethical Markets Media, USA & Brazil

ROSALINDA SANQUICHE, MA, Executive Director, Ethical Markets Media, USA

TIMOTHY JACK NASH, MSc, Director of Sustainability Research, Ethical Markets Media; Principal, SSI – Strategic Sustainable Investments, Toronto, Canada

If you have questions about this research, including breakdowns of investments by company and year, please email tim.nash@ethicalmarkets.com.

For full disclosure: members of the research team and other principals of Ethical Markets Media, LLC, are invested in companies supporting the green transition, most of which are privately held, early stage, pre-IPO companies.

The Green Transition Scoreboard® and icon are trademarked by the USPTO. We license selected non-profit groups to carry our icon for information to their members.

© 2013

Ethical Markets Media (USA and Brazil)
PO Box 5190, Saint Augustine, FL 32085
Business 904.829.3140, fax 904.826.0325
office@ethicalmarkets.com
Twitter @ethicalmarkets #greenscore

