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2013 Who's Winning the Clean Energy Race?

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Jessica Frohman Lubetsky, officer

Tracy Schario, officer, communications

Tom Wathen, vice president

Tom Swanson, officer

Lynn Abramson, senior associate

Sarah Greene, associate

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About the report

Who's Winning the Clean Energy Race? 2013 Edition was developed for public informational and educational purposes. It is an update of Pew's reports tracking 2009 to 2012 clean energy investment in the developed and developing countries that make up the Group of 20.

Underlying data for this report were compiled for Pew by Bloomberg New Energy Finance, a leading market research firm with a global network of analysts providing data and news on the transformation of the energy sector. Currency values are in U.S. dollars. A full description of the data sources and methodology employed in the development of this report can be found in the Appendix on Page 32.

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Overview

For the past five years, Pew has tracked investment and finance trends in the world's leading economies. Over that period, the clean energy industry has been buffeted by a global recession, broad changes in energy markets, and uncertainty surrounding international policies on clean energy and climate change. Despite these challenges, the clean energy sector is now an annual $250 billion component of the world economy.[1]

Although global clean energy investment in renewable sources, biofuels, smart energy, and energy storage fell 11 percent in 2013, to $254 billion, a number of developments indicate a promising future for clean energy. First, the prices of leading technologies such as wind and solar have dropped steadily for decades; they are increasingly competitive with century-old and more financially volatile conventional power sources. Second, clean energy manufacturers are moving forward and have effectively weathered withering competitive pressures, consolidations, and policy changes. Investor confidence about the long-term future of renewable energy was reinforced in clean energy stock indexes in 2013, which rose sharply over the year. Third, markets in fast-growing, developing countries are prospering; these economies see distributed generation as an opportunity to avoid investments in costly transmission systems, comparable to the deployment of cellphones instead of costly landline infrastructure. Even in the contracting markets of Europe and the Americas, which have affected the overall industry, policymakers are recalibrating rather than abandoning clean energy policies.

$54.2 billion China is the leading market for clean energy finance.

Worldwide investment dips for 2nd straight year

Over the past two years, clean energy investment has declined 20 percent from a 2011 record of $318 billion. Although investment in non-G-20 markets grew by 15 percent, with promising sectors emerging in such places as Chile and Uruguay, investment in the larger and more established markets of G-20 countries[2] declined by 16 percent. Only three G-20 countries—Japan, Canada, and the United Kingdom—had increased levels in clean energy investment in 2013.

Asian investment grows steadily, Europe slides sharply

Clean energy investment in the European region, which is comprised of Europe, the Middle East, and Africa, slid sharply for the second year in a row. It fell 42 percent, to $55 billion, less than half the region's 2011 record of $115 billion. Investment levels declined sharply in once-vibrant markets, with levels in Germany down 55 percent and Italy 75 percent. In contrast, the Asia and Oceania region continued to grow steadily in 2013, with levels increasing 10 percent, to $102 billion. China continued to be the leading regional and global market, attracting $54.2 billion in 2013. Japan experienced the fastest investment growth in the world, increasing 80 percent, to almost $29 billion.

Investment levels decreased in the Americas for the second year in a row to $52 billion, 8 percent lower than in 2012. Most notably, the largest markets in North and South America—the United States and Brazil—were down by 9 and 55 percent, respectively. For the first time, clean energy investment in Brazil was less than the combined

total for the rest of Latin America. Canada was the second-fastest growing market in the G-20, increasing 45 percent, to $6.5 billion.

Wind investment holds steady as solar slips

Wind sector investments held relatively steady in 2013, falling 1 percent, to $73.5 billion, and accounted for 39 percent of the G-20 total. Financing dropped significantly in Turkey and Brazil, but those losses were offset by gains in Canada and the United Kingdom. China continued to attract the largest share of wind energy investment, accounting for 38 percent of the global total.

For the fourth year in a row, solar energy technologies garnered the largest share of G-20 clean energy investment—52 percent of the total. Nonetheless, investment in solar technologies fell by 23 percent in 2013, to $97.6 billion. Steep drops in Germany and Italy were among the reasons that collective investment in the solar sector fell below the $100 billion mark for the first time in seven years.

Energy efficient/low-carbon technologies, which include smart meters and energy storage devices, constituted the only clean energy sector with rising investment levels, growing 15 percent to $3.9 billion. G-20 investment in biofuels sank by 41 percent, to just under $3 billion. Other renewable energy technologies, including geothermal, biomass, and waste-to-energy, dropped by 31 percent, to $10.7 billion.

52%

Solar attracts majority of clean energy investment.

55%

United States is the leading destination for venture capital and private equity finance.

Getty Images/View Stock

Asset financing declines, but clean energy stocks soar

Investment in small-distributed capacity, which is residential-scale solar projects of less than 1 megawatt, declined 29 percent in 2013, as did financing for large-scale assets. Together, these two classes account for more than 80 percent of clean energy investment. Asset financing decreased 14 percent in 2013, to $123.7 billion. China maintained its wide lead in asset financing for large projects, attracting $53.3 billion—more than 40 percent of the total.

In line with falling solar investments overall, residential and small commercial solar capacity investments fell to $52.5 billion, the lowest level recorded in the past four years. Japan garnered 44 percent, or $23 billion of small-distributed capacity investments.

Venture capital/private equity investment levels in the G-20 declined for the fourth consecutive year, falling 32 percent, to $4 billion. The United States continued to play a leading role in the venture capital/private equity category, accounting for 55 percent of 2013 investments.

Stock market investors' confidence in the clean energy sector grew in 2013. Stock prices on the WilderHill New Energy Global Innovation Index, or NEX, which tracks leading renewable energy stocks, rose by 54 percent over the year—outpacing gains in major stock indexes such as the Standard & Poor's 500. Consistent with rising stock prices, public market financing for company scale-ups across the G-20 increased by 176 percent, to $9.8 billion.

Solar takes the lead in annual capacity additions

For the first time in more than a decade, solar outpaced all other clean energy technology in terms of new generating capacity installed. Solar capacity additions increased by 29 percent compared with 2012 even though investment in the sector declined by 23 percent. This was due in part to ongoing price reductions, including significant cuts in manufacturing costs, but it was also a result of investment shifting from small-scale projects to less expensive large-scale ones. All told, a record 40 gigawatts of solar generating capacity was installed in 2013. By comparison, less than 40 GW of solar was installed from 2001 to 2010.

Installations in the wind sector were 40 percent less than a year earlier, declining by 21.6 GW. The United States accounted for more than 56 percent of that drop, as wind installations collapsed in light of delayed renewal of the production tax credit. Nonetheless, with 27 GW of capacity added worldwide in 2013, cumulative wind installations surpassed 307 GW in 2013—more than 40 percent of the world's clean energy capacity.

40 GW

Amount of solar generating capacity installed in 2013.

On a regional basis, installations in 2013 dropped 48 percent in the Americas and 22 percent in the Europe, Middle East, and Africa region. Installations in the latter region were down for the first time in more than 10 years. By contrast, clean energy capacity in the Asia and Oceania region increased by 64 percent, with more than 50.1 GW of capacity installed. More than a third of Asia's gains in capacity were in the Chinese and Japanese solar sectors, which added a total of 18.8 GW. Japan added 6.7 GW, and China's addition of 12.1 GW of solar far outpaced forecasts—setting a one-year record for solar deployment by any country.

On a global basis, 87 GW of clean power was added in 2013, and cumulative installed capacity now surpasses 735 GW.

China holds a wide lead in the clean energy race

Although overall clean energy investment declined 6 percent in 2013, China solidified its leadership position in the global clean energy race by attracting $54.2 billion. Its clean energy sector is reorienting from an exclusive focus on exports toward greater domestic consumption, as evidenced by China's dramatic growth in solar power capacity in recent years. Solar deployment increased almost fourfold in 2013, to an unprecedented 12.1 GW, besting its record of 3.2 GW in 2012. In addition, for the fifth year in a row, China deployed more than 10 GW of wind power. In total, China installed more than 35 GW of clean generating capacity in 2013, a record. In terms of investment, China led in the wind category with $28 billion and was second in the solar sector with $22.6 billion. Almost all of China's investment was in the asset financing category, with $53.3 billion recorded, more than 40 percent of all G-20 asset financing.

12.1 GW

Amount of solar capacity additions in China.

$28 billion

Amount invested in Japan's solar sector.

The U.S. clean energy sector is in a holding pattern as the second-largest world market. The fulfillment of state-level renewable portfolio standards, the lack of progress on national energy policy, and uncertainty about the direction of policies on global warming pollution has dampened investor interest in the sector. Overall, clean energy investment in the United States declined 9 percent in 2013, to $36.7 billion. The United States remained the second-leading destination for wind energy investments, attracting $14 billion. It was third in solar energy investments, with $17.7 billion. As has been the case for several years, the United States continued to garner world-leading investment levels in the biofuels and energy efficient/low-carbon technology subsectors. The United States also remains the dominant recipient for public market and venture capital/private equity investments, attracting $6.8 billion and $2.2 billion, respectively, in 2013.

U.S. wind installations in 2013 were down more than 90 percent, from a record installation of more than 13 GW of wind in 2012 to less than 1 GW in 2013. When the production tax credit was renewed in early 2013, slight changes in the law appear to have slowed a sharp drop in investment—deferring deployment of new wind capacity into 2014, when a strong rebound in capacity additions is forecast. Solar sector generating capacity continued to grow significantly, as it has in recent years. A record 4.4 GW of solar was added in the United States in 2013, 30 percent more than came online in 2012. Lower technology prices overall, and completion of a number of larger, less-expensive, utility-scale plants, fostered deployment growth despite lower investment totals.

Japan jumped from fifth to third place among G-20 nations for overall clean energy investment, reflecting a priority since the Fukushima nuclear

disaster for new energy alternatives. In 2013, Japan became the fastest-growing clean energy market in the world, growing by 80 percent, to $28.6 billion. Most striking was a near doubling of investment in Japan's solar sector, which received $28 billion in 2013, almost 30 percent of the G-20 total.

The United Kingdom defied the clean energy contraction that gripped the rest of Europe in 2013. Although clean energy investment in Germany, Spain, Italy, and France dropped by 40 percent or more, the United Kingdom experienced 13 percent growth in 2013. The U.K. was one of three G-20 countries to have investment gains last year, and it ranked fourth among G-20 nations. Most of this growth came in the wind sector, where investments increased by nearly 50 percent to $5.9 billion, on the strength of offshore projects and greater activity in public market financing. The world's largest offshore wind project, the 630-MW London Array, was completed in 2013, and major financing was secured for the 210-MW Westermost Rough Offshore Wind Farm.

Investment levels in Germany were highly sensitive to clean energy feed-in tariff[3] reductions in 2013. Financing fell 55 percent from 2012 levels, to $10 billion, and the country dropped from third to sixth place among G-20 nations. Wind investments were down by 16 percent, to $5.1 billion, and solar financing declined by more than $10 billion, to $4.8 billion. The recalibration of German clean energy policies also affected deployment levels. Wind capacity additions totaled 3.4 GW in 2013. New solar generating capacity additions were down 50 percent, to less than 4 GW, after record additions of almost 8 GW in 2012. Germany has the most installed solar of any country in the world, with 35.5 GW.

Strong clean energy investments in 2013 catapulted Canada up five spots to seventh place in the G-20. Investment grew by 45 percent, to $6.5 billion. The wind sector was especially strong, with financing increasing by more than 40 percent, to $3.6 billion. In Ontario province, a number of backlogged projects were permitted and several others were completed, such as the 270-MW South Kent Wind Farm and the 299-MW Blackspring Ridge project. The solar sector also recorded impressive growth, attracting $2.5 billion.

45% Growth in clean energy finance in Canada.


Getty Images


Getty Images

South Africa's clean energy sector garnered $4.9 billion in 2013, and it moved up from the 10th–largest to ninth-largest market in the G-20. Although investment levels were down 14 percent last year, South Africa's market has grown the second fastest in the G-20 over the past five years. Sixty percent of the country's clean energy investment in 2013, $3 billion, went to the solar sector in conjunction with Phase II of its carefully planned reverse auctions. An additional $1.9 billion was invested in the wind sector.

Key findings

Worldwide clean energy investment falls a 2nd year

Globally, public and private investment in solar, wind, and other technologies fell 11 percent in 2013, to $254 billion. Last year's decline follows a 9 percent drop in 2012, and investment declined by one-fifth from the 2011 record of $318 billion.

Although investment in non-G-20 markets grew by 15 percent, with promising sectors emerging in such places as Chile and Uruguay, it dropped in the larger, established G-20 markets by 16 percent. In 2013, clean energy investment rose in only three G-20 countries: Japan, Canada, and the United Kingdom.

The results from 2013 indicate several ongoing developments affecting the clean energy marketplace. Investment has fallen in recent years in response to mutually reinforcing economic and political pressures in developed markets. Governments in Europe, the United States, and elsewhere have initiated fiscal austerity measures and curtailed certain clean energy incentives. The political environment surrounding climate change has also evolved in these countries, as domestic negotiations drag on and it remains uncertain whether the international community can agree on a comprehensive framework for reducing carbon emissions. Recent technological advancements in oil and gas recovery also have directed some investment back toward more traditional energy sources.

In response to these developments, the clean energy sector has experienced some consolidation—shuttering less-competitive companies and forcing the industry overall to become more efficient and capable of competing in a less-subsidized marketplace. It is a measure of the sector's resilience that worldwide financing and investment have totaled more than $250 billion four years running. Moreover, impressive levels of deployment have been sustained as the prices for wind, solar, and energy-smart technologies have fallen. In view of industry maturation, Bloomberg New Energy Finance projects a 2014 rebound in worldwide investment and installation of renewable energy.

Investment in European market plummets

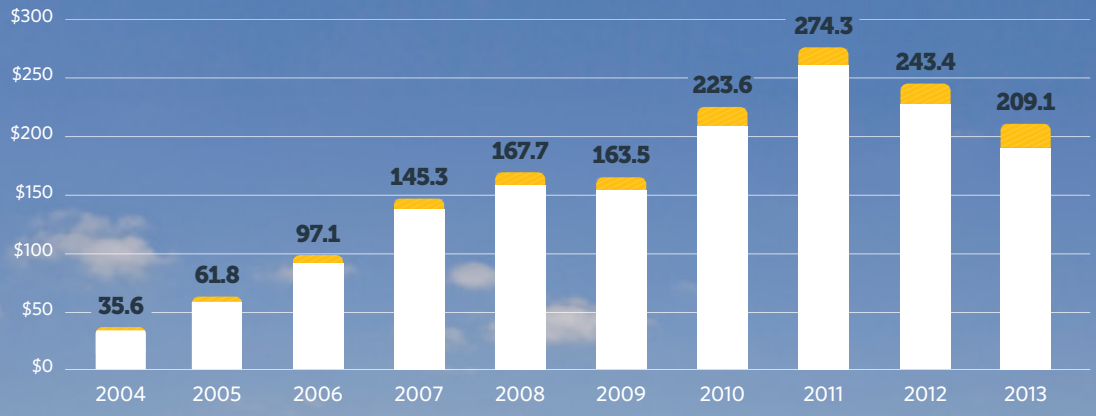
Clean energy investment in the region that encompasses Europe, the Middle East, and Africa declined sharply for the second year in a row, falling 42 percent in 2013 to levels not seen since the mid-2000s. This region had been the world's most attractive clean energy market over the past decade, garnering a record $115 billion in 2011. But investment has since plummeted, tumbling to $55 billion in 2013, less than half that of 2011 levels. Most of Europe's major clean energy markets decreased considerably in 2013, with year-over-year investments down 55 percent in Germany, 75 percent in Italy, and 84 percent in Spain. Investment increased only in the United Kingdom, as a few large offshore wind projects gained significant financing and several were completed. Overall, declines in the European region accounted for much of the reduction in global clean energy investment.

In contrast, steady, uninterrupted growth in clean energy investment in the Asia and Oceania region continued apace in 2013, with overall levels increasing 10 percent, to $102 billion. This was the only region to experience

Figure 1

Global and G-20 Clean Energy Investment* (in US$ billions)

Worldwide investment falls 2nd straight year, 2004-13



*Does not include research and development or digital energy investments.

Source: Bloomberg New Energy Finance

iStockphoto

rising investment last year. China continued to dominate regional and global markets, attracting $54.2 billion in 2013, a decrease of 6 percent from 2012. But China's decline was more than offset by gains in the Japanese market, which grew by 80 percent, to almost $29 billion.

