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The Green Economy: The Race is On

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Introduction

Active support from businesses and investors for government to tackle climate change and incentivize clean technology continues to grow rapidly, both globally and in the US. Asset owners representing more than \$10 trillion have publicly signaled their support. At the same time, governments around the world are stepping up the pace of legislation and regulation to encourage the development of a low carbon economy, ensure energy security and help create new jobs. The key to success is to attract large-scale private investment into climate change industries. The essential characteristics of the most successful policy regimes in countries such as Germany and China are Transparency, Longevity and Certainty. In short, investors need a little TLC at the "right price" (See **DBCCA's "Paying for Renewable Energy: TLC at the Right Price – Achieving Scale through Efficient Policy Design," December 2009**). The US has so far failed to implement TLC on a national scale (although some states are taking action). As a result, the US is falling behind in the race to develop new technologies, industries and jobs as the global economy moves towards a low carbon future, although there are still ongoing efforts in the US Congress.

In this research note, we focus on three topics:

- (1) There is growing business support for tackling climate change and deploying clean technologies, products and services;
- (2) Government policy regimes around the world have identified climate change and clean technology as a megatrend as well, and have begun accelerating policies to address this trend (See **DBCCA's "Global Climate Change Policy Tracker: An Investor's Assessment," October 2009**);
- (3) However, this policy action differs at the individual country level, showing that the US is falling behind. This can be seen through renewable energy capacity growth and capital investment relative to the economy.



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Business support for climate change action is growing

Climate change and clean technology investment is a secular trend driven by the underlying science and government policy as well as energy security and green job creation. Investor interest in climate change has been shaped by major events, reports and educational milestones. General market trends also influence investor sentiment towards climate change sectors.

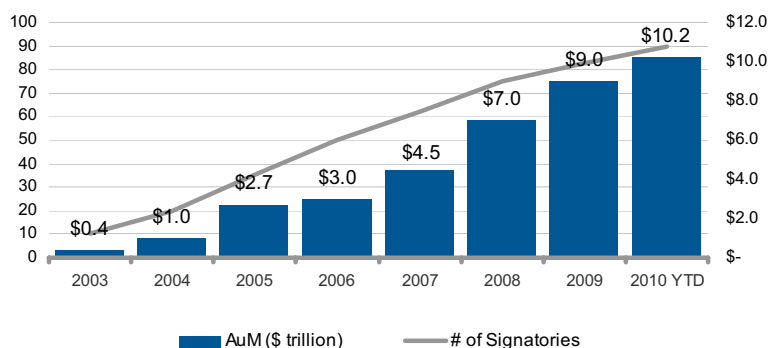
We recognize public interest in the trend will fluctuate around other priorities such as jobs and the economy. Nonetheless, we believe investors will continue to be attracted to climate change opportunities because of the long term structural changes and opportunities. We see three main pressure groups ensuring that climate change remains on the public and corporate agenda.

- (1) International organizations are likely to continue demanding climate change initiatives.
- (2) Government action – likely to be driven in part by public demand for policies, the possibility to create jobs and growth and ensure energy security.
- (3) We believe the science and the impact on the planet will continue to prove the case.

A significant number of mainstream investors have "turned a corner" on how they put responsibility into practice, with the number of investors embracing action on climate change significantly increasing. The key findings below show signs of a growing culture of active ownership and collaboration among investors.

Ceres Investor Network on Climate Risk (INCR) - Growth of AuM of signatories since launch

- INCR now has **90 members** with approximately **\$10 trillion** in assets.
- Of this, 80 members with approximately \$9 trillion in assets are US-based.
- The number of members today represents almost a **9-fold increase** since its inception in 2003.



