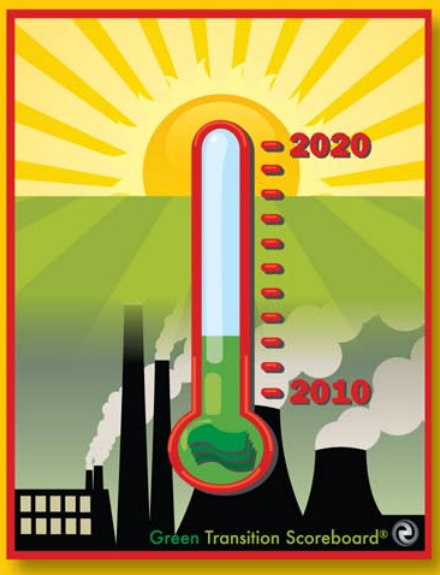
Green Transition Scoreboard® 2012



From expanding cleantech sectors to emerging trends in biomimicry

Ethical Markets

Green Transition Scoreboard® 2012: From expanding Cleantech Sectors to emerging trends in Biomimicry

Cover: concentrated solar power array mimics sunflowers (see page 7)
Cover design by Regine de Toledo, Graphics Ink Design Studio, St. Augustine, FL

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This report does not contain investment advice. For full disclosure: principals of Ethical Markets Media, LLC, are personal investors in green companies (see Appendix 4).

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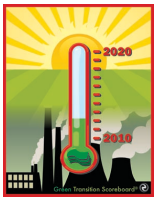

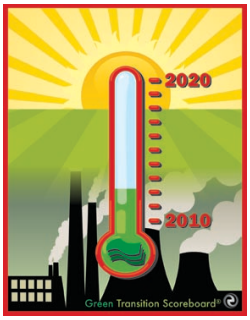

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Executive Summary

The Green Transition Scoreboard® (GTS) is a time-based, global tracking of the private financial system for all sectors investing in green markets. This update of the GTS has found investments totaling more than $3.3 trillion in the green economy since 2007, with Asia, Europe and Latin America catching up with the USA.

INVESTMENTS IN GREEN TRANSITION 2007 - 2011	
Sector	**(US $)**
Renewable Energy	**$1,813,514,837,600**
Green Construction & Efficiency	**$800,011,200,000**
Cleantech	**$148,464,254,073**
Smart Grid	**$214,532,960,000**
Corporate R&D	**$329,528,188,007**
Total	**$3,306,051,439,680**

As investment funds shift away from more speculative sectors such as hedge funds, private equity and commodity ETFs, as well as other fossilized sectors, and redeploy at least 10% of their portfolios directly in companies driving the global Green Transition, the $10 trillion by 2020 goal is well within reach. With the data in the GTS, security analysts can update their strategic asset allocation (SAA) models to highlight green markets, as now recognized in the report by Mercer which suggests 40% of portfolios should be in green sectors – half to hedge against climate risk and half to capitalize on these opportunities (see Appendix 3).

The Green Transition Scoreboard® tracks five sectors: Renewable Energy, Green Construction and Efficiency, Cleantech, Smart Grid and Corporate R&D. Renewable Energy includes private technology development, equipment manufacturing, project finance and M&A activity. Green Construction and Efficiency includes new building construction, existing building retrofits and, newly added this year, efficiency financing. Cleantech is a broad sector and includes sustainable agriculture; air, water and environment; energy efficiency and storage; infrastructure; materials; recycling, reuse and waste reduction; and transportation. Smart Grid includes companies actually putting smart grids in place, building the infrastructure rather than designing the technology. Together, these first four sectors account for over $2.9 trillion in investments since 2007, alone higher than last year's five sector total of over $2.4 trillion.

Corporate Research and Development (R&D) in green transition technologies alone accounts for over $329 billion in investments. The Green Transition Scoreboard® is the only place to find aggregate corporate green research and development investments, specifically tracking R&D dollars for innovative technologies that reduce the use of natural resources and minimize environmental impacts.

Several subsectors such as nuclear, biofuels and coal carbon sequestration have been purposefully omitted either because of controversy or lack of consensus that they will make a long-term contribution to sustainability.

Companies, organizations and the sources of financial data included in the GTS are screened by rigorous social, environment and ethical auditing standards. Data sources include the highly respected Cleantech Group, LLC, many United Nations, European and NGO reports, and traditional reporting sources such as Bloomberg, Yahoo Finance, Reuters and individual company reports.

This report highlights the tremendous body of work supporting the importance of moving forward quickly and substantively in green investments. Appendix 3 references all the works mentioned in the report and dozens of

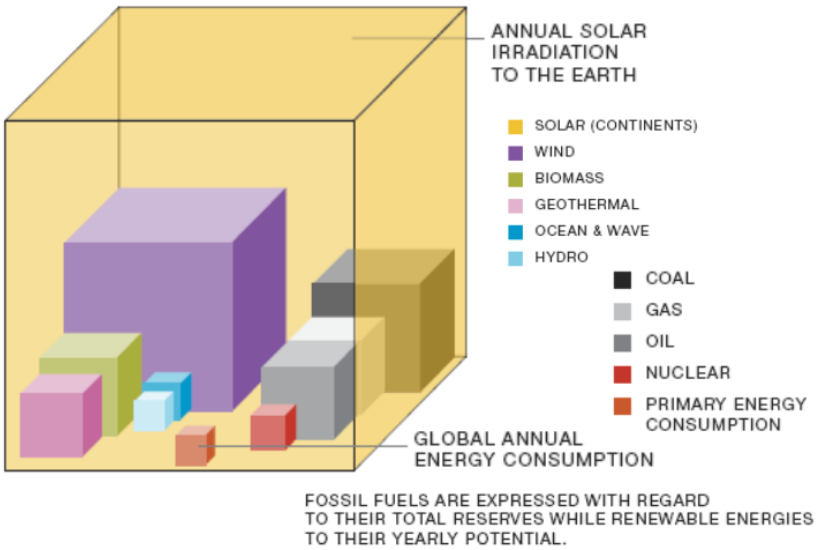
additional sources with similar findings and recommendations.

Many developing countries where these technologies are of paramount importance lack the resources to compile the kind of data found in this report. Yet, we report that these countries are taking advantage of "leapfrog" strategies for greening their economies, avoiding stranded assets and legacy technologies and drawing on available local resources in a more cost effective, time effective manner than technologies from the fossil-fueled era. Given Appendix 3 listing the research cited in this report and much more, touching on a myriad of green sectors and regions around the world, we provide a useful tool not only for institutional and other investors but for national and international policy makers.

The Green Transition Scoreboard® was created as a public service to help grow the green economy and reform market metrics and due diligence worldwide. The full report and other supporting materials are available online.

To provide this information as widely as possible, we are making the GTS available to those UN agencies spearheading the UN's Green Economy Initiative and to organizations participating at the UN summit in Brazil, Rio+20. We are partners with many of these organizations, including the global Green Economy Coalition.

The Green Transition Scoreboard® is a trademarked, ongoing program of research with new reports published every six months. We intend to deepen this research, expanding current categories and adding new ones as green sectors grow and develop in many countries. We see this global green transition as part of the human evolutionary process as we progressed from the Iron and Bronze Ages to using wood, coal, whale oil and petroleum.

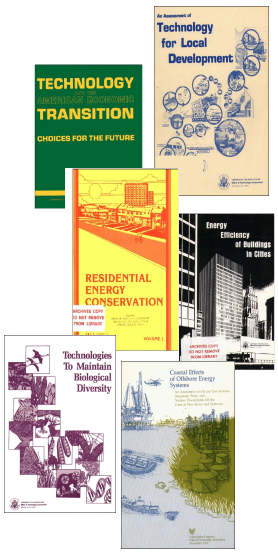


Solar irradiation versus established global energy resources ***Solar Generation 6, EPIA 2011***

Inside the Global Green Transition

Overview by Hazel Henderson

In Q3 2011, the Green Transition Scoreboard® totaled private investments in green sectors since 2007 worldwide at $2.4 trillion. Our new total of $**3,306,051,439,680** confirms our view that this transition is on track to reach the $10 trillion we project by 2020. This global transition follows many earlier phases of human societies' evolution as our technologies evolved from the Iron and Bronze Ages through the energy transitions from wood to coal, whale oil to petroleum. As I noted in our [2011 update], this current transition from fossil fuels to greater efficiency and renewable energy and resources is simply the next stage in human knowledge and scientific progress. This has been forecast since the 1970s by the US Office of Technology Assessment. As OECD Secretary-General Angel Gurria recently stated, "Green growth strategies focus on ensuring that natural assets can deliver their full economic potential."



This and our review of over 100 studies since 2010 was the basis for our recommendation that pension funds and other institutional investors shift at least 10% of their assets to green investments. The Mercer report of February 2011 recommended a shift of 40%: half to hedge against climate and environmental risk and half to capitalize on opportunities in green sectors. Mercer's follow-up survey of 14 asset-owner partners found more than half had already conducted the process of or planning to review their holdings, based on the report's findings.

As this report went to press, the Dutch pension fund APG announced a $1billion investment in a windfarm in Mexico.

Responsible Investor, February 24, 2012

We have seen a marked increase, since our 2011 Green Transition Scoreboard® (GTS) report, of concern by governments and United Nations agencies in promoting the global green transition. Private markets and financial sectors rode roller-coasters and global geopolitical risks, many self-inflicted: from political wrangling in the USA to the failure of EU politicians to address the travails of the euro. All this fueled rising civic anger over bailouts of too-big-to-fail banks while imposing cuts and austerity on their citizens, echoed worldwide in the 99%

facing the concentrated power of the 1%, verified by ETH. January 2012 saw a new level of concern by institutional investors at the CERES-UN Foundation Investor Summit on Climate Risk and Energy Solutions at the United Nations in New York. Secretary-General Ban Ki Moon commissioned a high-level panel on Global Sustainability which endorsed his Sustainable Energy For All By 2030 in its report "Resilient People: Resilient Planet: A Future Worth Choosing," 2012. Moon urged these investors, representing some $10 trillion assets under management, to step up their investments in renewable energy and greater efficiency since governments were struggling with budget cuts "while there is no lack of capital in the world."