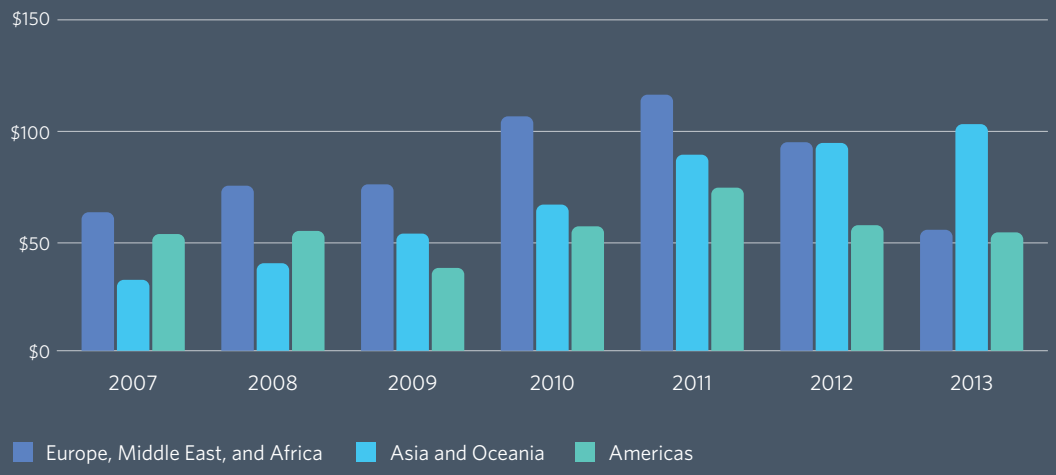
10% Growth in investment in Asia and Oceania region.

Investment levels fell in the Americas for the second year in a row, to $52 billion, 8 percent lower than in 2012. Most notably, the region's largest markets in North and South America—the United States and Brazil—were down 9 and 55 percent, respectively. For the first time, clean energy investment in Brazil was less than the combined total for the rest of Latin America. The Brazilian market slowed, as auctions for wind power flagged and only 600 MW of new capacity was added. In North America, significant new wind energy investments in Canada led to a 45 percent increase in 2013.

Figure 2

Total Investment in Clean Energy by Region, 2007-13 (in US$ billions)

Asia continues uninterrupted investment growth, Europe falls back



Source: Bloomberg New Energy Finance

Solar investment falls sharply but maintains lead

For the fourth consecutive year, solar energy technologies attracted the largest share of G-20 clean energy investment, accounting for 52 percent of the total. Nonetheless, investment in solar technologies fell by 23 percent in 2013, to $97.6 billion, registering below $100 billion for the first time in four years. Solar investments drecreased by more than $10 billion in both Germany and Italy, accounting for approximately two-thirds of the overall decline.

Wind sector investments held relatively steady in 2013, slipping 1 percent, to $73.5 billion, and accounting for 39 percent of the G-20 total. Wind energy investment did not change appreciably in most major markets, except for a drop of more than 30 percent in Brazil. China continues to attract the largest share of wind energy investment by a wide margin, accounting for 38 percent of the global total.

Energy efficient/low-carbon technologies, which include smart meters and energy storage devices, constituted the only clean energy sector with

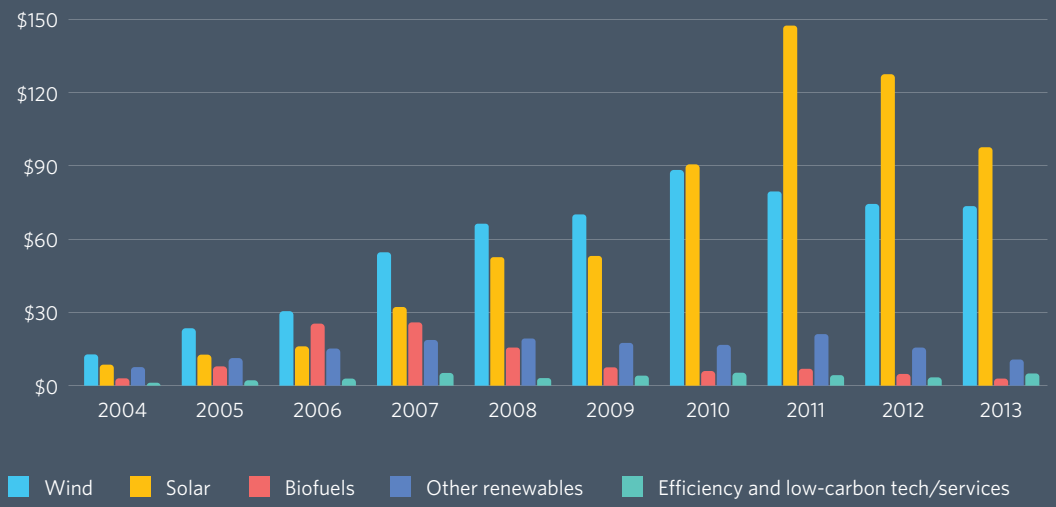
$3.1 billion

Amount invested in Brazil's clean energy economy.

Figure 3

G-20 New Investment in Clean Energy by Sector, 2004-13 (in US$ billions)

Solar investment falls, wind holds steady in G-20



Source: Bloomberg New Energy Finance

rising investment levels, growing 15 percent, to $3.9 billion. More than two-thirds of the energy efficient/low-carbon technology investments were in the United States. Advanced energy efficiency products such as the Nest thermostat and promising energy storage and fuel cell technologies, such as those developed by Bloom Energy, have helped boost this sector. Bloom Energy raised $130 million to expand operations through a private equity investment.

G-20 investment in biofuels declined by 41 percent in 2013, to just under $3 billion. Other renewable energy technologies (geothermal, biomass, small hyrdro, and waste-to-energy) fell by 31 percent, to $10.7 billion. (See Figure 3 for a breakdown of investment by technology.)

$3.9 billion

Amount invested in energy efficient/ low-carbon technologies.

Asset finance, small-distributed capacity investments decline

Investment in clean energy assets for larger plants and small-distributed capacity, which account for more than 80 percent of total clean energy investment, both fell. Asset financing dropped 14 percent in 2013, to

$123.7 billion. China attracted a world-leading $53.3 billion worth of asset financing, more than 40 percent of the G-20 total, and the United States $19.8 billion.

Consistent with declines in the solar sector, investment in residential and small commercial solar capacity dropped 29 percent, to $52.5 billion, the lowest level recorded in the past four years. Japan garnered 44 percent of small-distributed capacity investments for a total of $23 billion, as its residential solar market expanded significantly.

29% China's share of G-20 clean energy investment.

Venture capital/private equity investment levels in the G-20 declined for the fourth consecutive year, falling 32 percent, to $4.0 billion. This kind of early-stage investment in innovative new clean energy companies has decreased since funding for capital-intensive solar companies has waned and clean-tech companies have not produced the rapid windfall payouts that many venture capitalists seek. The United States continued to play a leading role in venture capital/private equity, accounting for 55 percent of 2013 investments, with key financings for Bloom Energy (fuel cells), Joule Unlimited (biofuels), and Fluidic (energy storage).

Research and development investments made by governments and corporations worldwide rose by 1.2 percent, to $29.2 billion. In an encouraging development, investors signaled growing confidence as reflected in the stock prices of the NEX, which rose by 54 percent, outpacing gains in major stock indexes such as the Standard & Poor's 500. Consistent with rising stock prices, public market financing for company scale-up across the G-20 increased by 176 percent, to $9.8 billion. Innovative financing models helped spur public market financing. NRG Energy, a U.S. utility, raised $430 million from investors interested in its portfolio of wind, solar, and other natural gas generating capacity. Other prominent public market transactions included initial public offerings by Pattern Energy Group, a wind project developer, and Hannon Armstrong Sustainable Infrastructure Capital in the United States, Foresight Solar Fund in the United Kingdom, and TransAlta Renewables in Canada.

Among the prominent bond offerings were those proffered by SolarCity and Warren Buffett's MidAmerican Energy, which issued an $850 million bond to help finance a major solar photovoltaic project in California. (For a full description of the financing categories explored in this report, see Figure 14 on Page 22.)

Solar capacity soars, installed wind surpasses 300 GW

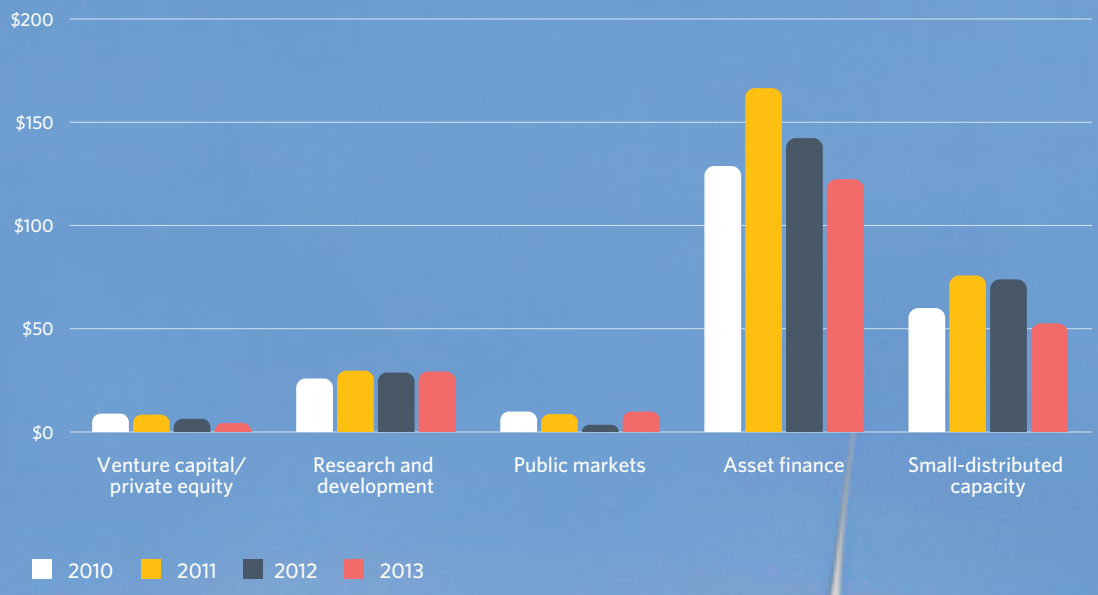
In 2012, falling prices for wind and solar technologies allowed installed capacity to increase even though worldwide clean energy investment dropped. This was not the case in 2013. Prices continued to slide in 2013, especially for permitting and other "balance of system" costs, but investment was insufficient to prevent slippage in annual installed capacity. Overall investment was down 11 percent globally, but annual capacity additions in 2013 fell by only 1 percent, to 87 GW.

For the first time in more than a decade, more solar generating capacity was installed than any other clean energy technology. Solar capacity additions grew by 29 percent annually even though investment in the sector declined by 23 percent, compared with 2012. This was due in part to ongoing price reductions, but also to an investment

Figure 4

Worldwide Investment by Financing Type, 2010-13 (in US$ billions)

Investment for clean energy assets decline



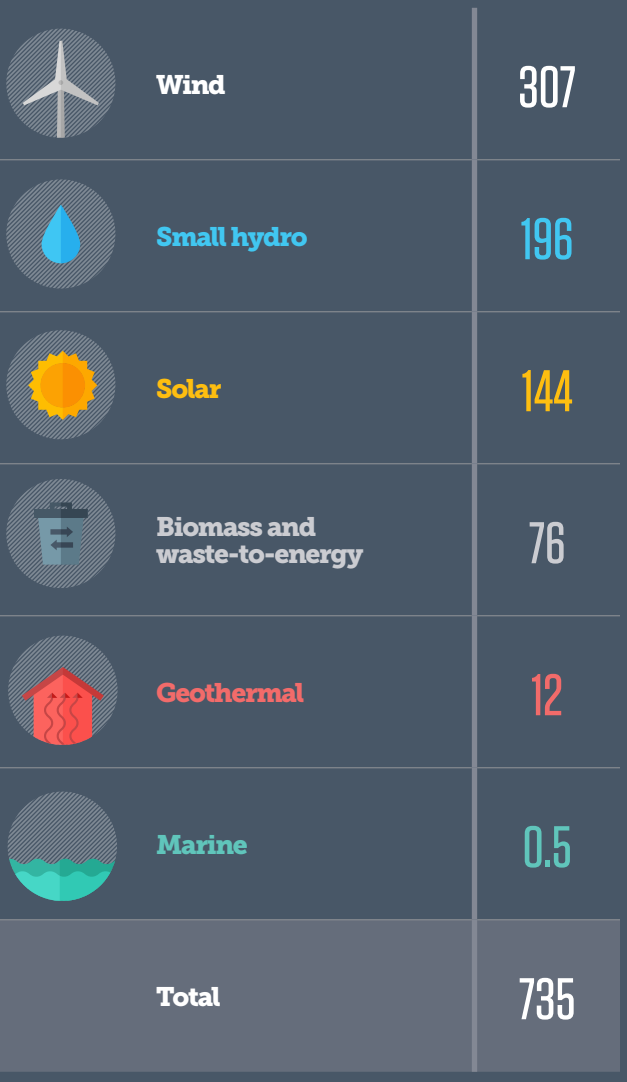
Source: Bloomberg New Energy Finance

Thinkstock

Figure 5

Total Worldwide Installed Clean Energy Capacity by Sector, 2013 (in GW)

Global clean energy generating capacity surpasses 735 GW



Source: Bloomberg New Energy Finance

shift from small-scale projects to less-expensive large-scale ones. At year's end, a record 40 GW of solar generating capacity was installed in 2013; less than 40 GW of solar was installed from 2001 to 2010.

Installations in the wind sector declined by 21.6 GW (44 percent) in 2013, compared with the previous year. In the United States, wind installations were down more than 12 GW, as deployment sank 90 percent in response to uncertainty in 2012 over renewing the country's production tax credit. Nonetheless, with 27 GW of capacity added in 2013, cumulative wind installations surpassed 307 GW, accounting for more than 40 percent of the world's clean energy capacity.

On a regional basis, installations in 2013 dropped 48 percent in the Americas and 22 percent in the

307 GW

Global capacity for wind power.

Europe, Middle East, and Africa region. Installations in this region were down for the first time in more than 10 years. By contrast, clean energy capacity in the Asia and Oceania region increased by 64 percent, with more than 50.1 GW of capacity installed. Almost half of Asia's gains in capacity were logged in the Chinese and Japanese

solar sectors, which added a total of 18.8 GW. Japan installed 6.7 GW, and China's addition of 12.1 GW of solar far outpaced forecasts and was a one-year record for solar deployment by any country.

$4.4 billion

Australia ranked 10th in clean energy investment.

Who's winning the clean energy race?

China solidifies leadership in global clean energy race

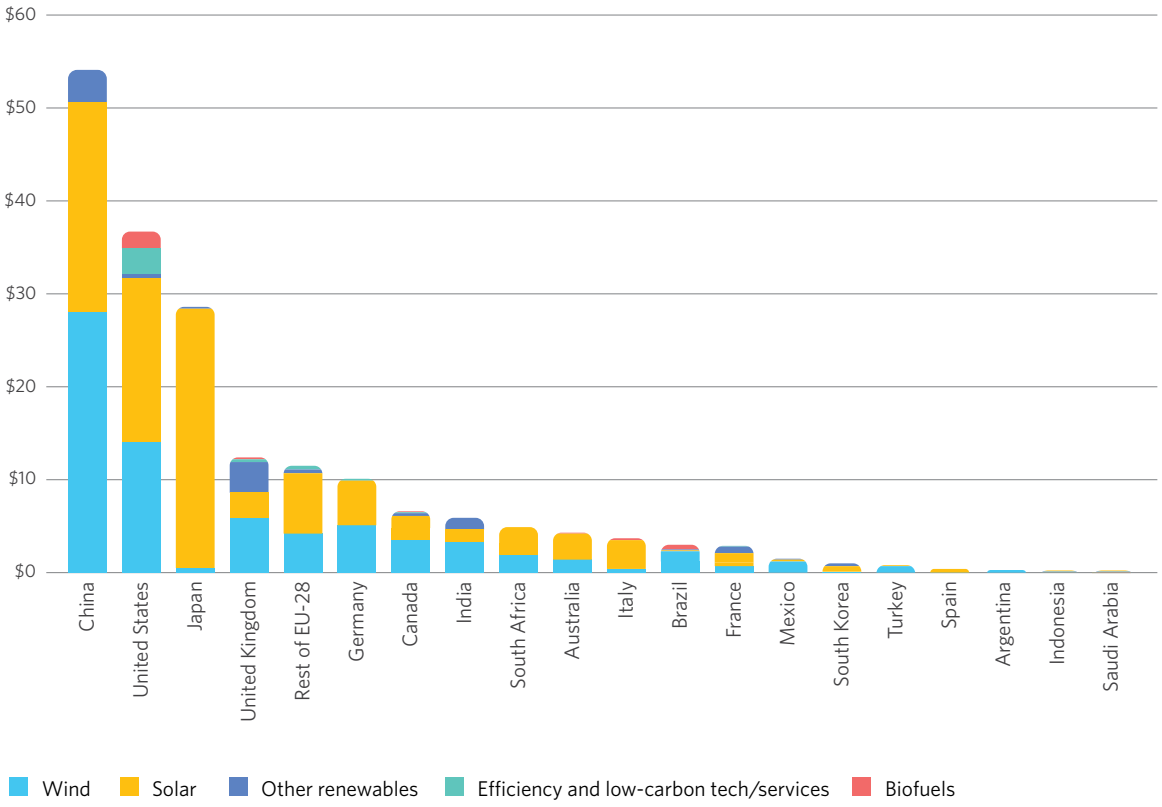
China's efforts to reduce poverty and expand energy access, keep pace with rapid economic development, and address severe air pollution in its major cities have propelled its rapid rise to the front of the world's clean energy race. Although clean energy investment declined 6 percent in 2013, China solidified its leadership position by attracting a world-leading $54.2 billion in investment.