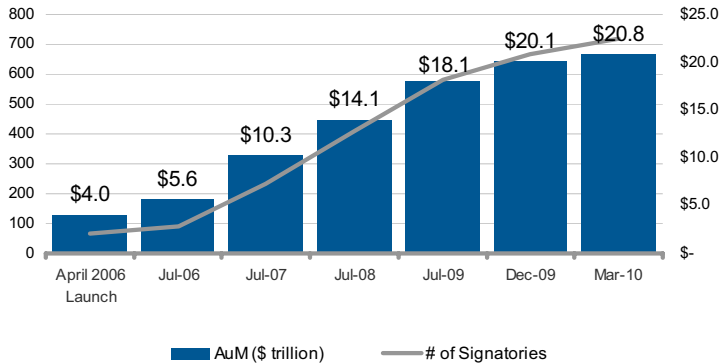
Source: Ceres INCR, 2010.

	AuM (\$ trillion)	# of Signatories
2003	\$ 0.4	10
2004	\$ 1.0	20
2005	\$ 2.7	35
2006	\$ 3.0	50
2007	\$ 4.5	62
2008	\$ 7.0	75
2009	\$ 9.0	83
2010 YTD	\$ 10.2	90
US Members	\$ 9.0	80
Non-US Members	\$ 1.2	10

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UN Principles for Responsible Investment (PRI) - Growth of AuM of signatories since launch

- Part of the UNPRI's is to identify environmental and indeed climate related issues that affect investments.
- UN PRI now has **718 members** with approximately **\$21 trillion** in assets.
- The number of members today represents an approximate **11-fold increase** since its inception in 2006.



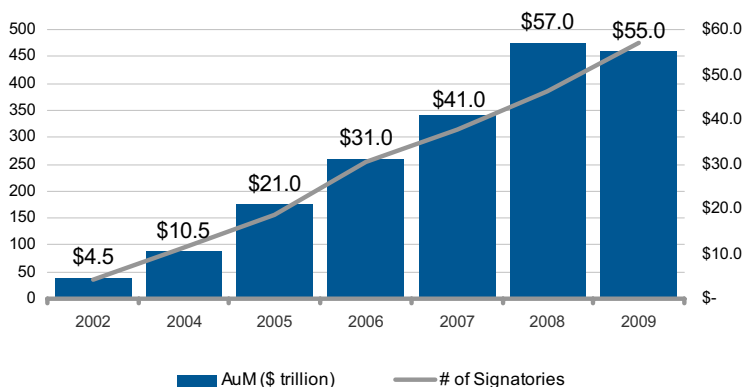
	AuM (\$ trillion)	# of Signatories
April 2006 Launch	\$ 4.0	65
Jul-06	\$ 5.6	89
Jul-07	\$ 10.3	234
Jul-08	\$ 14.1	410
Jul-09	\$ 18.1	579
Dec-09	\$ 20.1	668
Mar-10	\$ 20.8	718

Source: UN PRI, 2010.

Business support for climate disclosure is growing

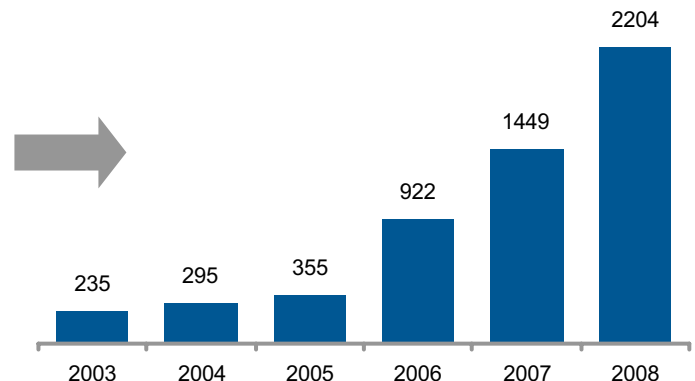
- INCR states that **56 organizations** with **\$2.1 trillion** of assets have signed the most recent letter (March 2010) to the **SEC** regarding climate risk disclosure. The letter re-affirms their support for the SEC's recent issuance of interpretive guidance. In summary, the SEC approved an Interpretive Guidance on Climate Risk Disclosure to public companies in the US on January 27, 2010. The Interpretive Guidance asks companies to evaluate the following for their shareholders:
 - (1) Impact of existing and pending legislation in the US, and how it might affect one's business
 - (2) Impact of international accords and treaties that govern greenhouse gases
 - (3) Actual and potential indirect consequences of climate change - anything that could impact business operations, variability in demand for certain types of products that are either carbon intensive or not, increased competition, etc.
 - (4) Physical impact of climate change, such as availability of natural resources
- The **Carbon Disclosure Project (CDP)**, which gathers data on behalf of over **475 institutional investors** (signatories) with **\$55 trillion** of AuM, has encouraged over **2,000 companies** in some 30 countries around the world to measure and disclose their greenhouse gas emissions and climate change strategies through CDP. See figures below.