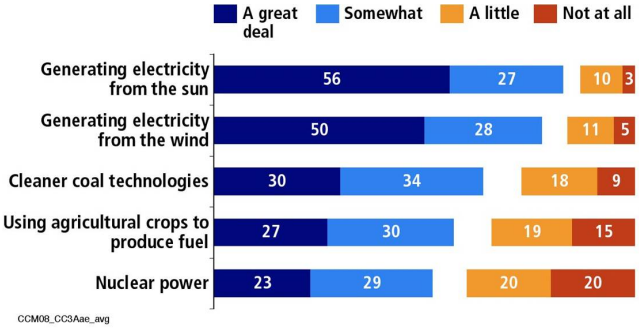
Speakers from Deutsche Bank, Goldman Sachs, GE, Bank of America and other mainstream financiers previously have spoken little about the green transition. Risks of investments in coal reserves of companies comprising 25% of London's FTSE Index are rising as they are seen less as assets than future liabilities in a carbon-constrained world. A high-level group has warned the Bank of England and the European Central Bank that these are now "sub-prime" assets, posing a systemic risk to pension funds and economic stability. While many other institutional investors have focused on climate risk (mostly pension funds, endowments and mutual funds), they now have made the leap to seeing the opportunities in the global retooling for the inevitable green transition, estimated by venture capitalists and others as a $45 trillion new global market. Thus, our GTS thermometer is calibrated for a realistic annual global private investment of $1 trillion until 2020, so as to secure this transition.

Meanwhile, global geopolitical shifts rearranged power toward Asia, particularly India, China, Indonesia and the rising influence of developing countries, especially Brazil – the natural resource-rich "green giant" now the world's 7th industrial economy. The mature economies of Europe and North America stagnated along with Japan, all on various forms of life-support from their central banks and rebellious citizens. Nature added an unprecedented series of crises: Japan, Chile and New Zealand suffered earthquakes followed by tsunamis in Japan and Chile,

both situated on the Pacific Ocean's Ring of Fire. Pakistan, Thailand and Australia suffered devastating floods, while the USA experienced droughts, a wave of destructive tornados, massive flooding along the Mississippi basin and in the Northeast from unusual hurricanes. The loss of life and disruption of production was massive as were the costs estimated by Munich Re – $378 billion for 2011. Intimidation by those denying scientific consensus on Darwin, evolution and anthropogenic (i.e., human) effects on our planet's biosphere (including the 75 members of the US Congress) was confirmed by 360.org which found US citizens behind 26 other advanced countries in their belief in evolution. No wonder that media and public debate was muted on the need in the USA to shift to a more ecologically sustainable, socially just, cleaner, greener economy. Thus, Ethical Markets Media's reporting in our Green Transition Scoreboard® came as a surprise to most mainstream media and public opinion driven by advertising revenues from incumbent fossil-fueled sectors.

At the same time, in China, India, South Korea, Brazil and many other countries, even including the beleaguered European investors and companies, were advancing apace in shifting to greener economies. The Asian Development Bank-UNESCAP report sees Asia emerging as a green economy leader. Pew research found that among the G-20 the USA lagged far behind. Momentum, for the global green transition was accelerated by the OECD group of 37 advanced economies and their Towards Green Growth reports and many others indicating greater efforts to "de-carbonize" their economies and grow green sectors simply to modernize, create jobs and invest in more energy and resource efficiency. The International Monetary Fund's working paper: "Who's Going Green and Why?" appeared in December, 2011 (see Appendix 3).

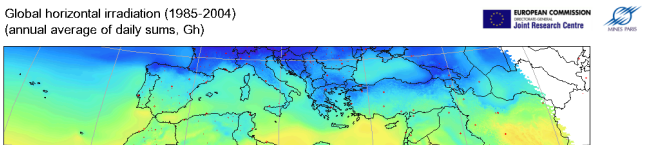
Mainstream financial markets were confronted with "Pricking the Finance Carbon Bubble," based on a report from Carbon Tracker showing that some 40% of companies listed in London's FTSE Index had foolishly over-invested in "proven reserves" of fossil fuels that likely will never be exploitable. Such mal-investment illustrates again the need for new metrics, both to internalize externalities in prices and investment models, as well as to correct GDP. We were pioneers with Calvert in 2000 with our dashboard: the Calvert-Henderson Quality of Life Indicators, regularly updated at www.calvert-henderson.com and emulated by the OECD in their new Better Life Index. Since 2008, large majorities in 22 countries agree

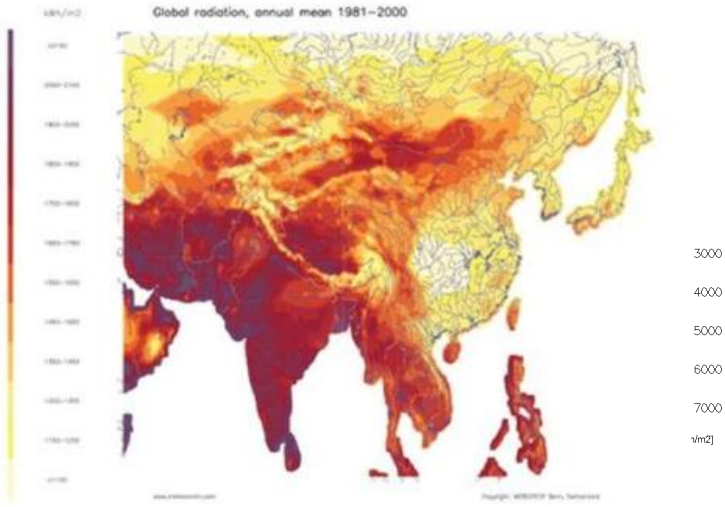


that the move to renewable energy is critical to prevent climate change. The Green Growth Knowledge Platform, launched January 2012 by OECD, UNEP and the World Bank will help governments design and implement green growth policies.

In 2012, the impetus for green growth also is coming from the United Nations as its 193 member nations submit their plans for the green transition to the UN Commission on Sustainable Development (UNCSD) for the UN Summit, Rio+20 in Rio de Janeiro, Brazil, June 20-22, 2012 (Zero Draft). Only two countries remain skeptical about this global transition to a green economy: Venezuela and Bolivia, both seeing it as a capitalist takeover of environmental resources to commodify them for private profit. Indeed, agricultural land is described as the newest "asset class" in an April 2012 conference for hedge funds, sovereign wealth funds and other institutional investors (www.globalaginvesting.com). Pakistan, Mexico, Ghana, Egypt and Argentina expressed reservations that poor people and the social dimensions of development would be shortchanged. Some smaller Caribbean states and Honduras as yet have no policy positions – unlike Costa Rica, a green economy leader. Meanwhile, 27 European Union countries increased their share of renewable energy consumption from 11.5% in 2009 to 12.4% in 2010. A GlobeScan survey of experts found 72% saying that the green economy is the right theme for Rio+20 while 76% agreed that socially responsible investors would be the most important influencers, along with NGOs (69%) and labor unions (57%).

As shown in the graphics on the next page, the developing countries of the South have specific advantages in the race to green the world's economies. UNEP-FI reports on financing renewable energy in developing countries focus on Africa. India and Africa are rich in solar resources. All these countries have fewer legacy, incumbent industries in fossilized sectors, less obsolescent infrastructure and fewer stranded assets (e.g., aging nuclear plant decommissioning, mal-investments in proven fossil-fuel reserves which are unlikely to be recovered for multiple reasons: net energy costs, prices, additional pollution, etc.). Thus, the "technological leapfrog" strategies are preferred, particularly by China, Brazil, India and many other emerging giants, including the DESERTEC initiative in North Africa.





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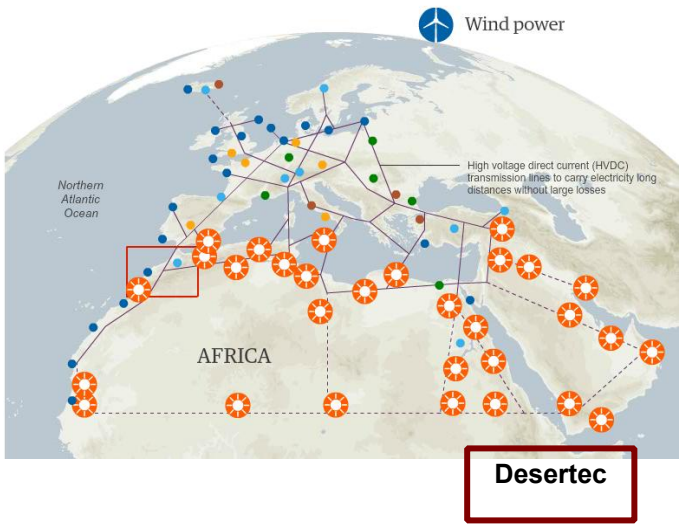
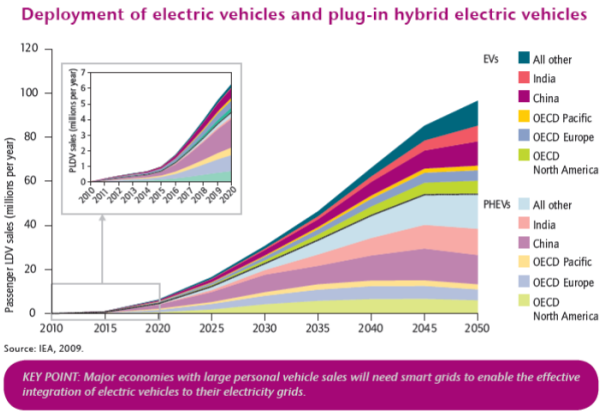