As with its overall economy, the Chinese clean energy sector is reorienting from an emphasis on exports toward greater domestic consumption. This shift is evident in record-setting deployments of wind and small hydro capacity in recent years and especially by China's dramatic growth in solar power capacity. Solar deployment

Figure 6

Investment by Country and Sector, 2013 (in US$ billions)

China garners 29% of G-20 clean energy investment



Source: Bloomberg New Energy Finance

increased almost fourfold in 2013, to 12.1 GW. No country previously had ever installed more than 10 GW of solar in one year. China's highest level to date was 3.2 GW in 2012. In addition, for the fifth year in a row, the country deployed more than 10 GW of wind power, adding 14.1 GW in 2013. In total, China installed more than 35 GW of clean generating capacity in 2013—a record for any nation.

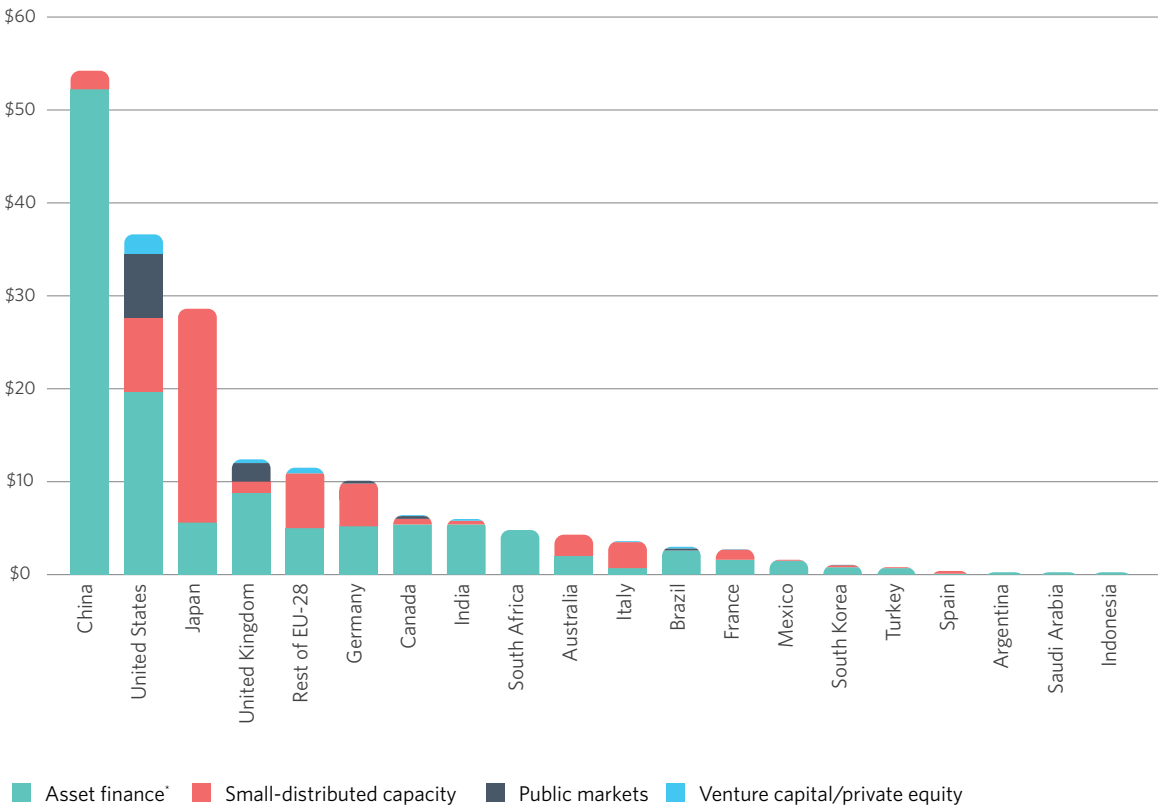
Strong investment levels fueled China's clean energy deployments. China led the world in wind energy investment with $28 billion, or 38 percent of the G-20 total. In the solar sector, China attracted $22.6 billion, second only to Japan's amount and 23 percent of the G-20 total. Almost all of China's investment was in the asset financing category, with $53.3 billion recorded, more than 40 percent of G-20 asset financing.

Over the past five years, China's level of clean energy investment has grown at a compound annual growth rate of 18 percent, fifth highest in the G-20. With extensive manufacturing capacity in the solar and wind sectors, growing domestic markets, and unequaled national targets for renewable energy, China is poised to be a leader in the world's clean energy marketplace for many years to come. (See Figures 6 through 13 for countries' data on investment, capacity additions, and growth rates.)

Figure 7

Investment by Country and Financing Type, 2013 (in US$ billions)

Japan's small-distributed capacity investments soar



*Asset finance is adjusted for reinvested equity.

Source: Bloomberg New Energy Finance

U.S. clean energy sector stalls

Clean energy investment in the United States fell 9 percent in 2013, to $36.7 billion. Several forces appear to have placed the country's sector in a sustained holding pattern. The near-fulfillment of state-level renewable portfolio standards, lack of progress on national energy policy, and uncertainty about the direction of key policies on clean energy and carbon pollution have dampened investor enthusiasm for the sector. But market forces, including sharp price declines and new third-party financing models, demonstrate the U.S. clean energy market's long-term resilience.

Despite the overall slowdown in investment, the United States maintained its position as the second-leading destination for wind energy investments globally, attracting $14 billion in 2013. It was third in acquiring solar energy investments, with $17.7 billion. As it has for several years, the United States garnered world-leading investment levels in the biofuels and energy efficient/low-carbon technology subsectors. Biofuels investments in the United States were $1.8 billion in 2013, 63 percent of the G-20 total, and $2.8 billion was invested in energy efficient/low-carbon technologies, 72 percent of the G-20 total. The United States also remains the top

Figure 8

Top 10 Countries in Investment (in US$ billions)

United Kingdom, Canada, and Japan move up in clean energy investment rankings

2013 rank	Country	2013	2012	2012 rank
1 =	**China**	$54.2	$57.9	1
2 =	**United States**	$36.7	$40.3	2
3 ↑	**Japan**	$28.6	$15.9	5
4 ↑	**United Kingdom**	$12.4	$11.0	7
5 ↓	**Rest of EU-28**	$11.5	$22.0	4
6 ↓	**Germany**	$10.1	$22.4	3
7 ↑	**Canada**	$6.5	$4.5	12
8 =	**India**	$6.0	$7.1	8
9 ↑	**South Africa**	$4.9	$5.7	10
10 ↑	**Australia**	$4.4	$4.4	13

Source: Bloomberg New Energy Finance

Figure 9

Top 10 Countries in Investment Growth, 2012-13

Only 3 clean energy markets expand in 2013

Rank	Country	1-year growth rate
1	**Japan**	80%
2	**Canada**	45%
3	**United Kingdom**	13%
4	**Australia**	0%
5	**China**	-6%
6	**United States**	-9%
7	**South Korea**	-11%
8	**South Africa**	-14%
9	**India**	-15%
10	**Mexico**	-18%

Source: Bloomberg New Energy Finance

Figure 10

Top 10 Countries in Investment Growth, 2008-13

South Africa fastest-growing clean energy market over past 5 years

Rank	Country	5-year growth rate
1	**South Africa**	96%
2	**Japan**	57%
3	**Australia**	32%
4	**United Kingdom**	18%
5	**Mexico**	13%
6	**China**	18%
7	**India**	2%
8	**Canada**	24%
9	**United States**	0%
10	**Rest of EU-28**	-6%

Source: Bloomberg New Energy Finance

Figure 11

Top 10 Countries in Investment Intensity, 2013

Clean energy investment intensity rankings

Rank	Country	Investment intensity*
1	South Africa	0.82
2	Japan	0.60
3	United Kingdom	0.52
4	Australia	0.44
5	Canada	0.43
6	China	0.41
7	Germany	0.31
8	United States	0.22
9	Italy	0.20
10	Brazil	0.13
10	France	0.13

*Clean energy investment per dollar of GDP.

Source: Bloomberg New Energy Finance, CIA World Factbook 2013

Figure 12

Top 10 Countries in Installed Renewable Energy Capacity, 2013 (in GW)

China installed 30 GW of renewable energy capacity in 2013

Rank	Country	Capacity (GW)
1	China	191
2	United States	138
3	Germany	78
4	Rest of EU-28	38
5	Spain	35
6	Japan	34
7	Italy	34
8	India	30
9	United Kingdom	19
10	Brazil	18

Source: Bloomberg New Energy Finance

recipient for public market and venture capital/private equity investments, attracting $6.8 billion and $2.2 billion, respectively, in 2013. Public market financing in the United States increased significantly through offerings by companies such as Tesla, SolarCity, First Solar, and Silver Spring Networks.

Levels of U.S. clean energy investment fell only modestly, but overall installations dropped considerably in response to uncertainty in 2012 surrounding renewal of the federal production tax credit, or PTC. As a result, U.S. wind installations declined more than 90 percent, from the record of 13.6 GW in 2012 to less than 1 GW in 2013. When the PTC was renewed in early 2013, slight changes in the law appear to have slowed a sharp drop in investment, and deferred deployment of new wind capacity into 2014, when a strong rebound in capacity additions is forecast. Despite stagnation in investment levels, solar sector installations continued to grow significantly, as they have in recent years. More than 4.3 GW of solar was added in the United States in 2013, 30 percent more than came online the year before. Lower technology prices overall and completion of a number of larger, less-expensive utility-scale plants enabled deployment to grow much faster than investment in the solar sector.

Figure 13

Top 10 G-20 Countries for Growth in Renewable Energy Capacity, 2008-13

South Korea and Turkey lead in 5 year capacity growth rate

Rank	Country	Percentage increase
1	Turkey	28
2	United Kingdom	25
3	Italy	25
4	China	23
5	South Korea	23
6	South Africa	23
7	Australia	22
8	Mexico	19
9	France	19
10	Brazil	19

Source: Bloomberg New Energy Finance

Japan jumps to the lead in solar sector

Japan has a long history with solar: The electronics firm Sharp has been developing solar technologies for more than 50 years, and small solar systems have been deployed throughout the country for the past quarter-century. But Japan's ongoing efforts to displace nuclear energy and diversify its power sector since the Fukushima nuclear accident have propelled the nation's clean energy sector forward in recent years.

In 2013, Japan became the fastest-growing clean energy market in the world, growing by 80 percent. Overall, it rose two spots within the G-20 rankings to become the third-leading destination for clean energy investment, attracting $28.6 billion. Investment in Japan's solar sector nearly doubled; it received $28 billion in 2013, almost 30 percent of the G-20 total. Most of the solar investment was for small-distributed capacity, which has been stimulated by generous feed-in tariff incentives. Japan added 6.7 GW of solar in 2013.

$36.7 billion

United States was second-leading destination for clean energy investment.

United Kingdom is only European market with investment gains

Although investments dropped by 40 percent or more in Germany, Spain, Italy, and France, the United Kingdom experienced 13 percent growth in clean energy investment—one of only three G-20 countries with investment gains last year. Most of this growth came in the wind sector, in which investment levels increased by nearly 50 percent to $5.9 billion, on the strength of offshore wind projects and increased activity in public market financing. The world's largest offshore wind project, the 630-MW London Array, was completed in 2013, along with several other large projects, and major financing was secured for the 210-MW Westermost Rough Offshore Wind Farm. The United Kingdom also had strong investment in biomass technologies, helping it place second in the G-20 for investment in the "other renewable" category.

$5.9 billion

Wind investment in United Kingdom nearly doubled.

Policy changes cause investment, deployment to slide in Germany

For much of the past decade, Germany's feed-in tariffs have driven deployment of solar and wind technologies, which now provide more than 20 percent of the country's power. But government austerity and pressure from consumers and industry about the impact of high electricity prices spurred the government to initiate policy changes in 2013 and curtail clean energy incentives. Investment fell 55 percent from 2012 levels, to $10 billion, and Germany dropped from third to sixth place among G-20 nations. Wind investments decreased by 16 percent, to $5.1 billion (still fourth highest in the G-20), but solar financing declined by more than $10 billion, to $4.8 billion, far off the pace of world leaders Japan, China, and the United States. The recalibration of German clean energy policies also affected annual deployment levels, which had previously been among the world's greatest. Wind capacity additions remained above 3 GW in 2013, but new solar generating capacity additions were down more than 50 percent, to 3.3 GW, after a record addition of almost 8 GW in 2012.

Canada records G-20's second-fastest clean energy investment growth

Strong clean energy investments in 2013 catapulted Canada up five spots to seventh place in the G-20. Investment rose by 45 percent, to $6.5 billion. The wind sector grew by more than 40 percent, to $3.6 billion; in the province of Ontario, a number of backlogged projects were permitted and several others were completed. Included in the finished projects were the 270-MW South Kent Wind Farm and the 299-MW Blackspring Ridge facilities. Canada's solar sector also recorded impressive growth in 2013, attracting $2.5 billion.

Program implementation challenges slow clean energy investment in India

India remains a compelling clean energy opportunity as it seeks to expand access to energy to keep up with demand from a growing population and emerging economy. Within the G-20, the Indian renewables market remained the eighth largest for the second year in a row, but investment was down 15 percent, to $6 billion. As evidenced in the strong clean energy target in India's 12th five-year plan, the country has ambitious goals. But the results of 2013 show that implementing the program remains a challenge, as bureaucratic delays curtailed investment levels in the wind and solar sectors. Commissioning of new wind facilities in 2013 declined for the second consecutive year as a result of uncertainty surrounding key policies. Wind investments totaled $3.3 billion for the year. In the solar sector, investment decreased by more than $1 billion, to $1.3 billion, due to delays in several solar auctions. Deployment of solar held steady in 2013 at 1.1 GW, a level that must increase substantially if the country is to meet its solar target of 10 GW for 2017.

Clean energy investment remains strong in South Africa

South Africa's clean energy sector garnered $4.9 billion worth of investments in 2013, and it moved from the 10th- to ninth-largest market in the G-20. Although investment levels were down 14 percent, South Africa's market has been the second-fastest growing over the past five years. Sixty percent of the clean energy investment in 2013, $3 billion, went to the solar sector in conjunction with phase II of the country's carefully planned reverse auctions. An additional $1.9 billion was invested in the wind sector.

$3 billion

Amount invested in solar power in South Africa.

Financing types and trends

About the investment data

This report presents 2013 data on clean energy finance and investment in G-20 nations. Public and private investment in research and development, totaling $29.2 billion, are not included in the total G-20 investment presentations. Spending on digital or energy-smart technology assets, totaling $15.7 billion, also are excluded from G-20 totals because they cannot be broken down on a country by country basis and compared with prior year data. No data are presented for G-20 members Russia and Saudi Arabia because clean energy investment there was negligible. Spain, a member of the European Union but not an individual member of the G-20, is presented separately in this report because of the size and relevance of its clean energy sector over the past decade. (For more details on the research methodology of this report, please see the Appendix on Page 32.)

Bloomberg New Energy Finance tracks thousands of transactions across the spectrum of clean energy finance, from the research and development funding and venture capital invested in technology and early-stage companies, to the public market and asset financing used to fund business growth and clean energy deployment.