CDP signatory investors over time



Source: CDP, 2010.

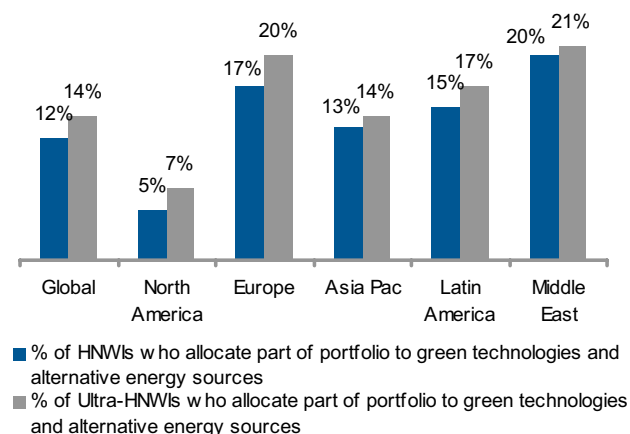
Number of responding companies



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American HNWIs' are underrepresented in global green investing, though wealthy investors have allocated heavily to green investments globally.

HNWIs' & Ultra-HNWIs' interest in green investing, 2007



Source: Capgemini/Merrill Lynch Financial Advisory Survey, April 2008

A survey of high-net-worth (HNW) and ultra-high-net-worth (UHNW) investors showed that a large number have already begun allocating to clean energy investments. Investor interest varies in scale across geographies.

- Both HNW and UHNW investors allocate strongly to green investments – represented here by clean energy sectors.
- The relative level of investor interest varies both by geography and by investor net worth, with UHNWIs more heavily allocated to the sector across all geographies.
- Geographic variation shows that European and Middle-Eastern investors are most heavily allocated to the sector, with both classes of North American investors less heavily allocated than any other category.
- In all geographies these allocations indicate that HNWI and UHNWIs are heavily overweighting clean energy.

Copenhagen was No Failure – Policy gathers momentum worldwide

Public interest in climate change has also been driven by the growing focus by governments to create policies around this mega-trend. On the international level, the climate change summit in Copenhagen in December produced no binding agreement but it is clear now that it was also no failure. Copenhagen served to raise awareness of the problem all over world, and that in turn forced governments to focus on the issue. The net effect has been to catalyze a rush of new policy announcements that has dramatically improved the outlook on limiting greenhouse gas emissions. As per our "Global Climate Change Policy Tracker: The Green Economy – The Race is On" whitepaper published in March 2010, the Copenhagen Accord shifted the focus to countries reporting individual action and initiatives. The spate of new initiatives also confirms what we have asserted: that the fight against climate change is not just a matter of international agreements but a collective of country and regional initiatives.

- There were a **record number of climate policies** announced in **January 2010**, primarily due to the response to the Copenhagen Accord.
- From October 2009 (lead-up to Copenhagen) through January 2010, there were **154 new climate policy announcements**.
- **121 countries** submitted acknowledgement letters to the UNFCCC in response to the Copenhagen Accord.