Desertec

frog"

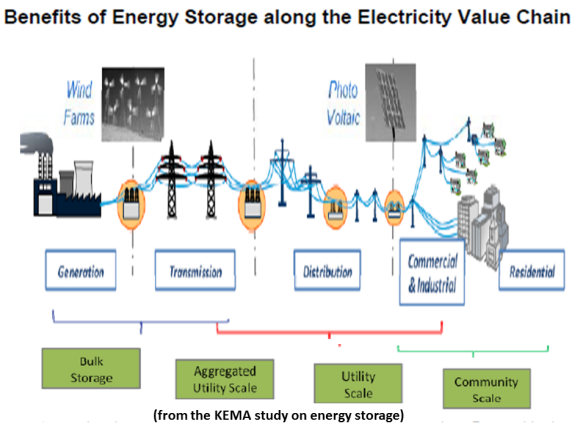
This "leapfrog" takes many forms: e.g., mobile phones, leapfrogging costly landlines; distributed, local solar, wind, geothermal, low-head hydro leapfrogging wasteful national grids and costly centralized power plants; more energy and resource efficiency leading to re-designing of cities for pedestrians, cycles and mass transit, LED-municipal lighting and locally-sourced solar and wind generators. As noted in many studies, not only do developing countries now have these "leapfrog" advantages, costs are lower, allowing the 1.6 billion people living far from electricity grids to enjoy simple solar electricity thanks to such innovators as Swiss-based DT Power. Many joined us in pointing out that most developing countries cannot afford nuclear power or big central power plants and grid systems while they are abundant in solar and renewable resources and culturally attuned to conservation and efficiency.



(from the IEA Smart Grid Technology Roadmap)

As our team has tracked all these geopolitical changes since our 2011 Green Transition Scoreboard® update, we are emphasizing research into how green technologies are being developed and deployed in more decentralized ways and in these developing regions. Smart grid technologies can be centralizing or decentralizing. We continue to exclude from the Green Transition Scoreboard® many technologies touted by legacy and incumbent industries as "cleaner" or "greener" including: nuclear power (also disqualified on costs alone now that local solar PV and wind power are cheaper); coal and CCS (still unproven, costly and imposing a huge thermodynamic burden making coal-electricity generation some 40% less efficient); biofuels, particularly derived from food crops, those wasting productive land and water (since we believe that electrifying liquid-fueled transport using renewables is more efficient).

We expand our focus on R&D and deals below $100 million, and will be tracking the growing interest in recycling, as well as geothermal, both for base-load electricity and for shallow uses in heating. The January 2012 Geothermal Energy Finance Forum projected continued growth in the US and worldwide for this overlooked resource.



(from the KEMA study on energy storage)

Energy storage is key, particularly for solar and wind generation's intermittent features. In addition to current and mature technologies: pumped water storage, compressed air and lead-acid batteries, new systems: flywheels, super-capacitors, lithium-ion, sodium-sulfur, flow batteries are in early market adoption stages.

A key issue concerns potentials for job-creation. The issue of jobs has been politicized, as in the postponed USA-Canada XL Pipeline project, with wide discrepancies in estimates of job creation, fears of environmental damage and revelations that the oil would likely be exported from the USA. Meanwhile, most studies we reviewed on the green transition cite net new jobs in the millions. A US Department of Energy study found, in August 2010, 46,500 permanent workers in solar energy alone. The conceptual and political confusion over the jobs issue is rooted in special interests and obsolete economic theories ("Jobs: Let's Get Real"). A report in California from Next 10 found that green jobs losses in the US recession were 3% compared with 7% losses in the rest of the economy (GreenBiz.com). "Making It Happen," a report by the OECD, covers "green and decent" jobs, estimating that China will have 4.5 million jobs in wind and solar by 2020.

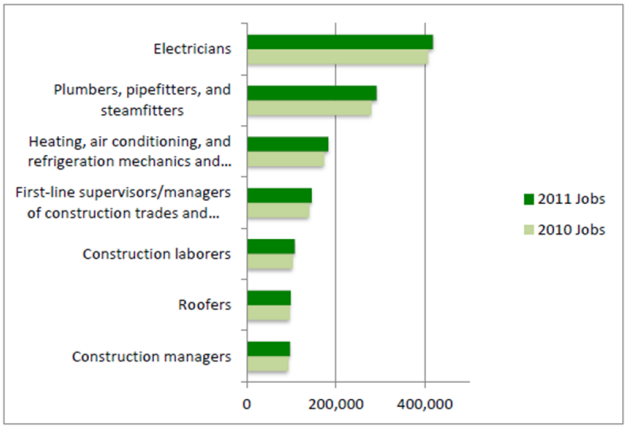


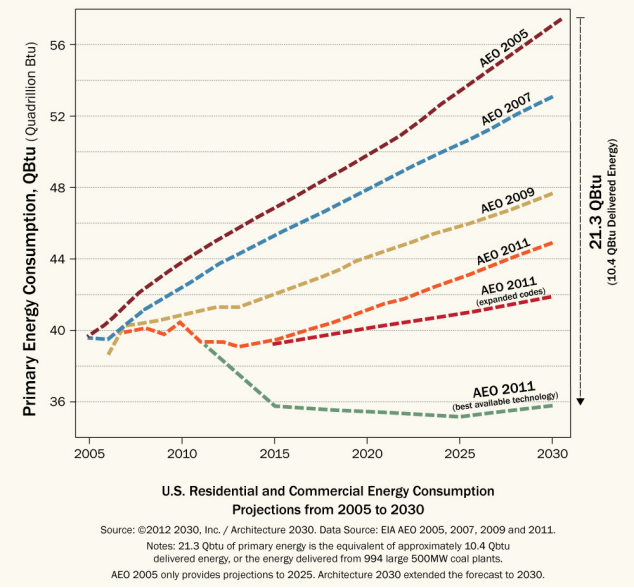
Figure 5. Twelve-month occupational growth in traditional industries related to solar installations

(from NREL's *Solar Installation Labor Market Analysis*)

We are now including research on the most efficient technologies of all: those employing the science of biomimicry (see, for example, our cover and computer optimization for solar power plants, *The Economist*). These new technologies mimic Nature's designs for producing materials, conserving energy – optimized over 3.8 billion years of experimentation! Biomimicry design is also helping re-design many industrial methods and products such as dying fabrics using CO_2 instead of water. Helping companies re-tool offers safe biomimicry alternatives in many areas, including those in nanotechnologies, not yet assessed for their possible social and environmental impacts. Ethical Markets Media, LLC, itself is deeply involved in the accelerating green transition and, for full disclosure, our principals are also personal investors in many green technologies. We are also partnering with the Biomimicry Guild in furthering its research on ways to embed this new science in products and services (offered as a 2-year Masters

degree in seven universities). With Biomimicry's scientists, Ethical Markets Media, LLC, will be developing Ethical Biomimicry Investing© protocols and criteria for investors in biomimicry companies, while promoting sustainable agriculture, forest and fisheries. Globally, companies are turning toward biomimicry methods in production. We are partners in the Green Economy Coalition and contributing to its presentations, particularly to the Rio+20 process and in reviewing OECD Towards Green Growth reports. A useful overview, "State of Green Business 2012" covers all the key sectors, the new start-ups, including the emerging "mesh" generation of young companies, some for profit, others non-profits.

Energy efficiency and reducing material throughput in all national economies target the lowest-entropy goals. For example, the potential of 120 million buildings in the USA could triple or quadruple their energy productivity with an average return of 33%. Projections by the US Department of Energy, based on best available technology, show reductions in primary energy consumption are possible by 2030. Demonstrable progress has been made in many countries as we reported in 2011 and the potentials for huge efficiency improvements still exist worldwide. ACEEE, ECEEE and the US Energy Information Administration's "Annual Energy Outlook: Early Release Overview 2012" see energy use per capita declines at an average rate of 0.5% per year from 2010 to 2030.



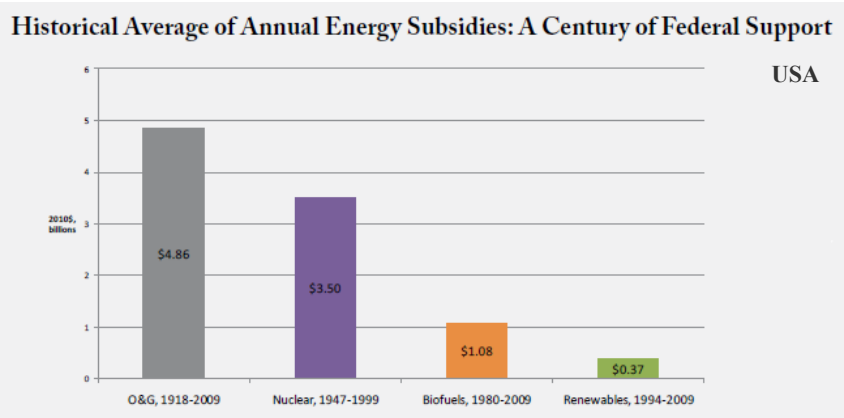
U.S. Residential and Commercial Energy Consumption
Projections from 2005 to 2030

Source: ©2012 2030, Inc. / Architecture 2030. Data Source: EIA AEO 2005, 2007, 2009 and 2011.

Notes: 21.3 Qbtu of primary energy is the equivalent of approximately 10.4 Qbtu delivered energy, or the energy delivered from 994 large 500MW coal plants.