The key investment categories are:

Asset financing.

This category includes money invested in renewable energy generation projects, whether from internal company balance sheets, debt finance, or equity finance. The category excludes refinancing and short-term construction loans. Asset financing typically is associated with installing clean energy equipment and generating capacity.

Small-scale distributed capacity.

This category includes money invested in residential-scale solar projects of less than 1 MW.

Public market.

This category includes money invested in the equity of publicly listed companies developing renewable energy technology and clean power generation. Public market financing is typically associated with the scale-up phase, when companies are raising capital in public stock markets to finance product manufacturing and rollout. Investment in companies setting up generating capacity is included in the next category.

Venture capital and private equity.

This category includes money invested by venture capital funds in the equity of companies developing renewable energy technology. In general, venture capital is invested at the innovation stage, when companies are proving the market potential of goods and services.

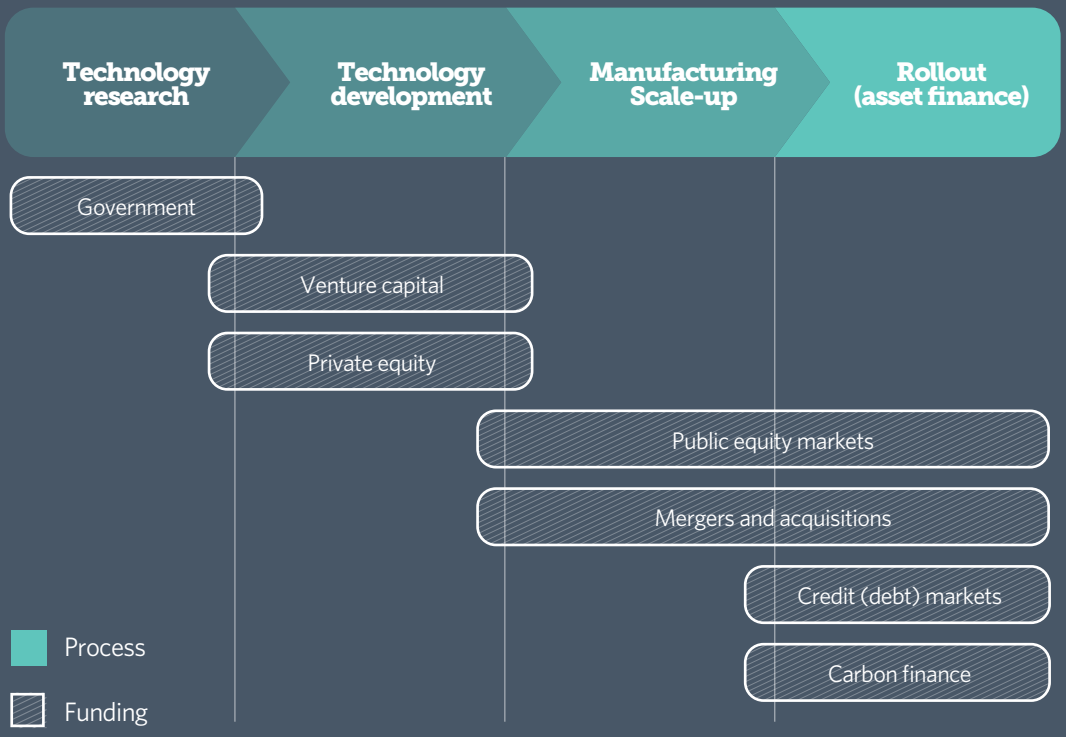
Finally, the data factor reinvested equity into investment totals. Reinvested equity is a deduction and is therefore referred to as an "adjustment." The purpose of this adjustment is to remove double counting upon aggregation of asset classes. Double counting is caused when companies that raise funds from the venture capital and private equity community or on the capital markets invest them in projects through asset financing within 12 months. Reinvested equity is deducted from the asset financing category when multiple asset classes are represented.

These investment vehicles range across successive stages of clean energy development and deployment in a continuum, as detailed in Figure 14.

Figure 14

Types of Financing

The clean energy financing continuum



Source: Bloomberg New Energy Finance

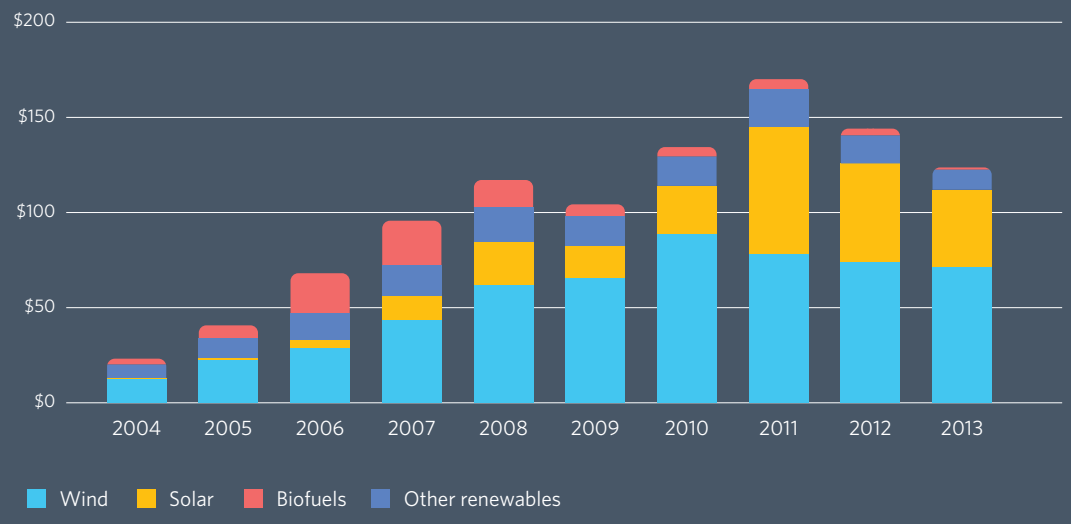
Asset financing

Asset financing, typically associated with the installation of clean energy equipment and generating capacity, is a barometer of clean energy deployment and job creation: It accounted for 57 percent of G-20 clean energy investment in 2013. All told, $123.7 billion was invested in physical assets that generate clean energy services (power, heat, fuels), with onshore wind being the dominant sector because of its relative maturity and scalability. (See Figures 15 and 16 on Page 23-24 for a breakdown of asset financing by renewable energy sectors and country.)

Figure 15

G-20 Asset Financing by Sector, 2004-13 (in US$ billions)

Asset financing favors wind



Source: Bloomberg New Energy Finance

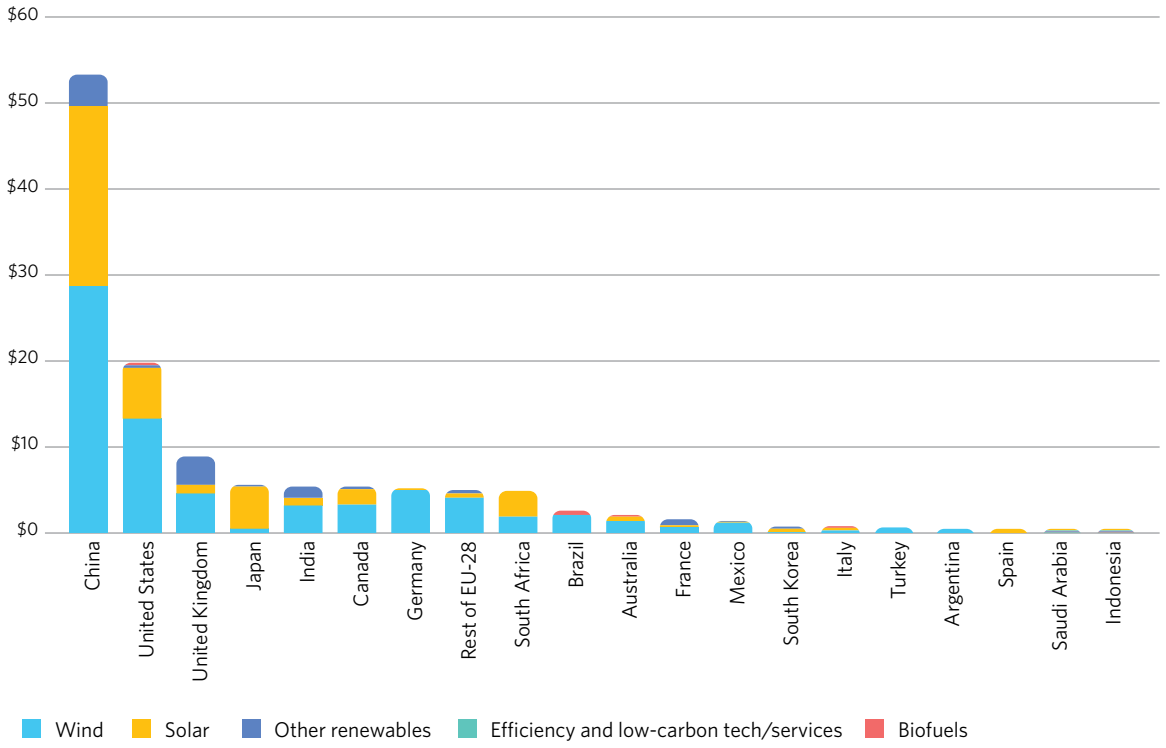
Key observations about asset financing in 2013 include:

- Asset financing declined 14 percent from 2012.
- Wind energy was the leading sector for asset financing, attracting $71.1 billion, or 57 percent of the total.
- Asset financing for solar energy fell approximately $10 billion, to $41 billion.
- Other renewable energy sources, such as biomass and waste power, geothermal, small hydro, and marine, garnered $10.5 billion.
- Asset financing for biofuels declined to $1.2 billion, more than 60 percent below the 2012 level.
- China led the G-20 in clean energy asset financing for wind, attracting $28.7 billion, or 40 percent of all G-20 financing of this type. China's asset financing for wind was more than double that of the United States, which recorded $13.3 billion.

Figure 16

G-20 Asset Financing by Country and Sector, 2013 (in US$ billions)

China dominates in clean energy asset financing



Source: Bloomberg New Energy Finance

Small-distributed capacity investment

Small-distributed capacity is associated with residential- or small commercial-scale solar projects of less than 1 MW. Investment in small-distributed capacity had grown significantly in recent years because of declining solar photovoltaic prices and new financing mechanisms. In 2013, however, small-distributed capacity investment declined sharply, to $52.5 billion. (See Figures 17 and 18 on Page 25-26.)

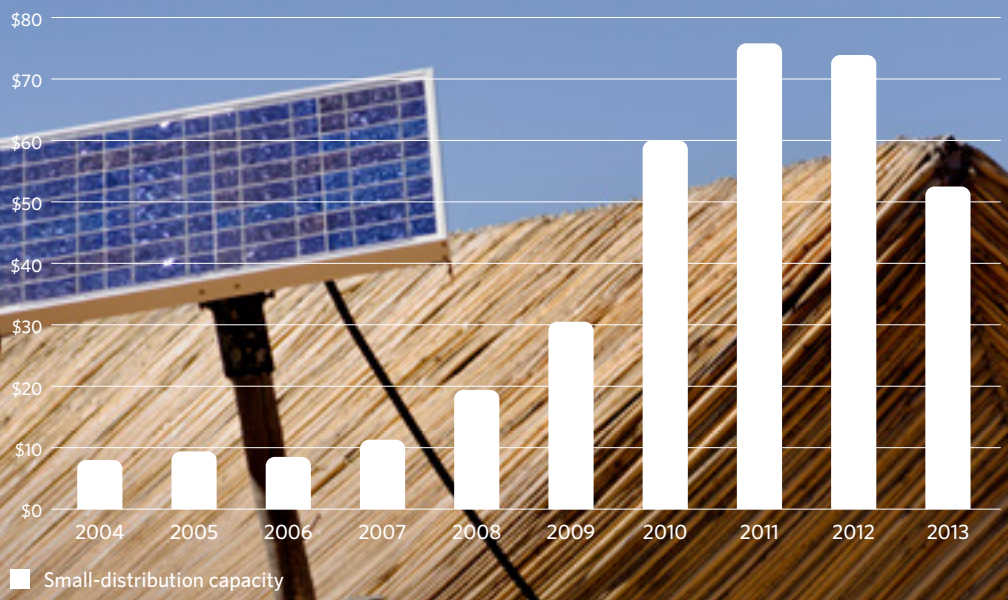
Highlights include:

- G-20 investment in small-distributed capacity fell 29 percent in 2013.
- Small-distributed capacity accounts for 24 percent of G-20 clean energy financing.
- Japan led this category by a wide margin, attracting $23 billion of small-distributed capacity financing, 76 percent more than in 2012.
- The United States also experienced growth in this financing for the second year in a row, totaling $7.9 billion in 2013.
- Investments in this category in Germany and Italy fell by more than two-thirds, to $4.6 billion and $2.8 billion, respectively.

Figure 17

G-20 Investment in Small-Distributed Capacity, 2004-13 (in US$ billions)

Small-distributed capacity investment dips in 2013



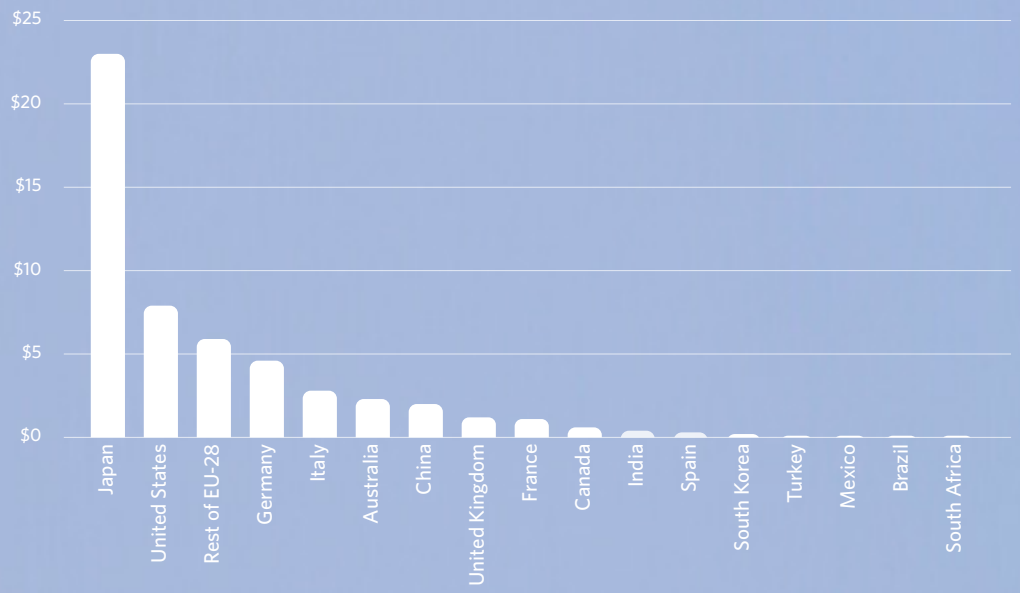
Source: Bloomberg New Energy Finance

iStockphoto

Figure 18

G-20 Small-Distributed Capacity Investment by Country, 2013 (in US$ billions)

Japan leads in small-distributed capacity investment in 2013



Source: Bloomberg New Energy Finance


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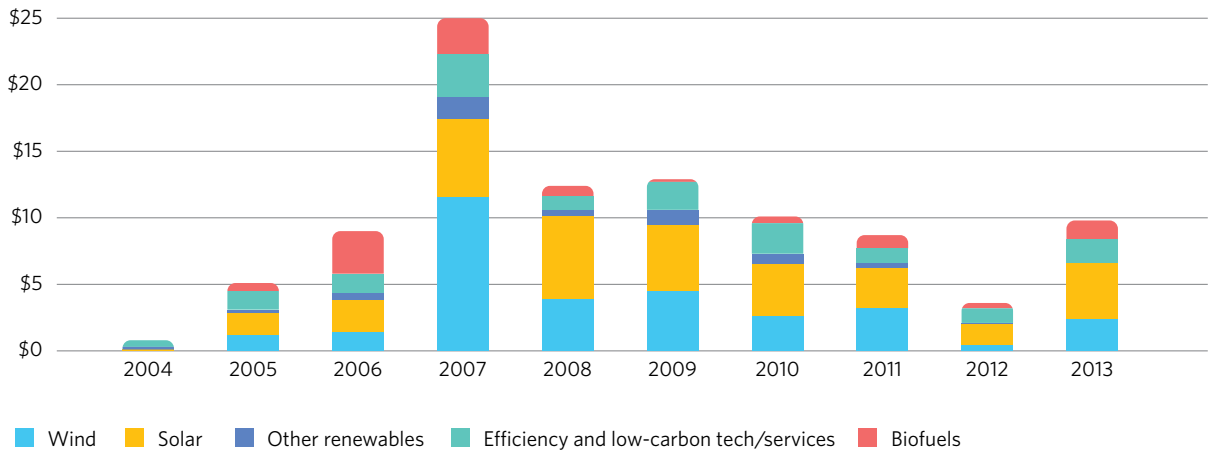
Figure 19

Public Market Investment by Sector, 2004-13 (in US$ billions)

Clean energy financing via stock markets rebound in 2013



Source: Bloomberg New Energy Finance

Public market financing

Public market financing is typically used by companies to fund expansion and growth, often in the manufacturing sector. As the clean energy economy emerged in the mid-2000s, many companies used stock markets to fund their growth plans. But public market funding declined sharply in recent years as clean energy stock prices fell. In 2013, this category rebounded sharply, along with stock indexes. Overall, public market financing increased 176 percent, to $9.8 billion, in 2013, as clean energy stock indexes rose faster than indexes such as the Standard & Poor's 500. (See Figures 19 and 20 on Page 27-28.) for public market financing details by sector and by country.)