Communication with the Accord	Number of Countries
Countries formally submitting letters to the Copenhagen Accord	121
Countries submitting targets to the Copenhagen Accord	55
Countries submitting action pledges to the Copenhagen Accord	19
Countries expressing support for the Copenhagen Accord	47

Source: DBCCA analysis, 2010

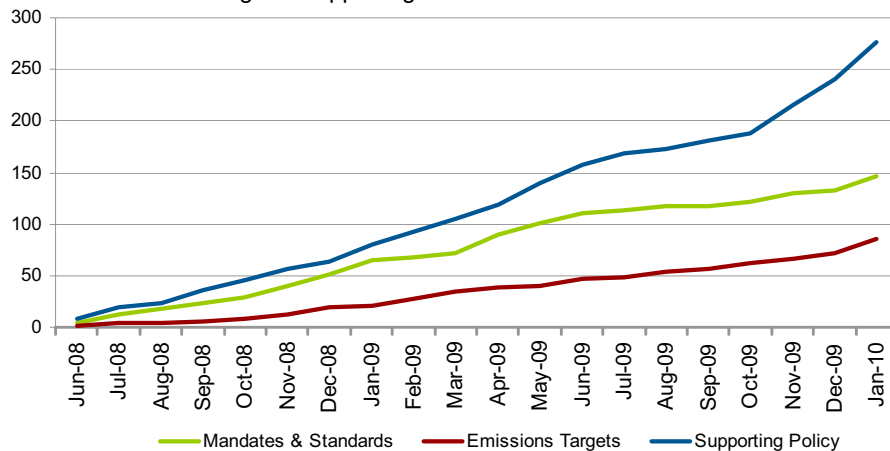
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Policy: All major categories are growing

Since we first started tracking climate policies in July 2008, the number of global climate policy initiatives announced since then has increased substantially, with over 500 announcements made since we started tracking to date. Particularly, commitments to tackle climate change and reduce emissions were noticeably introduced towards the end of 2009 and beginning of 2010, mostly driven by international negotiations and the resulting Copenhagen Accord, which requested countries to submit voluntary targets (See table below). Over and above announced emissions targets and mandates, supporting policy mechanisms such as incentives have comprised the bulk of announcements made over time, bolstering mandated markets and providing direct spending measures for emerging climate policies.

Cumulative # of global climate policy announcements by type

- DBCCA tracked **510 climate policy announcements** between June 2008 through January 2010. Of this:
 - **Supporting policies (incentives):** 54% of all policy announcements;
 - **Mandates:** 29% of all policy announcements;
 - **Emissions targets:** 17% of all policy announcements.
- There were **27¹ feed-in tariff announcements** made worldwide between October 2009 (lead-up to Copenhagen) through January 2010. These are included among the Supporting Policies line below.



Source: DBCCA analysis, 2010.

¹ Includes 3 announcements of downward revisions of feed-in tariffs

Germany and China have Long-Term TLC. The US does not.

The key developments in policy remain at a country and regional level, with countries such as Germany and China continuing to take significant steps that could potentially set the benchmark for other regions. These countries have developed robust policy frameworks, including clearly defined national targets, strong incentives and integrated plans, which can lead to more green jobs, increased innovation and a growth in technology adoption. Germany, in particular, has been an early adopter of supporting climate policy mechanisms such as a carbon price and advanced feed-in tariffs (FiTs), which is an integral underpinning of any prosperous green economy. Recently Germany has adjusted its tariffs to reflect the now much lower cost structures in solar PV, which follows the policy goal of achieving grid parity. China's rapid economic boom and industrial transformation has led it to be a major contender in the race, as it is a fast adopter of clean technologies, with a significant amount of installed capacity. It has made serious commitments to reducing its emissions levels and increasing renewable generation capabilities, especially in the wind sector, and has also committed to the Kyoto Protocol's Clean Development Mechanism. In the chart below, we depict some characteristics of Germany and China's climate legislative framework that depict TLC.