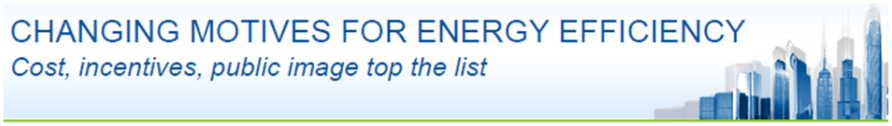
AEO 2005 only provides projections to 2025. Architecture 2030 extended the forecast to 2030.

Rearguard fossil industry opposition to the green transition is still potent, particularly in the USA, as shown below, and Canada's fossil fuel-focused government as well as the global problem of over $400 billion of annual subsidies both to producers and consumers.



Even the goals of more energy and resource efficient societies have come under attack! Status quo pleaders often employ the theories proposed by British economist Stanley Jevons in 1865 in his well-known "rebound effect" in 19th century England: that using coal more efficiently which saved money, often led to more use or spending on other energy-related goods or services. Jevons sensible observation in the 1800s cannot be extrapolated to vastly different, more complex national economies in the 21st century. The CO2 Scorecard provides a careful refutation of a recent energy "rebound" study with both analysis and ample documentation of the concrete evidence of the successful reduction of energy use (and CO_2 emissions) across the USA and Canada.

A positive note on the advance of energy and materials efficiency is the report "Long-term Efficiency Potential" which compares the 2050 USA energy-use forecast of 220 quads with an Advanced Scenario using only 70 quads and the super-efficient Phoenix Scenario using a mere 50 quads which requires deeper "re-design." These offer a net savings of $255 billion per year and net 1.3 million jobs in the Advanced Scenario and net 1.9 million jobs in the Phoenix Scenario.



How significant are the following in your organization's energy efficiency decisions?

2010 Global	2011 Global	Drivers of efficiency	Europe	India	China	US/CA
1	1	Energy cost savings	1	1	1	1
4	2	Gov't/utility incentives/rebates	2	3		2
3	3	Enhanced brand or public image				3
N/A	4	Increasing energy security	3	2	2	
2	4	Greenhouse gas reduction				
6	6	Existing policy			3	

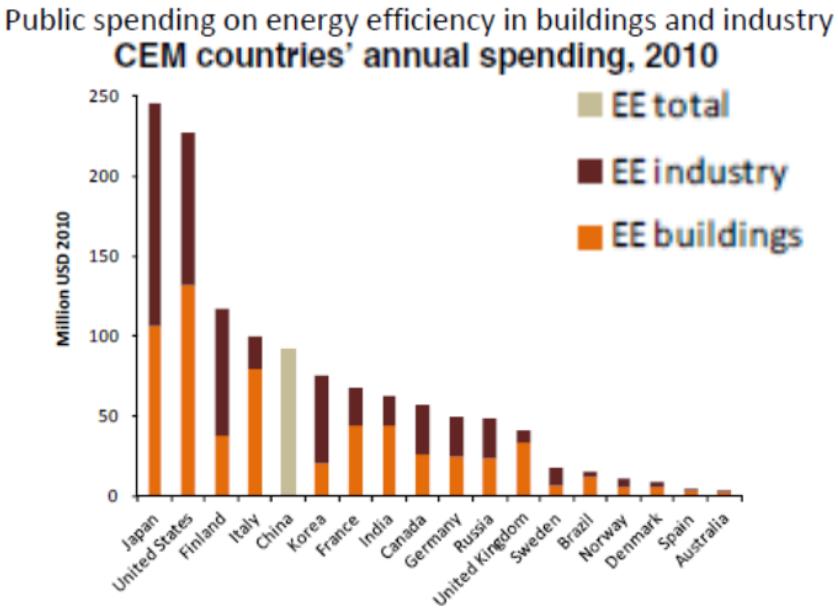
institute for building efficiency
an initiative of Johnson Controls

(from the Johnson Controls survey on Energy Efficiency implementation)

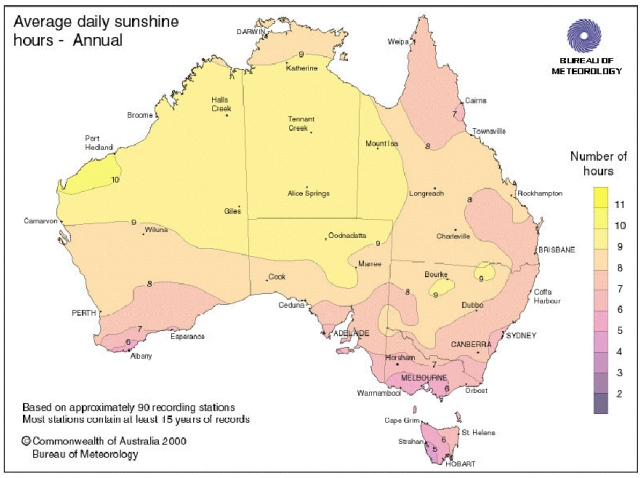
Energy-efficiency and information technologies are closely-related, not only in monitoring use and smart grids, as analyst Jeremy Rifkin describes. The competition between Intel and British upstart ARM (Advanced RISC Machines) seeks to increase the energy-efficiency of computer chips and the server racks housed in computer server farms. Their inefficiency has been likened to giant refrigerators full of racks of hot ovens! ARM chips are less powerful than Intel's but use 1/10 of the power of current server systems and cost 60% less. Gartner Research notes that "power consumption will become more and more critical." A useful tool is

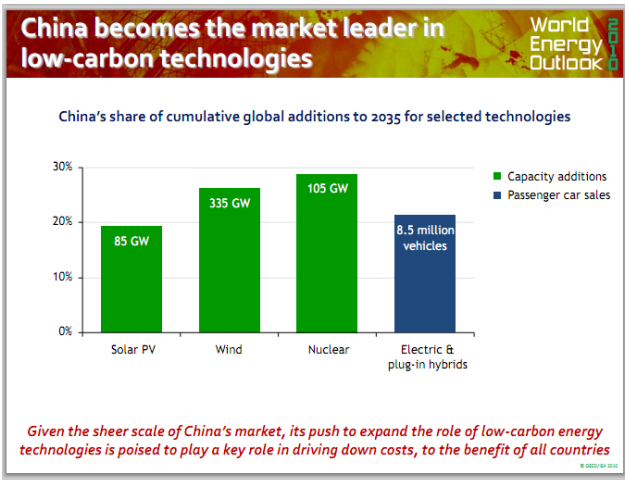
the Green Electronics Survey. Since many electronic products require rare earth elements, no longer produced in the USA, the Congressional Research Service's "Rare Earth Elements: The Global Supply Chain," released in September 2011, examines the current global dependence on China. Naturally, a key variable in energy and resource consumption is population growth – but as studies show, continuing the "dematerializing" and delinking of energy and material consumption from GDP and population growth is even more critical going forward. Progress in US electric efficiency in 2010 saved 112 TWh, enough to power over 9.7 million homes for one year while avoiding 78 million tons of CO_2 emissions.

News on subsidies for fossil fuels and nuclear power shows some progress in the debate as the G-20 and the OECD countries consider and implement cuts. The key issue remains cutting of producer subsidies rather than those to consumers. While more opposition has come from fossil industries protecting their production subsidies, the protests over cuts to consumer subsidies on oil led to huge demonstrations in Nigeria, which destabilized its government. We still support the phaseout of production subsidies for fossil fuels and nuclear power, which is proving more costly then ever after the Fukushima meltdown in Japan. It is clear that merely returning these huge subsidies to the world's taxpayers will help restore squeezed budgets and level the playing field for a more rapid transition. However, cutting subsidies to consumers, especially in developing countries, can cause real hardship unless offset by government policies to lower costs in other key services to promote more sustainable development. The problem is widespread distrust of governments as recent Nigerian protests evidenced, which forced the partial restoration of the fuel subsidies. Meanwhile, in OECD countries, energy efficiency in buildings and industry is led by Japan.



(from the IEA's Clean Energy Progress Report)





Clearly, in spite of recessions caused by the financial crises, the goal of a global green transition from fossilized sectors is underway. China is now the global market leader in low-carbon technologies in which they include nuclear. In spite of this, it provides a positive scenario for stabilizing the global climate beyond the disappointments of focusing only on carbon emission reduction. The UN and the IPCC now promote the green economy as well as focusing on other pollutants such as methane and soot which can slow global warming more cheaply and quickly while bringing positive health benefits. We will be watching coal-dependent countries, particularly India and Australia, both of which have abundant solar resources (prices for solar cells fell 51% in 2011, to 88¢), for signs of transition.

Thus, our Green Transition Scoreboard® 2012 update clearly shows how this global trend is accelerating in our new total of $3.3 trillion – all explained and documented in this report.

Sectors Covered

What's Included

The Green Transition Scoreboard® tracks five sectors: Renewable Energy; Green Construction and Efficiency; Cleantech; Smart Grid; and Corporate R&D.

These represent broad areas of investment in green technologies, many of them overlapping. Each covers an area of substantial capital investment in technologies which Hazel Henderson's years of research as a science advisor and which the Ethical Markets Advisory Board expertise indicate have contributed and are contributing to a sustainable future.

Companies, organizations and the sources of financial data included in the GTS are screened by the strictest rigorous social, environment and ethical auditing standards. They can be found in indexes such as Calvert, Domini and Pax World, as well as the PowerShares Cleantech Portfolio, Dow Jones Sustainability Indexes, London's FTSE4GOOD series, ASPI Eurozone, Brazil's Instituto Ethos de Empresas and Bovespa Indexes and others.

Data sources include the highly respected Cleantech, as well as traditional reporting sources such as Bloomberg, Yahoo Finance, Reuters, NASDAQ OMX Green Economy Global Benchmark Index, many new UN and other international studies and individual company reports.