Key observations include:

- As the price of manufactured clean energy products stabilized, companies returned to profit making and the value of clean energy stocks increased in 2013.
- The United States and the United Kingdom accounted for 91 percent of financing in this category. With $6.8 billion in public market offerings, the United States represented more than two-thirds of these investments. The United Kingdom's financings reached $2 billion.
- Public market financing in the solar energy sector more than doubled to $4.2 billion. Wind energy attracted $2.4 billion in public markets. The energy-smart technology sector gained $1.8 billion through public markets, followed by biofuels with $1.4 billion.

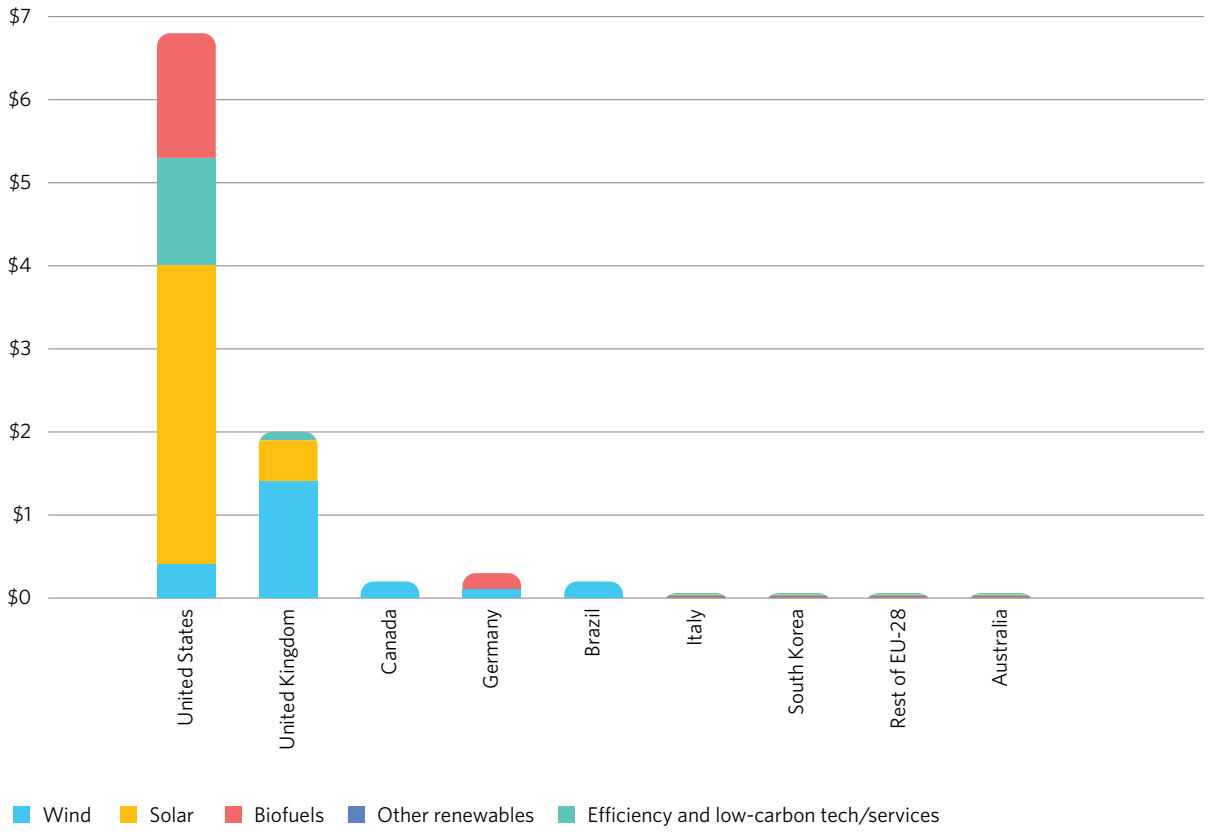
Venture capital and private equity financing

Venture capital and private equity financing are closely linked with technology innovation and development. (See Figure 14 on Page 22.)

Figure 20

G-20 Public Market Investment by Country and Sector, 2013 (in US$ billions)

United States accounts for two-thirds of stock market investment



Source: Bloomberg New Energy Finance

While accounting for only 2 percent of overall clean energy investment, venture capital is an oft-cited barometer of interest in emerging technologies. Venture capital financing in 2013 fell for the second year in a row, declining by one-third, to $4 billion. (See Figures 21 and 22 for a breakdown of venture capital and private equity financing by country and sector.)

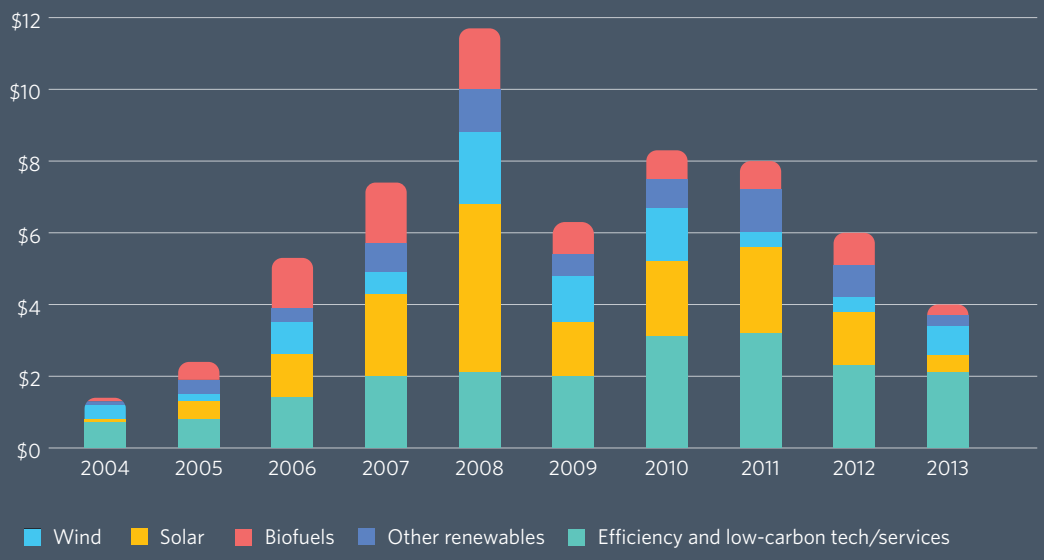
Key observations include:

- The United States remains the leader in venture capital and private equity financing, accounting for $2.2 billion in 2013, or 55 percent of the G-20 total. The United Kingdom was the only other country with significant investment levels, attracting $400 million in equity investment by venture capital and private equity firms.
- For the fifth year in a row, energy efficient/low-carbon technologies were the leading beneficiary of venture capital investment, attracting $2.1 billion. Solar energy attracted $500 million.

Figure 21

G-20 Venture Capital and Private Equity Financing by Sector, 2004-13 (in US$ billions)

Venture capital/private equity investment falls for third consecutive year



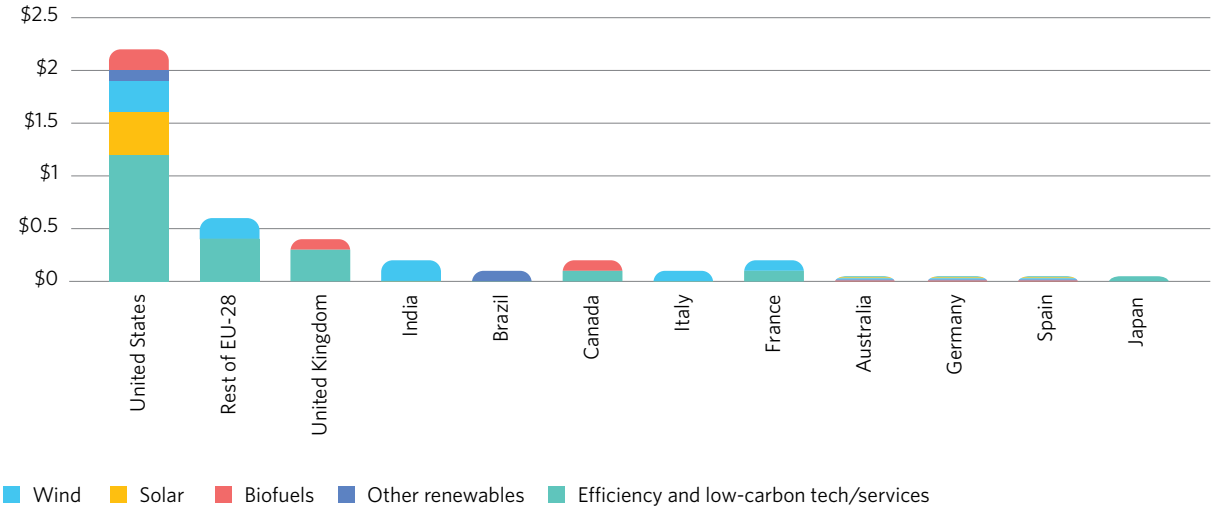
Source: Bloomberg New Energy Finance

Getty Images/Flickr RM

Figure 22

Venture Capital and Private Equity Financing by Country and Sector, 2013 (in US$ billions)

United States dominates venture capital financing

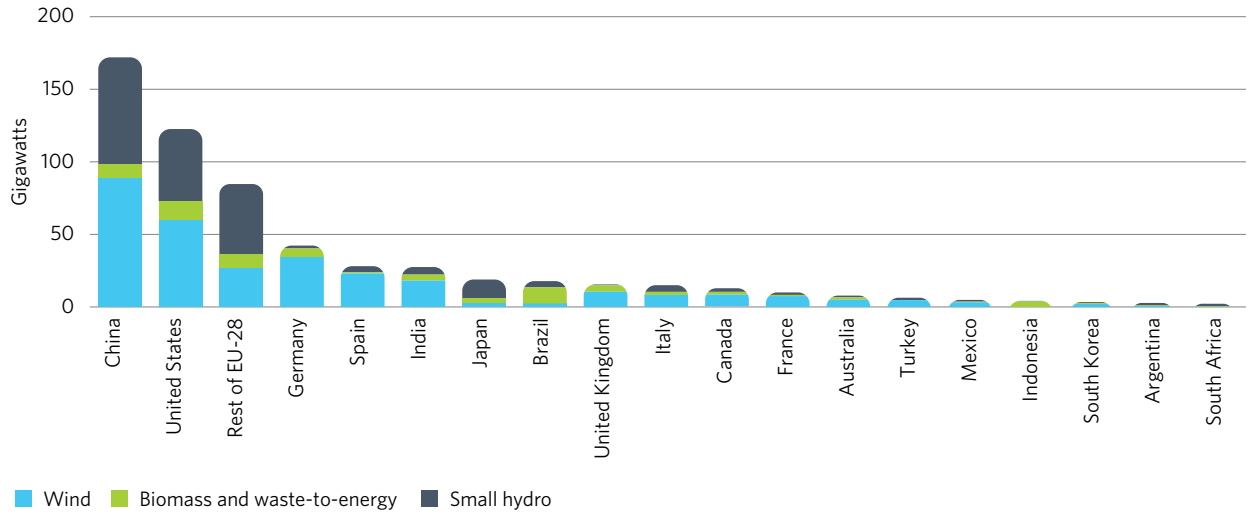


Source: Bloomberg New Energy Finance

Figure 23

G-20 Cumulative Installed Wind, Biomass, and Small Hydro Capacity, as of 2013 (in GW)

China and the United States Lead in Installed Wind and Small Hydro Capacity

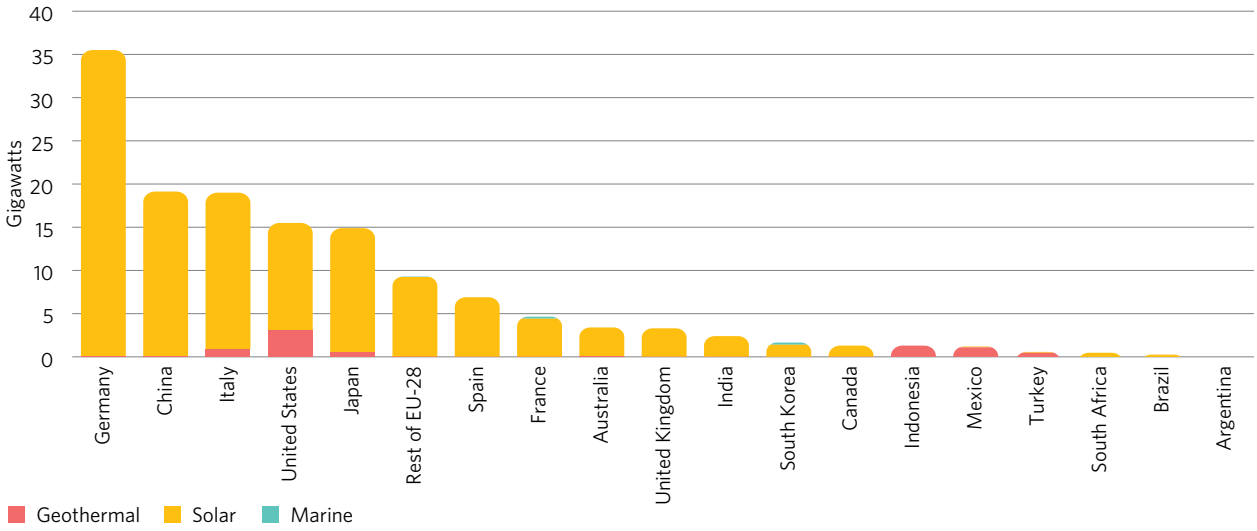


Source: Bloomberg New Energy Finance

Figure 24

G-20 Cumulative Installed Geothermal, Solar, and Marine Capacity, as of 2013 (in GW)

Germany leads in installed solar capacity



Source: Bloomberg New Energy Finance

Installed renewable energy capacity

Renewable power generating capacity additions declined by 1 percent in 2013. All told, 87 GW of new clean power was installed around the globe, bringing worldwide capacity to 735 GW. For the first time, more solar was installed than wind. Additions to solar generating capacity were 29 percent greater than in 2012, with 40 GW installed, raising the total to 144 GW. Wind deployments declined by more than 40 percent, compared with 2012. With an additional 27 GW installed in 2013, wind power capacity has reached 307 GW globally. Current projections indicate that solar will be the leading clean energy technology in both investment and capacity for the next several years. (See Figures 23 and 24 on Page 30-31 for a breakdown of installed renewable energy capacity by sector and country.)

Key developments include:

- China has the world's largest clean energy capacity, with 191 GW installed. It added 14.1 GW of wind energy in 2013, increasing total installed capacity to more than 88.6 GW. China also added an unprecedented 12.1 GW of solar.
- Worldwide, wind capacity additions were down by more than 21 GW, with the United States. accounting for almost two-thirds of that amount. U.S. wind installations fell by more than 90 percent in response to uncertainty surrounding renewal of the production tax credit. U.S. cumulative wind installation now stands at just under 60 GW. The U.S. also added 4.4 GW of solar, a national record.
- Geothermal capacity increased by 1 GW.
- Biomass and waste-to-energy generating capacity increased by 10 GW.