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Country	Emissions Control			Financial Support				Long-term Grid Improvement Plan
	National Emissions Target	National Renewable Electricity Standard	National Long-term Energy Efficiency Plan	National Feed-in Tariff	Long-term Government-based "Green Bank"	Tax Benefits	Long-term Funding Programs	
Germany	✓	✓	✓	✓	✓	✓	✓	✓
China	✓	✓	✓	✓	✓	✓	✓	✓
United States	⌚	⌚	⌚	⌚	⌚	✓	⌚	⌚

By contrast, the US lags behind, where political debates over climate change-related policy actions are hindering opportunities and leadership in this space, which curtail the possibilities of a successful green, low-carbon economy. Nonetheless, US policymakers have implemented short-term incentives for the uptake of renewables, but these only temporarily support industry growth. These short-term policies represent more of stop-gap measures, with many sunseting by 2011, whereas investors are looking for policy regimes that are stable, certain and long-term.

United States in more detail	<i>Proposal of 17% emissions reduction target from 2005 levels by 2020</i>	<i>State-level: 29 states have mandatory RES policies. State-level RPS policies also generate Renewable Energy Certificates (RECs)</i>	<i>State-level: 21 states have energy efficiency resource standards. ARRA* will also invest \$28 billion in efficiency programs.</i>	<i>Few state & local FiT experiments</i>	<i>DoE's Loan Guarantee program provides low-cost financing, and DOE-run ARPA-E* supports earlier stage innovation</i>	<i>Production Tax Credits and Investment Tax Credits –subject to renewal</i>	<i>ARRA* has \$6.3 billion for research, including advanced batteries, carbon capture and storage, and ARPA-E* that develops new clean energy technologies</i>	<i>ARRA* includes \$17 billion of grants and loans for transmission and smart grid.</i>
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Source: DBCCA analysis, 2010; Center for American Progress, "Out of the Running?" 2010. *ARRA stands for the American Recovery and Reinvestment Act. ARPA-E stands for Advanced Research Projects Agency-Energy.

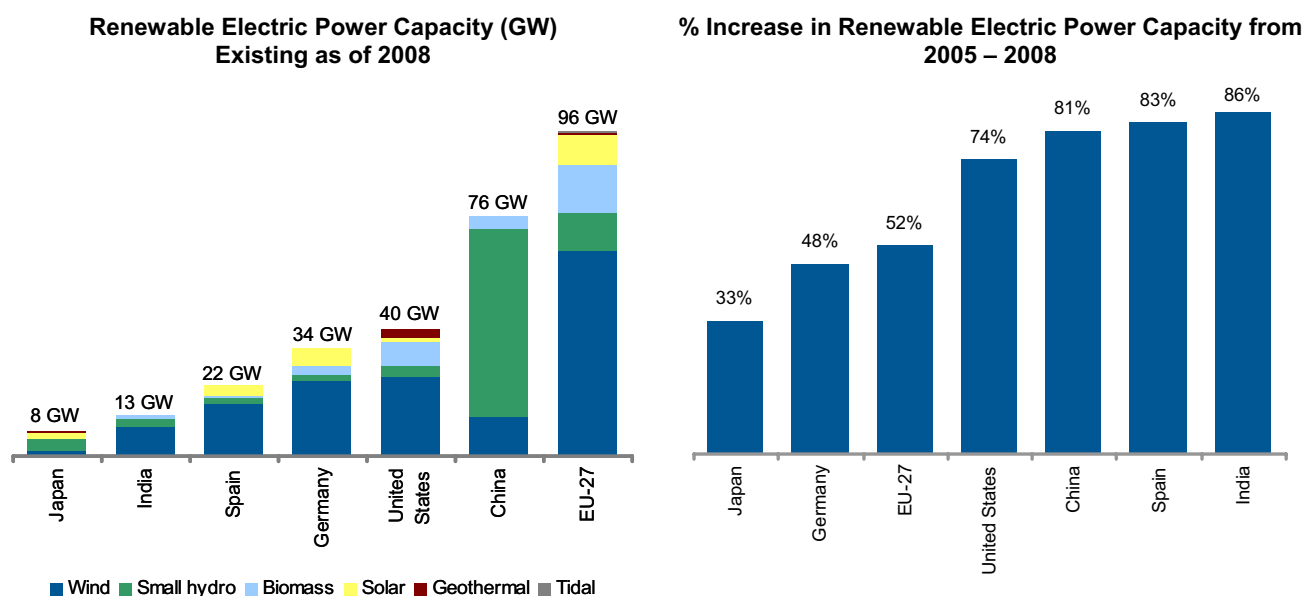
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The US is Lagging behind on Clean Energy Installed Capacity Growth

The key policy developments in countries with TLC, such as Germany and China, have further catalyzed greater adoption of renewable energy over the past few years, in addition to increased capital investment. We present some key country-by-country figures below.