This year, the research team began compiling data from projects below the $100 million threshold previously used, but still limiting most data to publically traded companies. We also looked to expand research on projects involving biological design, such as those pioneered by Janine Benyus and the Biomimicry Institute.

What's Omitted

The GTS focuses on private sector investments. Government funded projects and initiatives have been purposefully omitted. When government funding is part of a larger project, the research team has removed, in as far as is transparent, the portion of investments from government funds. Sustainable technologies suffer from the misperception that they cannot stand alone. Omitting government funding still exceeds $3.3 trillion in investments, proving that in spite of overcoming the $409 billion in annual subsidies to fossil fuels, green technologies are competing and are already cheaper than nuclear power, as well as coal and oil when their external costs are included. We encourage governments to become bolder in using proven green technologies in their procurement.

Several subsectors have been purposefully omitted either because of controversy or lack of consensus that they will make a long-term contribution to sustainability.

For example, nanotechnology as it appears in particular projects may be appropriate but would not be included or treated as automatically sustainable until further research confirmation. The research team was approached to include nanotechnology as a solution to stave off future crisis in agriculture and manufacturing. The team chose to address nanotech on a case by case basis after convening a working group with David Rejeski, Director of the Woodrow Wilson Center Science and Technology Innovation Program, and others researching the field.

Other technologies were easier to omit. Despite arguments made that nuclear energy is a sustainable option, we found evidence to the contrary once mining, enrichment, processing, transportation, waste disposal and decommissioning are counted. In the US in particular, the enormous taxpayer subsidies and the Price-Anderson government insurance provision also show how nuclear is neither environmentally sound or sustainable.

We also omitted coal carbon sequestration (CCS) due to its major government subsidies and huge costs, according to an MIT CCS study which projects costs would raise from the current 5 cents a Kwh to 8 cents (not including coal subsidies and externalities) from conventional energy sources.[1] Still unproven, CCS would reduce the efficiency of coal-fired plants by as much as 40%.[2] The rush to shale-fractured natural gas in the USA can reduce use

of coal since its burning emits 50% less CO_2, but these shale-gas deposits incur risks to water supplies.

Biofuels were omitted because research indicates that this is not a sustainable use of agriculture better suited for food production. Many corn-based ethanol plants have closed and the some $50 billion of US subsidies will be reduced and should be phased out. Exceptions are made for biofuels from algae or other organic matter which do not take from the essential lifecycle of returning nutrients to the soil. Even so, this is still a point of debate as ecological design shows that all phases of plant growth and decay are essential to ensure the most nutrient rich lifecycle of any given biota.

Financial Impact

As impressive as is $3.3 trillion invested in the green economy since 2007, there are many investments in the Green Economy which are not included in the GTS.

By no means are smaller ventures to be dismissed. Renewable capacity, whether solar, hydro, geothermal or other forms, is available around the world.

Many thousands of investments ranging from $100,000 dollars to several millions offer significant opportunities to move the green economy forward at the local and regional levels. The compilation of these "small" investments will transform Main Street to reach Wall Street's attention. Ethical Markets Media is reaching deeper into these figures with each update of the GTS. As mentioned previously, 2011 began research on projects below $100 million.

We urge such smaller companies to report to us since often smaller, decentralized, local enterprises are inherently more sustainable while providing more jobs than large companies.

Please note that international investments are reported in US dollars and are subject to fluctuating exchange rates.

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.

RENEWABLE ENERGY	
Year	(US $)
2007	$165,500,000,000
2008	$203,700,000,000
2009	$215,700,000,000
2010	$257,900,000,000
2011	$314,000,000,000
Commitments	$656,714,837,600
Total	**$ 1,813,514,837,600**

Renewable energy investments continued to soar in 2011, up 22% from 2010's level. Solar gained the most ground, although wind kept the largest market share. The vast majority of investments continued to come in the form of asset financing for new projects.

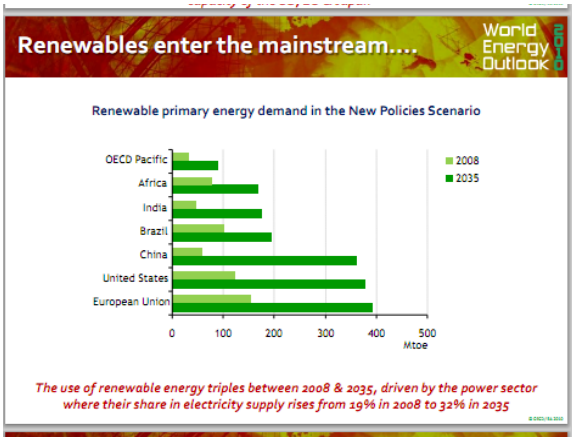
The majority of the current investment numbers are based on global trends reporting by Bloomberg New Energy Finance under contract with UNEP as well as other international studies.

Commitment numbers have been compiled project by project from daily monitoring by Hazel Henderson, online research and other sources, posted at www.ethicalmarkets.com on our Green Prosperity, Energy Efficiency and GreenTech pages. The $400 billion Desertec project is included in the commitments section even as it is now proceeding, and will be modified as projects come to fruition. With the backing of companies like Deutsche Bank, ABB and Siemens, we are confident that this Club of Rome initiative will reach its full commitment to provide 15% of energy needs to the European Union from the Sahara, if not more (see page 5).

Government R&D is omitted to remove public investments. As a rule, Corporate R&D is omitted here and reported in the Corporate R&D sector (page 22) to avoid double-counting.

Biofuels are omitted because biofuel production competes with food production and because studies, such as that from Cornell and Berkeley, show that biofuels have a negative EROI. However, amounts for 2010, 2011 and Commitments (see Appendix 2) are aggregates from industry and company press releases, limiting our ability to remove all Corporate R&D or biofuels.

Breakdown of commitments are available in the source report (Appendix 2).



Green Construction and Efficiency

Investments in **Green Construction and Efficiency** include new building construction and existing building retrofits. The sector is divided into current investments by year of funding.

GREEN CONSTRUCTION & EFFICIENCY	
Year	(US $)
Green Construction	
2007 (USA only)	$33,460,000,000
2008 (USA only)	$42,500,000,000
2009	$103,200,000,000
2010	$197,400,000,000
2011	$218,719,200,000
Energy Efficiency	
2007	$29,706,000,000
2008	$32,703,000,000
2009	$35,597,000,000
2010	$40,545,000,000
2011	$46,181,000,000
Total	$ 800,011,200,000

This sector is the most under-reported of any in this report. We are only counting green construction materials, not including labor. The value of global green buildings, for example, is significantly higher than what is reported here.

In previous reports, we aggregated the numbers for this sector. This year we have found that conservation efforts are wide ranging and reported using a myriad of terms. Also, the magnitude of investment in each subsector makes for useful comparison. As Amory Lovins of the Rocky Mountain Institute has long held, a foundation of sustainability is conservation. Investments in efficiency are more than $204 billion or 6% of total Green Transition investments.

While this sector has been the most challenging to quantify, it is expected to explode, with the green buildings material market projected to reach $406 billion a year by 2015. According to WWF and ECOFYS, by 2050, maximum energy efficiency will become central to all economic activity, saving nearly £4 trillion a year through reduced costs. The most innovative buildings now produce their own energy onsite, while advanced designs make buildings producing enough energy to feed into grids or local areas.

Amounts are calculated using the value of the green construction market, defined as construction built to LEED standards or that incorporate multiple green building elements. Since public-sector information is not recorded, the total includes some government buildings.

Figures for 2007 and 2008 are based on estimates from McGraw Hill that were published in the US Green Building Council 2009 Green Jobs Study.

Figures for 2009 are found in the “Diamonds in the Rough: Uncovering Opportunities in the $277 Billion Green Buildings Market” report by Lux Research. It compiles revenues from “any function, equipment, or material that improves the energy efficiency or reduces net material consumption of a building over and above that of the standard used at the time of original construction.” The broad categories are: Services, including green engineering and design companies; Equipment, including lighting, HVAC, and water heating systems; and Materials, including insulation, windows and some structural materials that double as thermal insulators.

Figures for 2010 and 2011 are based on research conducted by Green Market Research, conveyed to the GTS research team by personal correspondence. Given their accounting includes government spending, the research team chose to conservatively discount Green Market Research figures by 30% to account for government buildings.

We subtracted figures for government buildings, energy generation equipment and energy monitoring services and hardware (smart meters, etc.) to avoid public investments and double-counting with Smart Grid.

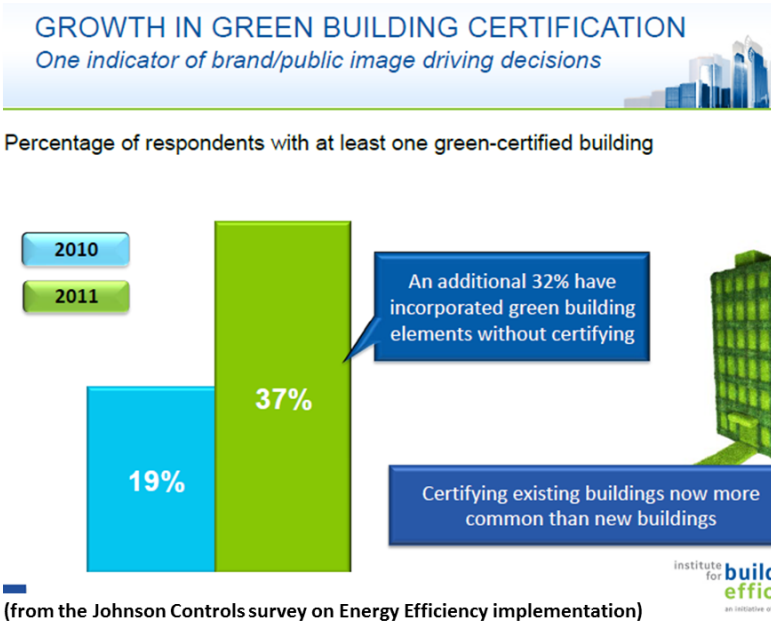
Green Construction and Efficiency figures are taken from revenues of larger equipment and material providers in OECD countries. Smaller projects and those in non-OECD countries are being compiled for future reports.