Appendix: Methodology

All figures in this report, unless otherwise credited, are based on the output of Bloomberg New Energy Finance's Desktop database (see below) and analysis by its regional and sector experts. Data are current as of the end of 2013 and are categorized by country. Members of the European Union not profiled individually here are aggregated as the "Rest of EU-28."[4]

The Bloomberg New Energy Finance Desktop is a Web-based database of clean energy and energy-smart technology companies, manufacturing facilities, generation projects, and financial deals that are organized according to transaction type, sector, geography, and timing. The Desktop database includes over 40,000 transactions, 45,000 renewable energy projects, and more than 50,000 organizations—including start-ups, corporations, venture capital and private equity providers, banks, and other investors. The Bloomberg New Energy Finance Desktop database is available by subscription and can be accessed at www.bnef.com.

Research for this report included data on the following renewable energy projects: biomass, geothermal, and wind generation projects of more than 1 MW, hydro projects between 1 and 50 MW, all marine energy projects, biofuels projects with a capacity of 1 million liters or more a year, and all solar projects. Small-distributed capacity describes projects of less than 1 MW and were estimated separately.

Energy efficient/low-carbon technology services include financial investment in technology companies covering energy efficiency, smart grid, energy storage, advanced transportation, carbon capture and storage, and general clean energy services companies. These sectors are also included in the corporate and government research and development investment figures. Investment in efficiency and low-carbon technology projects by governments and public financing institutions was excluded.

Where deal values were not disclosed, Bloomberg New Energy Finance assigned an estimated value based on comparable transactions. Deal values were rigorously rechecked and updated when information was released about particular companies and projects. The statistics used were historical figures, based on confirmed and disclosed investment.

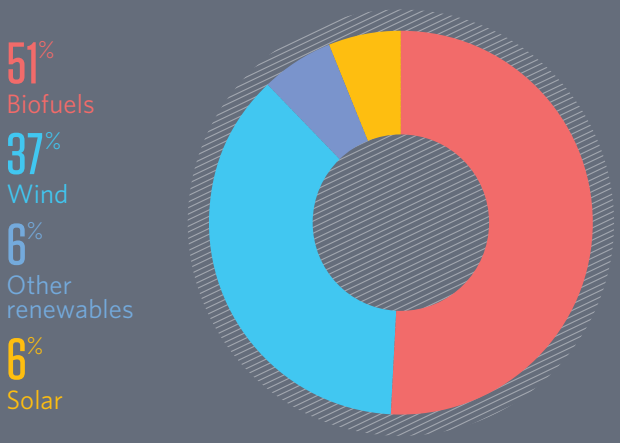
An adjustment for reinvested equity was made to remove potential double counting when aggregating funds raised (through public markets and venture capital/private equity) with funds spent (through asset financing). This calculation looks to match organizations that raised funds and then acted as investors in the financing of a project that occurred within one year of the funds being raised.

Bloomberg New Energy Finance continuously monitors investment in renewable energy and energy efficiency. This is a dynamic process. As the sector's visibility grows, information flow improves. New deals are made and existing data are refined, meaning that historical figures are constantly updated.

Argentina

Reflecting difficulties surrounding Argentina's economy, clean energy financing in the country fell to $100 million in 2013. Overall investment was down 83 percent, the third-sharpest decline in the G-20. All investment occurred in the wind sector, but those investments were off 50 percent from 2012 levels. In light of national economic instability, development banks that have been an important financier of clean energy efforts curtailed activity in Argentina. That has made it difficult to secure financing for wind or small hydro projects, the primary renewable resources developed in the country. Argentina has 200 megawatts of wind power and 500 MW of small hydro capacity.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$94 million
G-20 investment rank	18
Percentage of G-20 total	0.0%
5-year growth rate	-29.0%
Installed Clean Energy 2013	
Total renewable energy capacity (MW)	758
Percentage of G-20 total	0.1%
5-year growth rate	7%
Key Renewable Energy Sectors	
Biodiesel (million liters per year)	3,090
Small hydro (MW)	475
Wind (MW)	200

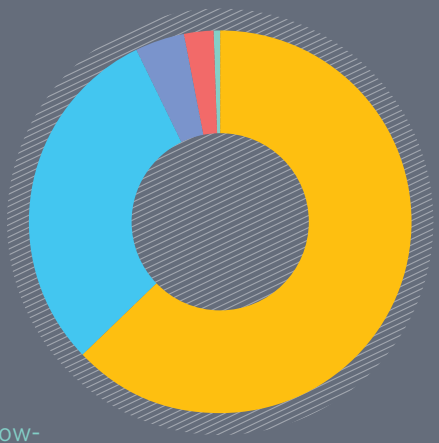
Key Clean Energy Targets	
Renewable energy electricity	8% of total power generation (by 2016)
Ethanol	5% of total gasoline consumption
Biodiesel	7% of total diesel consumption
Key Investment Incentives	
Wind, solar, biomass, small hydro	Tax incentives: Value-added tax rebate/accelerated depreciation benefit
Biofuel	Tax exemption for producers and guaranteed fixed prices set by government

National Clean Energy Policies			
Carbon cap		Auto efficiency standards	✓
Carbon market		Feed-in tariffs	✓
Renewable energy standard	✓	Government procurement	
Clean energy tax incentives	✓	Green bonds	

Australia

Clean energy investment in Australia held steady in 2013 at $4.4 billion. With most other G-20 nations experiencing declines, Australia moved up from 13th to 10th position among the G-20. Recent analysis has shown that unsubsidized wind in Australia is cheaper than new coal or gas generation technologies. Investment in wind increased by more than 25 percent in 2013 to $1.4 billion, enabling the addition of 500 MW. In the solar sector, investment was down slightly to $2.8 billion as equipment became cheaper, but capacity additions were steady at 1 gigawatt, bringing total installed solar to 3.4 GW. Over the past five years, Australia has been the third fastest growing market in the G-20. Maintaining that pace will be challenging because Australian climate change and clean energy policies are under pressure from a new government which took office vowing to abolish the national carbon tax in 2014. Despite the likely change, rooftop solar could remain an attractive option in view of high retail electric power prices.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$4.4bn
G-20 investment rank	10
Percentage of G-20 total	2.3%
5-year growth rate	32.1%

Installed Clean Energy 2013	
Total renewable energy capacity (GW)	8.2
Percentage of G-20 total	1%
5-year growth rate	22%
Key Renewable Energy Sectors	
Wind (GW)	3
Solar (GW)	3.4

Key Clean Energy Targets	
Large-scale renewable energy	41 terrawatt-hours additional
Small-scale renewable energy	4 terrawatt-hours additional
Electricity	20% renewable by 2020

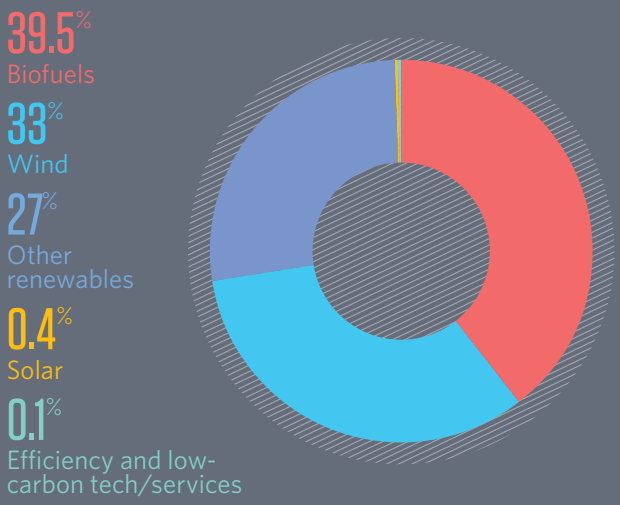
Key Investment Incentives	
Renewable energy	Tradeable permits
Biofuels	State-based blending mandates

National Clean Energy Policies			
Carbon cap	✓	Auto efficiency standards	
Carbon market	✓	Feed-in tariffs	✓
Renewable energy standard	✓	Government procurement	
Clean energy tax incentives		Green bonds	

Brazil

Clean energy investment in Brazil fell sharply for the second year in a row, dropping 55 percent, to $3.1 billion, and the country was no longer in the top-20 clean energy markets in the world. Almost three-quarters of private finance in Brazil, about $2.3 billion, was for wind power. However, investment in this sector was down more than 50 percent because the Brazilian economy cooled and local content requirements were imposed on projects financed by Brazil's national development bank, BNDES. Brazil's wind capacity additions were down by more than 70 percent, with less than 300 megawatts installed, compared with more than 1 gigawatt a year earlier. Brazil's biofuels sector fared better, receiving $500 million, second highest in the G-20, as the country moved to implement a strengthened blending mandate that requires gasoline to have 25 percent ethanol by 2017.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$3.1bn
G-20 investment rank	12
Percentage of G-20 total	1.6%
5-year growth rate	-24%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	18
Percentage of G-20 total	3%
5-year growth rate	19%
Key Renewable Energy Sectors	
Bioethanol (million liters per year)	38,202
Biomass and waste (GW)	11.1
Wind (GW)	2.4

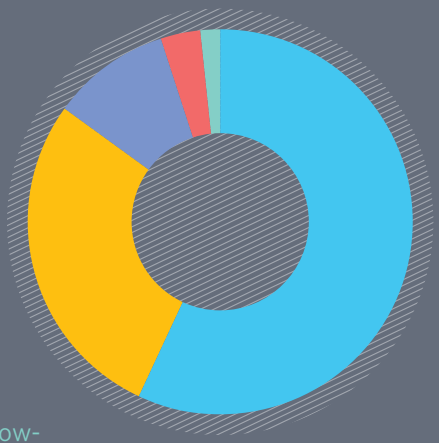
Key Clean Energy Targets	
Greenhouse gas emissions	36-39% reduction by 2020
Ethanol	25% blending mandate
Biodiesel	5% blending mandate
Key Investment Incentives	
Biomass, small hydro, solar and wind	Generation-based subsidies/ preferential BNDES loans/ transmission and distribution taxes discounts/tax incentives
Biofuels	Preferential BNDES loans (first and second generation biofuels)

National Clean Energy Policies			
Carbon cap	✓	Auto efficiency standards	✓
Carbon market		Feed-in tariffs	✓
Renewable energy standard	✓	Government procurement	✓
Clean energy tax incentives	✓	Green bonds	

Canada

With a 45 percent increase, Canada had the highest rate of growth in the Americas and second highest in the G-20. In total, $6.5 billion was invested, and the country rose from 12th to seventh in the G-20 rankings. Canadian clean energy policies are framed primarily at the provincial level, and impending reforms to Ontario's feed-in tariff program encouraged 2013 investment. A large number of projects were financed ahead of Green Energy Act reforms enacted late in the year that will reduce future incentives. Wind remains the favored clean energy technology for investors, attracting $3.6 billion. Solar garnered $2.5 billion, almost 50 percent more than in 2012. More than 1.5 gigawatts of new wind capacity was installed, as the 270-megawatt South Kent and 299-MW Blackspring Ridge wind farms received financing. Another 500 MW of solar was added.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$6.5bn
G-20 investment rank	7
Percentage of G-20 total	3.4%
5-year growth rate	24.3%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	13.5
Percentage of G-20 total	2.1%
5-year growth rate	16%
Key Renewable Energy Sectors	
Wind (GW)	7.9
Small hydro (GW)	2.5

Key Clean Energy Targets	
Electricity generation	90% from zero-emissions sources by 2020
Wind (Quebec, GW)	4.7
Solar (MW)	500
Key Investment Incentives*	
Generation and energy efficiency	Accelerated capital cost allowance
Biofuels	NextGen biofuels fund
Generation (Ontario)	Feed-in tariff
Advanced transportation (British Columbia)	Clean energy vehicle program

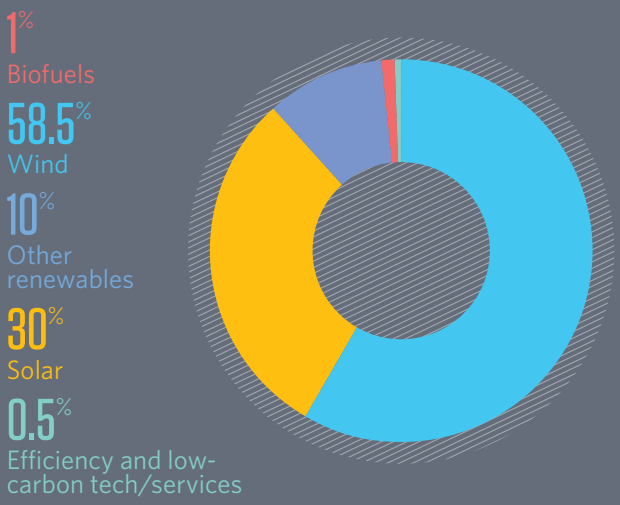
*primarily through provincial governments

National Clean Energy Policies			
Carbon cap		Auto efficiency standards	✓
Carbon market	✓	Feed-in tariffs	
Renewable energy standard		Government procurement	
Clean energy tax incentives	✓	Green bonds	✓

China

China solidified its position as the world's clean energy superpower, even though investment levels in 2013 declined 6 percent, to $54.2 billion. China maintains the world's most robust wind market, attracting $28 billion and adding more than 14 gigawatts of new wind generating capacity. But the story last year was China's emergence as a major solar market. Solar financing totaled $22.6 billion, and a world-record 12.1 GW of solar generating capacity was added—positioning the country to achieve ambitious solar goals for 2015. It is also a major hub for solar finance, manufacturing, and deployment. In view of its capacity growth in recent years, including more than 30 GW in 2013, China is approaching 200 GW of installed clean energy capacity and should pass that threshold in 2014. As concerns about air quality intensify, Chinese authorities have set goals for adding 18 GW of wind and 14 GW of solar in 2014. The country is also accelerating installation of ultra-high voltage transmission capabilities that facilitate integration of renewable sources.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$54.2bn
G-20 investment rank	1
Percentage of G-20 total	28.7%
5-year growth rate	17.8%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	191
Percentage of G-20 total	29%
5-year growth rate	23%
Key Renewable Energy Sectors	
Wind (GW)	88.6
Small hydro (GW)	73.6
Solar (GW)	19.1

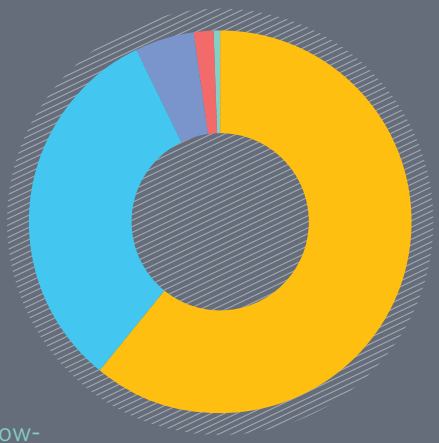
Key Clean Energy Targets	
Non-fossil fuel energy use	11.4% in total primary energy use by 2015
Wind	100 GW by 2015, 200 GW by 2020
Solar	35 GW by 2015, 50 GW by 2020
Biomass	13 GW by 2015, 30 GW by 2020
Key Investment Incentives	
Wind, biomass, waste-to-energy	Fixed feed-in tariff
Solar	Fixed feed-in tariff, rooftop and building integrated PV subsidies
Renewable energy	Renewable portfolio standard and guaranteed purchase by utilities

National Clean Energy Policies			
Carbon cap	✓	Auto efficiency standards	✓
Carbon market	✓	Feed-in tariffs	✓
Renewable energy standard	✓	Government procurement	
Clean energy tax incentives	✓	Green bonds	✓

France

For the second year in a row, clean energy investment in France fell sharply, by 42 percent in 2013, to $2.9 billion. France is in the midst of a national review of the country's energy sector, which has relied heavily on nuclear power for the past several decades. In 2013 a special commission initiated a nationwide debate on France's energy future and produced recommendations for policymakers. Several new energy efficiency programs were adopted. Further energy reforms will be considered in 2014 and should help determine the future of renewable incentives. In 2013, solar was the preferred clean energy sector, attracting $1.4 billion, and 800 megawatts of new solar capacity. Wind garnered $700 million worth of investment. The French government is also keen to develop tidal energy technologies, with the aim of matching the United Kingdom's development of marine resource technologies. In addition, France is seeking proposals for up to 1 gigawatt of offshore wind, which should encourage future growth in this sector.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$2.9bn
G-20 investment rank	13
Percentage of G-20 total	1.5%
5-year growth rate	-8.3%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	14.7
Percentage of G-20 total	2.2%
5-year growth rate	19%
Key Renewable Energy Sectors	
Wind (GW)	7.5
Solar (GW)	4.4