Installed renewable energy capacity - Country comparison

- **China exceeds the United States** in the amount of renewable electric power capacity installed in 2008, with over 30 GW of more capacity. This is primarily attributed to the vast amount of small hydro that China has installed.
- **Greatest increase** over the past three years:
 - Asia, including China, and Europe
 - China: 81% increase
 - US: 74% increase
- **Solar:** **Germany** is currently the leader in the **solar** sector with a total installed capacity of 5.4GW; **Spain** follows with about 3.3GW, and then **Japan** with about 2GW.
- **Wind:** **China doubled** its **wind** capacity in 2009, from approximately 12GW in 2008 to 25GW in 2009. China has a target to install 30GW of wind by 2020.



Source: DBCCA analysis, 2010; REN21, "Renewables Global Status Report," 2006 and 2009.

MEF country risk assessment

In our "Global Climate Change Policy Tracker: An Investor's Assessment" whitepaper, we rated each mandate that we tracked, resulting in overall risk evaluation assessments for different policy regimes, with a special focus on Major Economies Forum (MEF) on Energy and Climate Change countries.

In our follow-on whitepaper, "Global Climate Change Policy Tracker: The Green Economy – The Race is On," we stated that our MEF country risk assessments still stand, but recognize that the United Kingdom's new micro-generation feed-in tariff would represent a significant improvement in the country's overall incentive and integrated plan schemes. Therefore, we have put it on our Upgrade watchlist. Each MEF country risk assessment, as published in our most recent paper, is listed below.

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- Risk Assessment of “1” means that the regulatory regime is a lower risk for investors;
- Risk Assessment of “2” means that the regulatory regime is a moderate risk for investors;
- And Risk Assessment of “3” means that the regulatory regime is a high risk for investors.

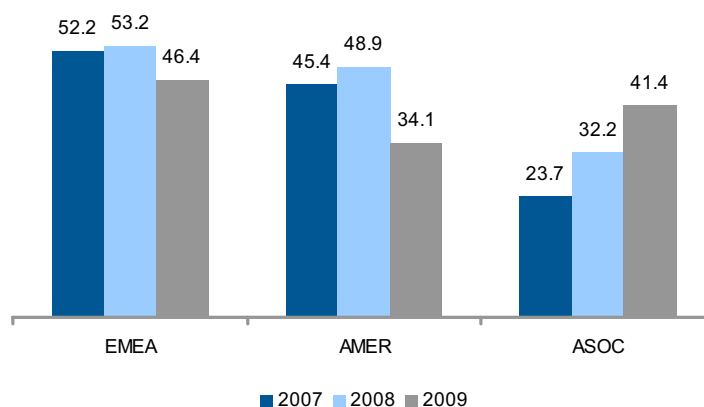
MEF Country	Overall Risk Assessment (1 = lower risk, 2 = moderate risk, 3 = higher risk)	Cumulative Cap Inv 2000 – 2009 (\$ m)	GDP 2009 (2009 \$ bn)
Australia	1	6,801	819
Brazil	1	20,770	2,024
China	1	72,436	8,767
France	1	8,078	2,113
Germany	1	38,597	2,812
Japan	1	1,549	4,141
Canada	2	9,616	1,287
India	2	9,907	3,548
Indonesia	2	601	969
Mexico	2	1,268	1,473
Russia	2	113	2,103
South Africa	2	334	489
South Korea	2	1,916	1,343
United Kingdom	2 (+ Watch)	29,016	2,165
United States	2	67,600	14,250
Italy	3	9,026	1,756