Similar data for other countries has been a challenge to compile (to provide country-specific sources on green construction and efficiency not included here, please contact our research team).

Companies now recognize efficiency investments' rapid payback periods from 12-24 months with revenues for pure-play energy efficiency companies

seen as expanding by 13% annually through 2020.

Note that international investments are reported in US dollars and are subject to fluctuating exchange rates.



Cleantech

Cleantech is a broad sector and includes companies in the following areas: agriculture; air and environment; energy efficiency, lighting, infrastructure and storage; materials; recycling and waste; transportation; and water/ wastewater.

CLEANTECH	
Type	(US $)
Venture Capital	$19,513,766,857
Initial Public Offerings	$20,559,485,119
Mergers & Acquisitions	$108,391,002,097
Total	**$148,464,254,073**

Cleantech figures are derived in cooperation with The Cleantech Group, LLC, based on their quarterly reporting. For this report, Cleantech Group removes those investment categories which we have chosen not to include in the GTS such as biofuels, clean coal and carbon offsets.

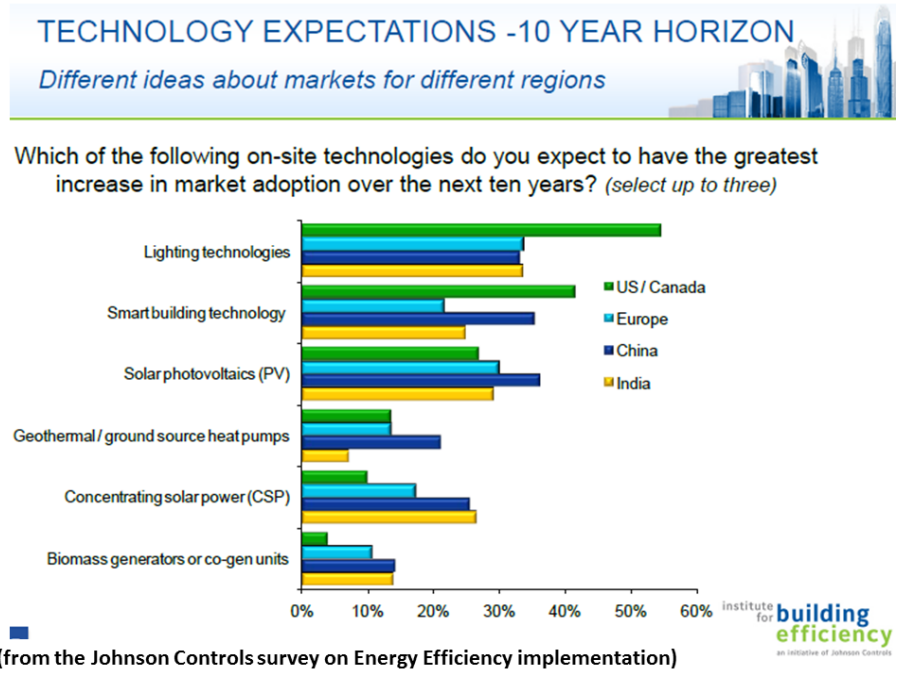
The recent burst of activity in the Mergers & Acquisitions space is largely due to companies that have been hoarding cash since the 2009 credit crunch. They are finally ready to deploy capital and are expanding into the green space. In addition to developing R&D in-house, firms like Google, DuPont, and Toshiba are acquiring small and medium-sized cleantech companies.

Breakdown of investments by value chain, sector and geography are available from the Cleantech Group (research.cleantech.com).

We omitted investments in clean coal, as they are a palliative fix for fossil fuel consumption and do not contribute to the green transition. Carbon sequestration of coal emissions could be costly enough to price coal out of many markets. In any case, carbon is best sequestered in soils and forests. Many soil-enrichment land-management methods are ancient and well proven, such as the biochar "terra prieta" used in Latin America and the sustainable management of grasslands.

Similar approaches use biomimicry principles (www.biomimicry.net) such as Allan Savory's Holistic Management restoring desertified scrubland in Africa, Australia and the Grasslands project in South Dakota, USA. The Rodale Institute, Emmaus, Pennsylvania, has shown that organically-grown food production can compete with industrial agriculture while preserving soils. The Land Institute in Salina, Kansas, restores perennial prairie grasses, following the research of ecologist Wes Jackson. Janine Benyus, in her *Biomimicry* (1997), has grown a network of expert consultants worldwide.

As Cleantech grows, energy storage will continue to increase in importance, both at the level of power plants and



(from the Johnson Controls survey on Energy Efficiency implementation)

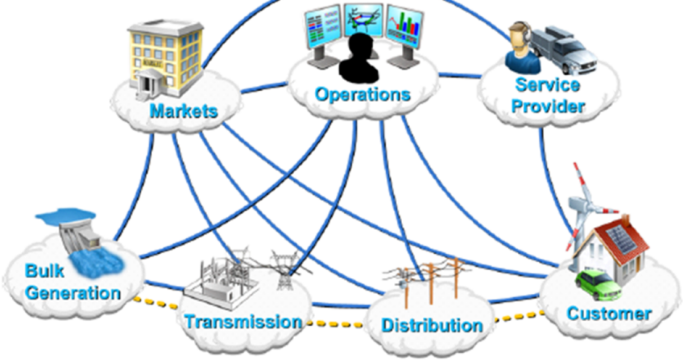
count revenues. Where these kinds of investments are included in the Renewable Energy category, they are omitted here.


iea
Solar Energy Perspectives
RENEWABLES ENERGY TECHNOLOGIES
In search of synergies…
Between various solar technologies
With other RE/EE technologies
Source: SunEarth Inc.
Integrated PV-thermal collectors
Source: Solimpeks Solar Energy
Solar thermal collectors
Solar PV panels
Driven by analyses of the demand for various uses
© OECD/IEA, 2011

Smart Grid

The **Smart Grid** sector includes investments in those companies actually putting smart grids in place, building the infrastructure rather than designing the technology. The sector is divided into current investments by year of funding and future commitments.

SMART GRID	
Year	(US $)
2007	$18,400,000,000
2008	$22,800,000,000
2009	$26,800,000,000
2010	$32,440,000,000
2011	$39,920,000,000
Commitments	$74,172,960,000
Total	**$214,532,960,000**



(from EPRI's assessment of Smart Grid costs and benefits)

...igures by 30% to account for government spending on infrastructure.

Numbers for 2011 are based on 2010 figures multiplied by the expected compound annual growth rate.

Commitment figures are gathered project by project from daily monitoring by Hazel Henderson and from online research of large national and international utilities in the private domain. This is a limited group of companies, including US utilities and private initiatives such as those from Russia's Federal Grid Company and South Korea's Smart Grid Institute.

Smart grids can either centralize energy systems or be designed to serve local cities and areas in decentralized "islanded" models, as described by Amory Lovins and Jeremy Rifkin in their recent work.

As we point out (page 6), smart grids are leading the monitoring revolution which is marrying information technologies ever closer to renewable energy and allowing for decentralizing homegrown economies.

Current investment numbers for 2007 through

Local US experiments such as those in Boulder, Colorado, offer a bird's eye view of how smart grid components link utilities with local consumers' demand monitoring.

Part of the current investment figures are likely government purchases, but there is not enough information to omit them. Government promises have not been included in commitments.

Companies supplying components or R&D are listed in other sections of the GTS.

Corporate R&D

The Green Transition Scoreboard® is the only place to find aggregate corporate green research and development (R&D) investments. We know of no other organization specifically tracking **Corporate R&D** in green transition technologies.

CORPORATE R&D	
Year	(US $)
2007-2011	$249,388,961,144
Commitments	$80,139,226,863
Total	**$329,528,188,007**

Corporate R&D includes investments in innovative technologies that reduce the use of natural resources and minimize environmental impacts, with green investments self-defined by each company. The sector is divided into an aggregate of current investments covering 2007-2011 and future commitments.

Corporate R&D figures for investments in green R&D are based on Ethical Markets Media and our Advisory Board research. Data has been gathered project by project from daily monitoring by Hazel Henderson (posted on www.ethicalmarkets.com), outreach to known companies in the field, online research and other resources. We invite submissions of information from all sources for possible inclusion.

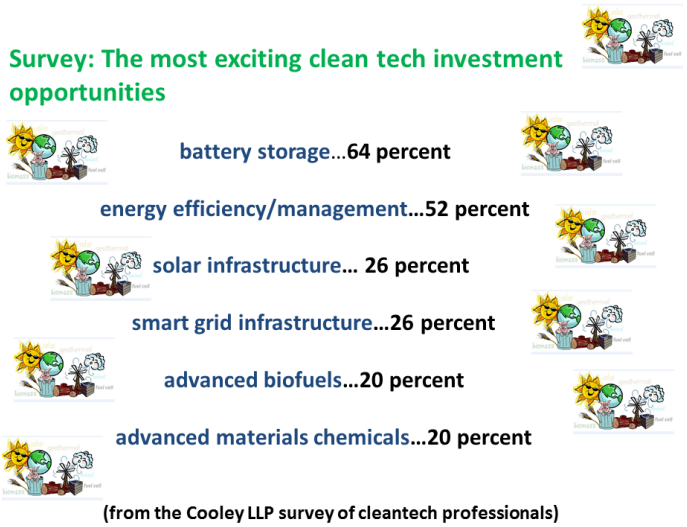
By analyzing balance sheets and self-reported expenditures, complete R&D budgets were used for pure-play companies within the cleantech sector, while only amounts targeted to green areas were counted for more diversified companies. A portion of R&D by renewable energy companies is from Global Trends 2010 cited in the Renewable Energy section of this report, but is being counted in this section for consistency.