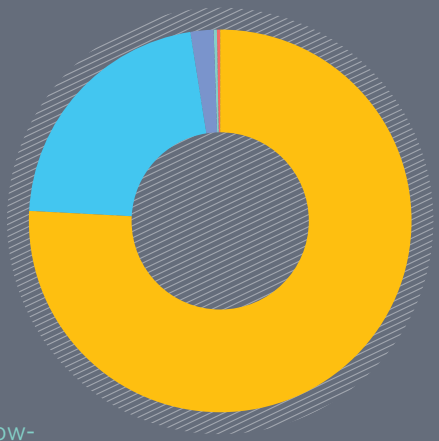
Key Clean Energy Targets (2020)	
Renewable energy	23%
Renewable electricity, heat	27% for electricity, 33% for heat
Biofuels	10% renewable energy share in transport (EU-wide)
Key Investment Incentives	
Offshore wind, solar, tidal	Tenders
Onshore wind,small solar, biomass, biogas	Feed-in tariff
Energy efficiency	Energy saving obligation/white certificate scheme/tax incentives

National Clean Energy Policies			
Carbon cap	✓	Auto efficiency standards	✓
Carbon market	✓	Feed-in tariffs	✓
Renewable energy standard		Government procurement	✓
Clean energy tax incentives	✓	Green bonds	

Germany

The performance of the German clean energy sector mirrored that of Europe's overall, declining 55 percent to just over $10 billion in response to cutbacks in feed-in tariffs, uncertainty about the future of clean energy incentives, and concerns about how much renewable energy the German grid can integrate. Germany's recalibration of national energy policies has moderated the solar sector significantly, with investment down by two-thirds, to $4.8 billion, and 2013 installations down to less than 4 gigawatts—50 percent below the levels achieved a year earlier. Nonetheless, with 35.5 GW of solar, Germany has deployed almost twice as much as any other nation. In the wind sector, investment fell modestly, to $5.1 billion. Three GW of new wind capacity was installed in 2013, bringing cumulative wind capacity to 34 GW, third highest in the G-20. Germany derives a robust 20 percent of its national power needs from renewable sources.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$10.1bn
G-20 investment rank	6
Percentage of G-20 total	5.4%
5-year growth rate	-8.2%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	77.4
Percentage of G-20 total	12%
5-year growth rate	16%
Key Renewable Energy Sectors	
Wind (GW)	34
Solar (GW)	35.5
Biomass (GW)	5.9

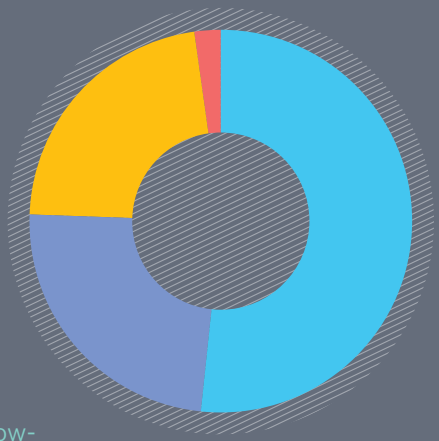
Key Clean Energy Targets	
Renewable energy share in final energy consumption	18% by 2020
Offshore wind capacity by 2020	6.5 GW
Key Investment Incentives	
Solar (PV)	Feed-in tariffs, or FiT, reduced monthly
Onshore wind	FiT or market premium
Offshore wind	FiT or market premium
Other renewables	FiT or market premium

National Clean Energy Policies			
Carbon cap	✓	Auto efficiency standards	✓
Carbon market	✓	Feed-in tariffs	✓
Renewable energy standard		Government procurement	
Clean energy tax incentives	✓	Green bonds	

India

Clean energy investment in India fell for the second year in a row, to $6 billion, 15 percent less than in 2012. India remains an attractive market as it seeks to expand energy access for a growing population and expanding economy. Although national renewable energy ambitions are strong—as articulated in the 12th Five Year Plan and National Solar Mission—India's clean energy sector has not accelerated as rapidly as experts expected in light of bureaucratic and policy delays that have curtailed investment in wind and solar. The depreciation of the rupee has also discouraged financing. Wind has been the technology of choice; it attracted $3.3 billion in 2013, but deployments fell steeply, to 1.7 gigawatts. The solar sector, which totaled $1.3 billion in 2013, fell most sharply in India, but more than 1 GW of new capacity was deployed—almost doubling installed solar. Several solar auctions were completed in 2013 and should be financed and commissioned in 2014, promising growth in the year ahead.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$6.0bn
G-20 investment rank	8
Percentage of G-20 total	3.2%
5-year growth rate	2.3%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	30
Percentage of G-20 total	4.5%
5-year growth rate	16%
Key Renewable Energy Sectors	
Wind (GW)	18.2
Small hydro (GW)	5.1
Solar (GW)	2.4

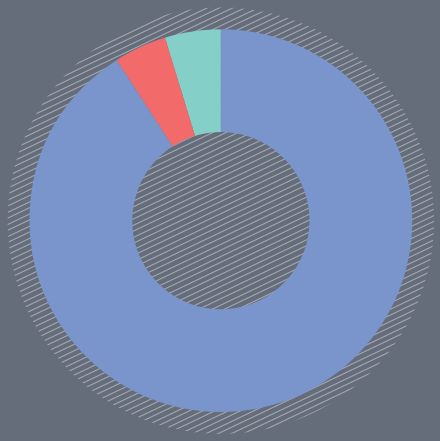
Key Clean Energy Targets (2017)	
Wind	32.4 GW
Solar	10.9 GW
Bio-energy	5.9 GW
Key Investment Incentives	
All renewable energy	Feed-in tariffs, lower tax rates for first 10 years, renewable energy certificates
All renewable energy except Wind	80% accelerated depreciation in the first year, capital subsidy
Wind and solar	Generation-based incentives

National Clean Energy Policies			
Carbon cap		Auto efficiency standards	
Carbon market		Feed-in tariffs	✓
Renewable energy standard	✓	Government procurement	✓
Clean energy tax incentives	✓	Green bonds	✓

Indonesia

Clean energy investment in Indonesia continued to fall, declining to near zero in 2013. Indonesia remains near the bottom of G-20 countries. Indonesia's renewable power focus is on geothermal energy, which it leads the world in tapping. With 1.3 gigawatts of geothermal tapped, Indonesia aspires to harness 9.5 GW by 2025, along with almost 1 GW each from small hydro, wind, and solar. A solar auction program was launched for 140 MW worth of projects, and the national biofuels blending mandate was tightened in mid-2013, as the government seeks to reduce fuel-import requirements.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$0.0bn
G-20 investment rank	19
Percentage of G-20 total	0.0%
5-year growth rate	-100.0%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	3.2
Percentage of G-20 total	0.5%
5-year growth rate	3%
Key Renewable Energy Sectors	
Biodiesel (million liters per year)	4,250
Biomass and waste (GW)	1.6
Geothermal (GW)	1.3

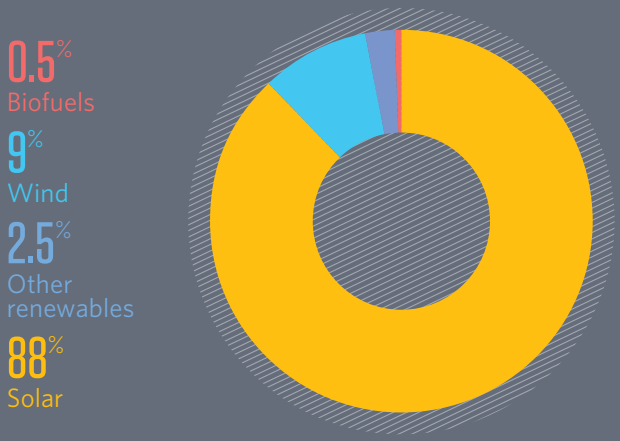
Key Clean Energy Targets	
Renewable energy consumption target	Proposed 25% of renewable energy in final consumption by 2025
Renewable energy capacity targets	Geothermal 9.5 GW, small-hydro 1 GW, solar 0.97 GW, wind 0.87 GW, biomass 0.81 GW, all by 2025
Biofuel blending targets	25-30% of biodiesel blending by 2025 depending on the sector; 20% of bioethanol blending by 2025 for all sectors
Key Investment Incentives	
Geothermal	Guided feed-in tariff
Solar	Auction-based mechanism with guided power prices
Small-hydro and biomass plants	<30 MW feed-in tariffs
All renewables	Payment guarantee from PLN, income tax rebates, accelerated depreciation benefit

National Clean Energy Policies			
Carbon cap		Auto efficiency standards	
Carbon market		Feed-in tariffs	✓
Renewable energy standard		Government procurement	
Clean energy tax incentives	✓	Green bonds	

Italy

Italy experienced a decline of 75 percent, after a drop of more than 50 percent in 2012. Investment in the sector has fallen sharply as feed-in tariffs were curtailed as part of overall government austerity initiatives. In 2013, feed-in tariffs were effectively ended and financing totaled $3.6 billion, as the country fell from sixth to 11th place among the G-20. Almost all clean energy investment has been for solar technologies, which accounted for $3.1 billion. All told, 2 gigawatts of solar was deployed in 2013, less than one-quarter of installation levels achieved in 2011. Still, Italy is home to 18.1 GW of installed solar, third highest in the G-20. The combination of high retail electric prices and available rooftop solar incentives should ensure continued deployment in the coming year. Italy has 8 GW of installed wind capacity, adding 300 megawatts in 2013.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$3.6bn
G-20 investment rank	11
Percentage of G-20 total	1.9%
5-year growth rate	-10.4%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	33.8
Percentage of G-20 total	5.1%
5-year growth rate	25%
Key Renewable Energy Sectors	
Solar (GW)	18.1
Wind (GW)	8.2
Small hydro (GW)	4.6

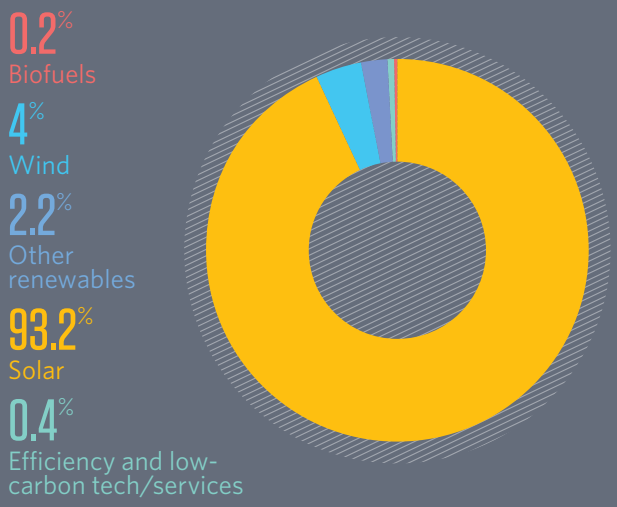
Key Clean Energy Targets	
Renewable electricity	26.4% share by 2020
Transportation	10% renewable share by 2020
Key Investment Incentives	
Renewable electricity	Net metering
Solar	Tax credit mechanism for household solar plants
Energy efficiency	Energy efficiency credits (white certificates)

National Clean Energy Policies			
Carbon cap	✓	Auto efficiency standards	✓
Carbon market	✓	Feed-in tariffs	✓
Renewable energy standard		Government procurement	✓
Clean energy tax incentives	✓	Green bonds	

Japan

Japan was the fastest-growing clean energy market in 2013, its investment increasing 80 percent to a national record of $28.6 billion. As such, Japan moved from fifth to third in G-20 rankings. The rapidly expanding clean energy sector reflects the nation's determination to diversify the power sector since the Fukushima nuclear catastrophe. Almost all investment was in the solar sector, which led G-20 nations by attracting $28 billion. An estimated 6.7 gigawatts of new solar generating capacity was installed, most of it small commercial and residential systems. With solar capacity almost doubling in 2013, Japan has the fourth highest total for installed solar energy. Over the past five years, Japan has achieved the second highest rate of growth. To continue its power diversification, the Japanese government has initiated broad-based reforms in the electric sector designed to increase competition and restructure the utility sector by 2020.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$28.6bn
G-20 investment rank	3
Percentage of G-20 total	15.2%
5-year growth rate	56.8%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	34
Percentage of G-20 total	5.2%
5-year growth rate	11%
Key Renewable Energy Sectors	
Solar (GW)	14.4
Small hydro (GW)	12.9
Wind (GW)	2.7

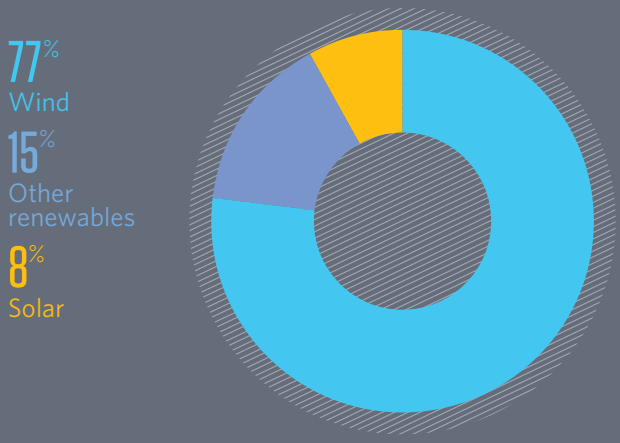
Key Clean Energy Targets	
Renewable energy electricity	Currently there is no specific target. New targets may be announced after a new Energy Basic Plan is announced in early 2014.
GHG emissions	3.8% GHG emissions reduction by 2020 compared with 2005 levels.
Key Investment Incentives	
Renewable power	Feed-in tariffs/accelerated depreciation
Energy efficiency	Cash subsidies for energy efficiency retrofits
Energy storage	Cash subsidies for energy management systems, residential fuel cells, battery-based energy storage (end-user, utility-scale)

National Clean Energy Policies			
Carbon cap		Auto efficiency standards	✓
Carbon market		Feed-in tariffs	✓
Renewable energy standard		Government procurement	
Clean energy tax incentives	✓	Green bonds	✓

Mexico

After dramatic growth a year earlier, clean energy investment in Mexico fell 18 percent, to $1.5 billion. Over the past five years, the compound annual growth rate for clean energy investment in Mexico has been 13 percent, seventh highest among the G-20. The wind sector in Mexico garnered $1.2 billion, accounting for 80 percent of the total. The solar sector gained $200 million, including financing for the nation's first large-scale solar project, a 39 megawatt plant in Baja California Sur. In 2013, Mexico initiated important policy reforms, adopting late in the year a new carbon tax on the sale and import of fossil fuels and a far-reaching restructuring of the country's oil and gas industry and electricity market. The reforms will release market forces and stimulate private competition that will impact the clean energy sector. Greater clarity should come in 2014 as secondary legislation and implementing regulations are developed.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$1.5bn
G-20 investment rank	14
Percentage of G-20 total	0.8%
5-year growth rate	13.3%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	3.6
Percentage of G-20 total	0.5%
5-year growth rate	19%
Key Renewable Energy Sectors	
Wind (GW)	1.6
Geothermal (GW)	1

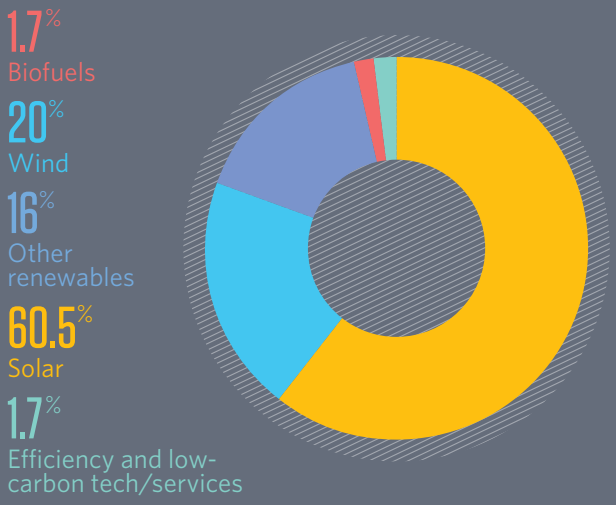
Key Clean Energy Targets	
Renewable energy electricity	35% clean energy sources electricity generation by 2024 (nonbinding)
Greenhouse gas emissions	30% reduction of greenhouse gas emissions by 2020 and 50% by 2050, compared to base-year of 2000 (nonbinding)
Key Investment Incentives	
Renewable energy	Accelerated depreciation tax incentive/Net metering for projects under 0.5MW