Source: DBCCA analysis, 2010. Capital investment from Bloomberg New Energy Finance Industry Intelligence Database, 2010. Data only includes disclosed data, and may not fully encompass all deals. Data includes the following: (1) The figures include VC/PE for company deals, PE - Buy-out deals, but excludes PE for projects; (2) New build Asset Financing in clean energy (wind, biofuels, biomass, geothermal, mini-hydro, marine, & solar projects only). The figures exclude re-financing and project acquisition deals, bridge/construction type financing, and small scale projects; (3) Includes public market investment in clean energy. Private Investment in Public Equity (PIPE), and Over-the-Counter (OTC) deals are included. GDP data sourced from CIA World Factbook, 2010.

Clean energy capital investment - Country comparison

- Asia was the only region in 2009 to see positive growth in new clean energy financial investment. In 2009, Asia experienced a 29% growth year-over-year in new financial investment, whereas Europe saw a 13% decrease and the Americas saw a 30% decrease.
- In absolute terms, Europe and Asia led in 2009 with the most new clean energy financial investment, while the Americas region lagged behind.
- In 2009, China saw more clean energy investment than the United States for the first time.
- **2009:** Both **China** and **Brazil** clean energy investment was about **three times greater** than that in the **US** as a percentage of their respective GDPs.
- **2000 – 2009:** **Germany's** clean energy investment was about **two to three times greater** than that in the **US** as a percentage of its GDP.

New financial investment in clean energy by region for 2007, 2008 and 2009 - \$ billion



Source: Bloomberg New Energy Finance, 2010.

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Clean Energy Capital Investment – A Further Look at the Regional Breakdown

Region / Country	Significance	2009 Capital Investment	Drivers of Investment
Global	Clean energy investment increased 131% from 2005 to 2009	\$162 billion	Asia saw greater investment in 2009 than Europe and the Americas. Investment declined 33% and 16% in the Americas and Europe, respectively, due to the economic downturn, decreased energy demand and the tightening of credit markets.
Asia	Clean energy investment in Asia increased 37% in 2009	\$39 billion	(1) Strong demand for wind power in China; (2) Ready availability of credit in Asian markets.
China	China took the lead among G-20 nations for the first time in terms of new capital investment.	\$34.6 billion	(1) Strong mandates for wind and solar power; (2) Availability of credit in China; (3) Strong manufacturing base and export markets.
United Kingdom	The UK came in third place with the most clean energy investment in 2009 among the G-20.	\$11.2 billion	(1) Large offshore wind deals (such as the \$3 billion <i>London Array Offshore Wind Farm</i>); (2) The UK also led in marine energy investments.
Spain	Wind and solar have been the primary areas of investment.	\$10 billion	(1) Investment in solar energy still remained strong; but (2) Spanish budget constraints forced cutbacks in incentive programs, which decreased 2009 investments.
Brazil	Brazil is an emerging leader, having recently announced a target to reduce emissions by almost 40% from 1990 levels by 2020	\$7.4 billion	Brazil is in position for growth in wind energy investments.
Germany	Germany has built the world's most sophisticated framework of TLC in renewable energy. Feed-in Tariffs are the backbone of this framework.	\$4.3 billion	Germany remains at the forefront of clean energy in terms of manufacturing and installed capacity, especially in the solar sector. The restructuring of tariff prices is not expected to significantly disrupt the trend.
United States	The United States lost the top spot in the G-20 for the first time in the past five years in terms of new capital investment.	\$18.6 billion	(1) The economic recession and investor uncertainty about tax incentives early in 2009; (2) State renewable energy standards and enactment of longer-term production and investment tax credits in February spurred investments later in 2009; (3) The US still led VC/PE investments; (4) But investors continue to look to Congress to pass comprehensive climate and energy legislation that will provide long-term certainty.

Source: DBCCA analysis, 2010; The Pew Charitable Trusts, "Who's Winning the Clean Energy Race?" 2010; Bloomberg New Energy Finance, 2010.

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