The green transition affects every sector, but some have recognized it sooner than others, such as the auto and electronics industries which have recognized consumer demand moving in this direction and are now making significant investments (see Appendix 2).

Expect different sectors to shine from year to year. For example, we reference on page 7 new storage technologies and their impacts on Smart Grid investments. 3-D printing will revolutionize efficiency in manufacturing as profoundly as nanotechnologies. These fabricating methods, based on information transmission, are operating in many countries, for example Stratasys and Shapeways in the USA, EOS in Germany, Kor Ecologic in Canada. We are carefully evaluating the impacts of this technology.

This section saw the largest growth from the 2011 report. This explosive rise is attributable to an expanded scope from our researchers. For the first time, we found and included investments under $100 million. Additionally, we branched out into emerging economies by bringing on board continent-focused researchers. Our experts now include: Matt Milam (North America); Siew Ching Yeo (Asia); André Winter (Latin America); and Kristen McKillican (Europe).

A large amount of the new investments reported came from Asia. South Korean firms such as LG and Samsung are investing billions in green R&D, while excellent Japanese environmental accounting standards allow us to include much smaller investments from a large number of companies.



leaving many smaller companies out of the accounting. For example, Nike uses DyeCoo Textile Systems in Holland for dyeing its

fabrics without water – using CO_2 instead, with other firms following suit. More private and publically traded companies will be included as we increase the depth of the research for subsequent reports (any company investing in green R&D not included here, please contact our research team).

Companies making long-term investments in R&D have these figures tallied as commitments. In this report, about $19 billion worth of "Commitments" from 2010 shifted to actual investments in 2011.

Assuming that companies will stay true to this pattern, making commitments and then following through into application, we are listing everything in present-day dollars.

Note that international investments are reported in US dollars and are subject to fluctuating exchange rates.

Breakdown of investments and commitments by company are available in the source report (Appendix 2).

Conclusion

The Green Transition Scoreboard® was created as a public service to help grow the green economy and reform market metrics and improve due diligence worldwide.

One of the many reasons we created this information base on private sector investments in green sectors is because many developing countries where these technologies and their "leapfrog" strategies are of paramount importance lack the resources to compile this data. Green technologies often draw on available local resources in a more cost effective, time effective manner than fossil-fueled era, dated technologies.

To provide this information as widely as possible, we are making the GTS available to those UN agencies spearheading the UN's Green Economy Initiative and to advising organizations of Rio+20 of which we are a part, as members of the Green Economy Coalition. We welcome enquiries from public agencies and those wishing to present our results at conferences, webinars and other venues.

Ethical Markets Research team members Hazel Henderson, Timothy Nash and Rosalinda Sanquiche are available to answer any questions and for interviews on the findings of this report and the continuing process of tracking investments in the green economy.

The Green Transition Scoreboard® is an ongoing program of research with new reports published every six months. We intend to deepen this research, expanding current categories and adding new ones as the green sectors grow and develop in many countries.

The report is a collaborative effort from colleagues in all sectors of the global green economy, drawing on Ethical Markets Media's daily collating and evaluating of green economy news from worldwide sources such as

Australia: Climate Risk Pty
Brazil: Mercado Etico, Instituto Ethos
Canada: Cleantech
China: CSR China, Syntao
European Union: Green Economy Coalition, Network for Sustainable Financial Markets, REN 21
Hong Kong: ASRIA
UK: Forum on the Future, Institute for Chartered Accountants in England and Wales, Green Economic Institute, New Economics Foundation, Responsible Investor, Tomorrow's Company
USA: ACORE, American Council for an Energy-Efficient Economy, American Sustainable Business Council, Calvert, CERES, CSRWire, GreenBusiness, Greentech Media, New Economics Institute, New Energy News, New World Energy News, World Business Academy

and many other groups reporting on the green transition around the world.

Appendices

Appendix 1 – Investment Totals

INVESTMENTS IN GREEN TRANSITION 2007 - 2011	
Year or Type	**(US $)**
RENEWABLE ENERGY	
2007	$165,500,000,000
2008	$203,700,000,000
2009	$215,700,000,000
2010	$257,900,000,000
2011	$314,000,000,000
Commitments	$656,714,837,600
Total	**$ 1,813,514,837,600**
GREEN CONSTRUCTION & EFFICIENCY	
Green Construction	
2007 (USA only)	$33,460,000,000
2008 (USA only)	$42,500,000,000
2009	$103,200,000,000
2010	$197,400,000,000
2011	$218,719,200,000
Energy Efficiency	
2007	$29,706,000,000
2008	$32,703,000,000
2009	$35,597,000,000
2010	$40,545,000,000
2011	$46,181,000,000
Total	**$ 800,011,200,000**
CLEANTECH	
Venture Capital	$19,513,766,857
Initial Public Offerings	$20,559,485,119
Mergers & Acquisitions	$108,391,002,097
Total	**$148,464,254,073**

INVESTMENTS IN GREEN TRANSITION 2007 – 2011 (continued)	
Year or Type	(US $)
SMART GRID	
2007	$18,400,000,000
2008	$22,800,000,000
2009	$26,800,000,000
2010	$32,440,000,000
2011	$39,920,000,000
Commitments	$74,172,960,000
Total	**$214,532,960,000**
CORPORATE R&D	
2007-2011	$249,388,961,144
Commitments	$80,139,226,863
Total	**$329,528,188,007**
GRAND TOTAL	**$3,306,051,439,680**

Appendix 2 – Source Report

- All amounts are in USD.
- Company names link to information source.
- Companies in each table are listed highest to lowest by investment amount.
- While some companies listed are not considered green, we include their green investments.

Renewable Energy Commitments	Amount (US$)
Desertec	$ 523,160,000,000.00
Lesotho	$ 15,000,000,000.00
EDF Energies	$ 13,079,000,000.00
GoldPoly, SunOasis, CTDC	$ 10,000,000,000.00
E.ON AB	$ 9,155,300,000.00
Bank of America	$ 8,400,000,000.00
Samsung	$ 8,200,000,000.00
Alcoa Inc	$ 7,610,000,000.00
AGL Energy	$ 7,489,300,000.00
IKEA	$ 5,231,600,000.00
NextEra	$ 4,700,000,000.00
Blythe Solar Power Project	$ 4,000,000,000.00
Iberdrola	$ 4,000,000,000.00
Bioenergy	$ 3,477,000,000.00
E.ON AB	$ 3,400,540,000.00
Blackstone Group	$ 3,269,750,000.00
Samsung	$ 3,000,000,000.00
Areva	$ 2,699,900,000.00
Cape Wind	$ 2,600,000,000.00
Mexico Power Group	$ 2,500,000,000.00
Windlab	$ 1,604,850,000.00
London Array	$ 1,569,800,000.00
Iberdrola	$ 1,500,000,000.00
National Solar Power	$ 1,500,000,000.00
Suzlon	$ 1,390,870,000.00
EDP Renewables	$ 1,333,333,000.00
Volkswagon	$ 1,307,900,000.00
BNDES	$ 1,043,100,000.00
Filasa	$ 1,020,162,000.00
Soros	$ 1,000,000,000.00
Solar Strong	$ 1,000,000,000.00
CLP Holdings	$ 645,000,000.00

Renewable Energy Commitments (continued)	Amount (US$)
Itochu Corp/Abengoa Solar	$ 326,975,000.00
Vattenfall	$ 208,460,000.00
Guodian	$ 190,497,600.00
SunEdison	$ 101,500,000.00
TOTAL	**$ 656,714,837,600.00**

Smart Grid Commitments	Amount (US$)
Korea Smart Grid Institute	$ 22,047,200,000.00
Southern California Edison	$ 21,500,000,000.00
Atlantic Wind Connection	$ 5,000,000,000.00
Red Electrica Corp S.A	$ 4,185,280,000.00
Iberdrola	$ 4,081,480,000.00
Rubenius	$ 4,000,000,000.00
Duke-American Transmission	$ 3,500,000,000.00
NextEra	$ 3,290,000,000.00
SDG&E	$ 2,160,000,000.00
PG&E	$1,300,000,000.00
Southern Company	$1,000,000,000.00
Duke Energy	$1,000,000,000.00
ABB	$1,000,000,000.00
PG&E	$109,000,000.00
TOTAL	**$74,172,960,000.00**