National Clean Energy Policies			
Carbon cap	✓	Auto efficiency standards	✓
Carbon market		Feed-in tariffs	
Renewable energy standard	✓	Government procurement	✓
Clean energy tax incentives	✓	Green bonds	

South Africa

Although investment levels fell 14 percent, to $4.9 billion, South Africa's clean energy sector is the largest in Africa and ninth-largest in the world. Over the past five years, no country has experienced faster growth, with South Africa's investment growing at a rate of 96 percent annually on average. The solar sector remained South Africa's largest, attracting $3 billion. The wind sector accounted for the remaining $1.9 billion. More than 2.4 gigawatts of renewable power is under development, and another 1.5 GW is planned. Investor confidence in the sector is buttressed by South Africa's revised Integrated Resources Plan, which forecasts as much as 17 GW worth of wind and solar could be installed in the country over the next 15 years—accounting for more than 20 percent of national generating capacity by 2030.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$4.9bn
G-20 investment rank	9
Percentage of G-20 total	2.6%
5-year growth rate	95.9%
Installed Clean Energy 2013	
Total renewable energy capacity (MW)	295
Percentage of G-20 total	0.04%
5-year growth rate	23%
Key Renewable Energy Sectors	
Solar (MW)	179
Small Hydro (MW)	81

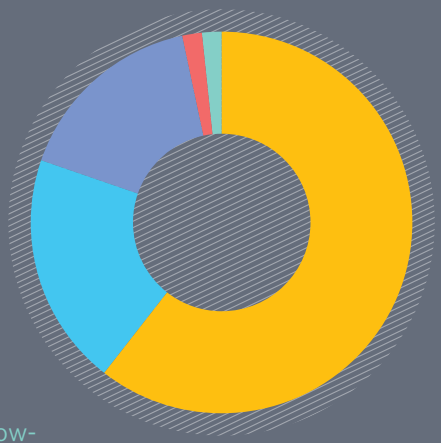
Key Clean Energy Targets	
Renewable energy electricity	20% renewable energy share in final energy consumption by 2030
Biofuels—biodiesel	5% blending requirement
Biofuels—bioethanol	2-10% blending requirement
Energy eficiency demand side management	Reduce demand by 3.4 GW by 2020
Key Investment Incentives	
Wind, solar, small hydro, biomass	Feed-in tariff as part of reverse auction

National Clean Energy Policies			
Carbon cap		Auto efficiency standards	
Carbon market		Feed-in tariffs	✓
Renewable energy standard		Government procurement	✓
Clean energy tax incentives		Green bonds	✓

South Korea

Clean energy investment decreased by 9 percent, to $1 billion, but the nation moved from 17th to 15th place among the G-20. Investment might have been curtailed by the government's plans to increase reliance on nuclear power to meet surging demand. Concerned about near-term potential for power shortfalls, South Korea is urging utilities to initiate energy efficiency, demand response, and other measures to stem peak demand. It is also working to build energy storage capabilities at Korea Electric Power Corporation substations. In 2013, $600 million was invested in the solar sector, enabling deployment of 400 megawatts of new capacity and double the level deployed in 2012. The wind sector attracted $100 million in 2013, and 100 MW was installed.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$1.0bn
G-20 investment rank	15
Percentage of G-20 total	0.5%
5-year growth rate	-8.9%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	2.5
Percentage of G-20 total	0.4%
5-year growth rate	23%
Key Renewable Energy Sectors	
Solar (GW)	1.3
Wind (MW)	579

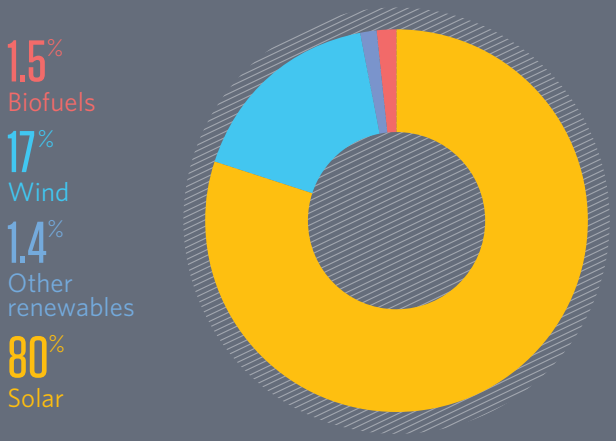
Key Clean Energy Targets	
Renewable energy	11% renewable energy share in final energy consumption by 2030
Biofuel blending target	2% of biodiesel blending by 2015
Key Investment Incentives	
Renewable energy	Renewable portfolio standard/tax relief for green building purchase
Solar PV	Separate RPS target for PV

National Clean Energy Policies			
Carbon cap	✓	Auto efficiency standards	✓
Carbon market		Feed-in tariffs	
Renewable energy standard	✓	Government procurement	✓
Clean energy tax incentives	✓	Green bonds	✓

Spain

Clean energy investment levels in Spain continued to decline in 2013, falling 84 percent, to $400 million, almost all of it in the solar sector. Spain's austerity program necessitated abrupt curtailment of what had been some of the world's most generous incentives. These cutbacks were anticipated, but investor confidence was severely affected by retroactive cuts, including those that effectively tax clean energy generation at a rate of 7 percent. Spain has become the first country in the EU to suspend operational support for renewable energy sources. Despite these dramatic policy changes, Spain's solar sector deployed 700 megawatts in 2013 and now hosts 6.9 gigawatts, sixth highest in the G-20.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$0.4bn
G-20 investment rank	17
Percentage of G-20 total	0.2%
5-year growth rate	-54.5%

Installed Clean Energy 2013	
Total renewable energy capacity (GW)	34.9
Percentage of G-20 total	5.3%
5-year growth rate	7%
Key Renewable Energy Sectors	
Wind (GW)	23.1
Solar (GW)	6.8

Key Clean Energy Targets	
Renewable energy share in final energy consumption	20% by 2020
Biofuels	10% of consumption by 2020

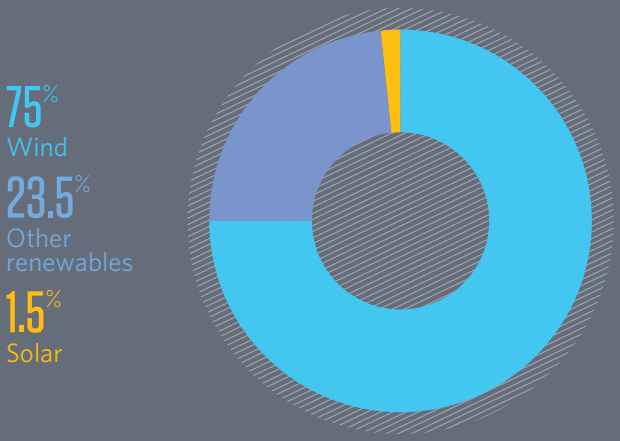
Key Investment Incentives
No incentives available for new renewable energy projects
Existing projects still benefit from the feed-in tarrifs but subject to various retroactive changes

National Clean Energy Policies			
Carbon cap	✓	Auto efficiency standards	✓
Carbon market	✓	Feed-in tariffs	✓
Renewable energy standard		Government procurement	
Clean energy tax incentives		Green bonds	

Turkey

Clean energy investment in Turkey has been volatile in recent years, with 2013 investment falling 54 percent to $800 million, after growing 180 percent in 2012. The wind sector has been dominant in Turkey; it accounted for more than 85 percent of private finance in 2013, with about $700 million and 500 megawatts of capacity additions. The solar sector is emerging, and an auction for 600 MW of capacity drew more than 6 gigawatts worth of proposals. Turkey aims to double its power generation capacity by 2023, with renewable energy slated to increase its share of total generating capacity from 25 to 30 percent.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$0.8bn
G-20 investment rank	16
Percentage of G-20 total	0.4%
5-year growth rate	-7.7%

Installed Clean Energy 2013	
Total renewable energy capacity (GW)	3.8
Percentage of G-20 total	0.6%
5-year growth rate	28%
Key Renewable Energy Sectors	
Wind (GW)	2.7
Small hydro (MW)	852

Key Clean Energy Targets	
Wind	20 GW capacity by 2023
Solar	3 GW by 2023

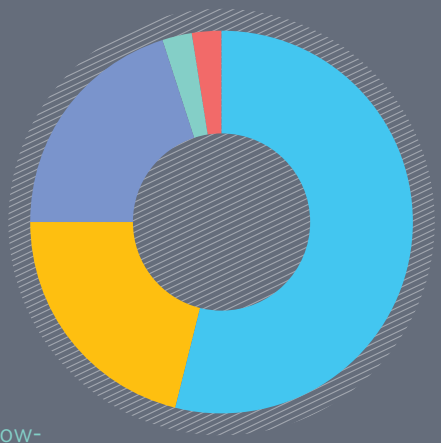
Key Investment Incentives	
Renewable energy	Feed-in tariffs
Wind	VAT and customs duty exemption for energy equipment

National Clean Energy Policies			
Carbon cap		Auto efficiency standards	
Carbon market		Feed-in tariffs	✓
Renewable energy standard		Government procurement	
Clean energy tax incentives	✓	Green bonds	

United Kingdom

The United Kingdom's clean energy sector fared better than the rest of the European Union: It was one of only three G-20 countries to grow in 2013. Investment increased 13 percent, to $12.4 billion. At $5.9 billion, the UK's wind sector had the third highest level of investment among the G-20. Overall, the nation rose three spots to rank fourth in the G-20. Almost 2 gigawatts of wind generating capacity was deployed in 2013, including completion of several large offshore wind projects. In addition, 1.2 GW of solar power was installed, with $2.7 billion invested in the sector. UK clean energy and climate policy has been in flux in recent years, but a comprehensive new Energy Act was adopted late in 2013. Implementation will begin in 2014, including for a system of "Contracts for Difference," which establish guaranteed prices for renewable energy suppliers.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$12.4bn
G-20 investment rank	4
Percentage of G-20 total	6.6%
5-year growth rate	18.3%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	18.7
Percentage of G-20 total	2.8%
5-year growth rate	25%
Key Renewable Energy Sectors	
Wind (GW)	10.5
Biomass and waste (GW)	4.4

Key Clean Energy Targets	
Renewable energy	15% by 2020 (legally binding under NREAP)
Renewable electricity	30% by 2020 (as part of achieving NREAP—nonbinding)
Biofuels	10% renewable energy share in transport by 2020 (EU-wide)
CO_2	80% cut (at least) by 2050 (1990 baseline)
Key Investment Incentives	
All renewables	Renewables obligation for projects >5 MW to be replaced starting in 2014 by Contracts for Difference, a form of market-integrated feed-in tariff
Solar, wind, AD, small hydro*	Feed-in tariffs for projects <5 MW
Efficiency	Green Deal: residential efficiency improvement loans can be paid via utility bill with no upfront cost.
Biofuels	Renewable transport fuel obligation—biofuel blending mandate, backed by tradeable certificates

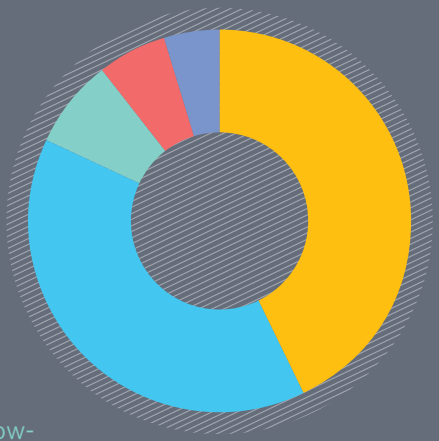
National Clean Energy Policies			
Carbon cap*	✓	Auto efficiency standards	✓
Carbon market*	✓	Feed-in tariffs*	✓
Renewable energy standard*	✓	Government procurement	✓
Clean energy tax incentives	✓	Green bonds	

*Incentives exist at state and/or regional level.

United States

After declining by more than a third in 2012, the 9 percent drop in clean energy investment in the United States last year seemed modest. Overall, the United States attracted $36.7 billion, second highest in the G-20. It led the world in investments for biofuels and energy efficient/low carbon technologies was second for wind, and third for solar. The United States again dominated the venture capital/private equity financing category, accounting for more than two-thirds of the world total. Although investment was relatively stable at $14 billion, installations in the wind sector dropped by more than 90 percent as a result of last-minute changes to the production tax credit. Price declines and new financing models spurred more than $17 billion in the solar sector and record levels of solar deployment. But even this is only one-third of what China installed. With the investment tax credit in place through 2016, investor confidence should remain high, and the U.S. solar sector should experience continued growth for the next several years.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$36.7bn
G-20 investment rank	2
Percentage of G-20 total	19.4%
5-year growth rate	-0.2%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	138.2
Percentage of G-20 total	21%
5-year growth rate	9%
Key Renewable Energy Sectors	
Wind (GW)	59.4
Small hydro (GW)	49.6
Solar (GW)	12.4

Key Clean Energy Targets	
Greenhouse gases	17% below 2005 levels by 2020
Generation	29 states plus DC have renewable electricity standards
Key Investment Incentives	
Wind, solar	Production tax credit, investment tax credit
Advanced transportation	Plug-in electric vehicle tax credit

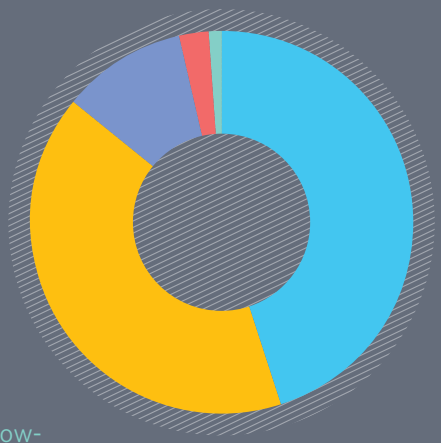
National Clean Energy Policies			
Carbon cap*	✓	Auto efficiency standards	✓
Carbon market*	✓	Feed-in tariffs*	✓
Renewable energy standard*	✓	Government procurement	
Clean energy tax incentives	✓	Green bonds	✓

*Incentives exist at state and/or regional level.

Rest of EU-28*

The European Union countries not profiled independently in this report saw investments decline 48 percent to $11.5 billion as what had been the world's most attractive market stalls. Greece, Romania, and Bulgaria joined other EU countries in cutting incentives retroactively in 2013, while Slovakia, Poland, and Estonia considered but have not yet implemented such moves. The majority of clean energy financing in the Rest of the EU, some $6.5 billion, was in the solar sector. The wind sector attracted $4.2 billion. The Netherlands is among several countries increasing offshore wind ambitions, announcing in 2013 plans to build 4.5 GW worth of projects off the Dutch coast. 2014 will be a year of ongoing change as the EU policy transitions from feed-in tariffs to more market-oriented mechanisms and adapts to a new long-term framework for reducing greenhouse gases.

Distribution of investment by sector, 2008-13



Finance and Investment 2013	
Total investment	$11.5bn
G-20 investment rank	5
Percentage of G-20 total	6.1
5-year growth rate	-5.8%
Installed Clean Energy 2013	
Total renewable energy capacity (GW)	38.1
Percentage of G-20 total	6%
5-year growth rate	12%
Key Renewable Energy Sectors	
Wind (GW)	31
Small hydro (GW)	12.3
Solar (GW)	9.2

Key Clean Energy Targets	
Renewable energy share in final energy consumption	20% by 2020
Energy efficiency	20% improvement by 2020
GHG emissions reduction	20% by 2020
Key Investment Incentives	
Small renewable projects	Feed-in tariff
Large renewable projects	Feed-in tariff, renewable energy standard (green certificates), market premiums, reverse auctions

National Clean Energy Policies			
Carbon cap	✓	Auto efficiency standards	✓
Carbon market	✓	Feed-in tariffs	✓
Renewable energy standard	✓	Government procurement	✓
Clean energy tax incentives	✓	Green bonds	

* Does not include data for other EU members profiled in this report.

Endnotes

1 All monetary values are 2013 U.S. dollars unless otherwise noted. This figure includes all investments, public and private (including research and development), in G-20 and non-G-20 countries.

2 The Group of 20 was established in 1999 to bring together leading industrialized and developing economies to discuss key global economic issues. The G-20 is made up of the finance ministers and central bank governors representing the European Union and 19 countries: Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom, and the United States. No data are provided for Russia and Saudi Arabia because clean energy investment there is negligible.

3 Feed-in tariffs are premiums paid to renewable energy projects for production of each megawatt-hour of clean power. They are used to stimulate investment in renewable generating capacity.

4 The "Rest of EU-28" category includes Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, and Sweden.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