Corporate R & D		
Company Name	**R&D 2007-2011 (US$)**	**R&D Commitments (US$)**
Renewable Energy	$76,150,000,000.00	
Toyota	$35,947,048,140.80	
Volkswagon	$29,711,564,300.00	
Samsung		$20,713,700,000.00
EADS	$11,912,353,200.00	
Hitachi	$11,331,968,000.00	$8,576,000,000.00
Robert Bosch	$9,734,045,750.00	
General Electric	$6,800,000,000.00	$8,200,000,000.00
Renault / Nissan	$5,231,600,000.00	
Siemens	$5,045,224,250.00	
EDP Energias de Portugal S.A.S	$4,524,026,100.00	
Pacific Gas & Electric	$4,343,300,000.00	
Denso Corp	$4,151,040,000.00	
Volvo	$3,895,670,700.00	
Mitsubishi Corp	$3,840,000,000.00	$3,840,000,000.00
Siemens AG	$3,770,021,750.00	
IBM	$3,000,000,000.00	$2,040,000,000.00
Audi	$2,485,010,000.00	$9,940,040,000.00
Corning, Inc.	$2,477,000,000.00	
Schneider Electric	$2,069,097,800.00	
EDP Brasil	$2,018,927,776.47	$3,483,913,333.00
Hyundai / Kia	$1,600,200,000.00	$800,100,000.00
Philips	$1,569,480,000.00	$1,046,320,000.00
Daikin Industries	$1,510,835,200.00	
LG	$1,333,500,000.00	$7,556,500,000.00
Bayer	$1,307,900,000.00	
NEC		$1,280,000,000.00
Sharp		$1,000,000,000.00
Posco		$1,000,000,000.00
Vail Resorts Inc.	$1,000,000,000.00	
Dow Chemical	$879,000,000.00	
Kimberly Clark	$833,000,000.00	
Arcelormittal	$746,810,900.00	
Umicore	$746,418,530.00	
Marubeni	$657,127,283.20	$640,000,000.00
Mazda	$576,000,000.00	$1,728,000,000.00
Woodward Governor Co.	$570,187,000.00	
Itron Inc.	$530,436,000.00	
Panasonic	$491,136,000.00	
CPFL	$477,484,820.00	$823,960,000.00
Akzo Nobel	$436,838,600.00	
BHP Billiton	$363,766,000.00	$133,737,500.00
Cree, Inc.	$350,843,000.00	
Pall Corp.	$306,169,000.00	
Lafarge S.A	$304,086,750.00	
Grupo André Maggi	$256,871,691.40	$443,264,351.00
CEMEX	$232,000,000.00	
Acciona S.A	$209,264,000.00	$418,528,000.00

Corporate R & D (continued)		
Company Name	**R&D 2007-2011 (US$)**	**R&D Commitments (US$)**
Kao Corp	$204,800,000.00	$204,800,000.00
Advanced Energy Industries, Inc.	$203,279,000.00	
Exxon	$200,000,000.00	$400,000,000.00
AmorePacific Corp	$196,763,259.00	
MEMC Electronic Materials	$189,400,000.00	
Suez Environnement	$180,490,200.00	
Bolloré Group	$177,874,400.00	
Donaldson, Inc.	$167,439,000.00	
Holcim Ltd.	$135,350,000.00	
Power Integrations Inc.	$134,608,000.00	
Hexcel Corp.	$134,300,000.00	
Acciona S.A	$130,790,000.00	$392,370,000.00
Gamesa		$130,790,000.00
Iberdrola	$126,212,350.00	
Industrias Peñoles	$125,000,000.00	
Toshiba	$122,214,400.00	
Stora Enso Oyj	$98,092,500.00	
Neste Oil OYJ	$81,612,960.00	
Outokumpu Oyj	$79,781,900.00	
Empresa Nacional de Eletricidad	$77,760,000.00	
Fujitsu	$77,056,000.00	
Sekisui Chemical	$75,175,436.80	
Ibiden	$62,553,600.00	
Fuel Systems Solutions	$60,406,000.00	
Teijin Ltd	$56,012,800.00	
Alfa	$53,000,000.00	
Hyundai Heavy Industries	$46,983,650.00	$46,983,650.00
Sumitomo Corporation	$44,901,721.60	
Energy Conversion Devices	$43,627,000.00	
Proctor and Gamble	$42,500,000.00	
Seiko Epson Corp	$38,784,000.00	
Unison		$36,000,000.00
Komatsu Corp	$33,113,600.00	
Red Electrica Corp S.A	$30,657,176.00	$5,231,600,000.00
EnerNOC, Inc.	$29,622,000.00	
3M	$27,000,000.00	
Colgate-Palmolive	$24,000,000.00	
Kadant Inc.	$23,458,000.00	
Molibidenos y metales SA	$20,000,000.00	
Votorantim	$14,313,650.00	$24,700,000.00
Ajinomoto	$13,030,400.00	
Energy Recovery, Inc.	$12,416,000.00	
Entergy Corporation	$10,700,000.00	
Hormel Foods	$10,000,000.00	
Brother	$8,921,600.00	
Actividades de Construccion y Servicios S.A	$8,893,720.00	
Canon	$6,784,000.00	

ConocoPhillips	$5,000,000.00	
Corporate R & D (continued)		
Company Name	**R&D 2007-2011 (US$)**	**R&D Commitments (US$)**
E.CL	$4,200,000.00	
TDK Corporation	$4,066,022.40	
Toray Industries	$3,315,200.00	
COELCE	$1,485,838.00	$2,564,000.00
Usiminas	$1,298,080.00	$2,240,000.00
CELESC	$1,083,652.83	$1,869,979.00
Light	$722,085.98	$1,246,050.00
NEC Corp	$486,400.00	
Grupo Mexico	$373,000.00	
TOTAL	**$249,388,961,144.48**	**$80,139,226,863.00**

Appendix 3 – Selected Research, Studies, Forecasts of Green Transition Potentials to 2050

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Appendix 4 – Positions held by Ethical Markets Media principals

As of January 31, 2012

Converge

CREE

Enernoc

Entech Solar

EnvisionSolar

FirstSolar

Innergex Renewable Energy

NASDAQ OMX CleanEdge Smart Grid Infrastructure Index

Nevada Geothermal

Ormat

PowerShares Cleantech Portfolio

Seimens

Solaria

Suntech

Tesla Motors

Waterfurnace Renewable Energy

Western Wind

ZBB Energy

Zipcar Inc.

Appendix 5 – Research Team

HAZEL HENDERSON, D.Sc.Hon., FRSA, created the Green Transition Scoreboard®. She is founder of Ethical Markets Media, LLC, is author of award-winning *Ethical Markets: Growing the Green Economy* and eight other books. Her editorials are syndicated by InterPress Service, with articles in Harvard Business Review, New York Times and many international journals. She leads the Transforming Finance initiative and developed with Calvert Group the widely used alternative to GNP, the Calvert-Henderson Quality of Life Indicators. Henderson lectures worldwide, holds many honorary degrees and serves as editorial advisor/board member of Futures, Elsevier UK; State of the World and State of the Future reports; Instituto Ethos de Empresas e Responsbilidade Social (Brazil) and World Affairs (India). She is an honorary advisor to the International Technology and Economy Institute, Beijing, China, and served as Advisor to the U.S. Congress Office of Technology Assessment, the National Science Foundation and the National Academy of Engineering, tracking disruptive technologies since the 1970s. Henderson provided overall guidance for this report with real-time analysis and synthesis of studies on the green transition.

ROSALINDA SANQUICHE, MA, Environmental and Resource Policy, George Washington University, is the executive director of Ethical Markets Media, LLC, co-author and editor of this report. She began her environmental career working for the American Wind Energy Association in Washington, DC, in research and communications. She has written on the construction industry for Builder/Architect and on the environment for various outlets. She has taught environmental policy and team-taught field classes combining ecology and policy in Florida and Belize. Sanquiche is an advisor to Collins Capital Management where she was instrumental in developing the first SRI portfolio specific to northeast Florida. She is treasurer of the Northeast Florida Green Chamber and continues as a speaker on environmental issues.

TIMOTHY JACK NASH, MSc, Strategic Leadership Towards Sustainability, Blekinge Institute of Technology, Sweden, is a senior advisor for Ethical Markets Media, LLC, and, as director of sustainability research, lead researcher for this report. He is the principal of SSI – Strategic Sustainable Investments in Toronto, Canada.

Nash's research team includes Matt Milam (North America); Siew Ching Yeo (Asia); André Winter (Latin America); and Kristen McKillican (Europe).

LESLIE DANZIGER, consultant member of Ethical Markets Media, LLC, Advisory Board, is a pioneer entrepreneur who is Co-Founder and former Chairman of Solaria Corporation, a developer and manufacturer of advanced solar modules and systems solutions (www.solaria.com) and Co-Founder and former Chairman and CEO of LightPath Technologies (www.lightpath.com), an optical technologies developer and manufacturer which she took public. She has been featured in *Business Week* and the *Wall Street Journal*. She holds two patents and was named the New Mexico Inventor of the Year. She currently also serves on the advisory boards of Equal Access (www.equalaccess.org) and WorldBlu (www.worldblu.com). She is a member of the Solar Circle and the American Solar Energy Society.

For full disclosure: members of the GTS 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.

Praise for the Green Transition Scoreboard®

"This important initiative tracks a quiet revolution: the Green transition to technologies that tend to be small-scale, community-oriented, non-polluting, energy-efficient, and labor-intensive, creating plenty of jobs. What more could we want?"
Fritjof Capra, physicist, author of *The Hidden Connections*

"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." — **Ashok Khosla, Chairman, Development Alternatives and pioneer social entrepreneur.**

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

"Wonderful initiative. Finally an overview of the amount of private money invested and committed to Impact Investing." – **Robert Rubinstein, CEO, TBLI GROUP™**

"I believe that once social investments have passed the 50% mark of the global economy and we look back on how that happened, we'll agree that the Scoreboard was absolutely key!" – **Susan Davis, President, CapitalMissions.com**

"The GTS adopts a much more comprehensive and therefore effective working definition of a green economy than is usually the case, and provides a robust and consistent framework for measuring our progress towards it." — **Matthew Kiernan, founder, Innovest; CEO, Inflection Point Capital Management; author, *Investing in a Sustainable World***

"As the world dramatically changes the way it produces and consumes energy, we are witnessing the first predictable industrial revolution, a historic progression detailed in the GTS." — **Paul Dickinson, Executive Chairman, Carbon Disclosure Project**

"We usually do manage what we measure; so the GTS is an important contribution from Ethical Markets Media in getting to the future our polling suggests people intend for their children." **— Doug Miller, Chairman, GlobeScan Inc.; President, GlobeScan Foundation**

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