EXECUTIVE SUMMARY

Companies and countries have experienced ups and downs in the world-wide clean energy race in recent years, and 2011 was no exception. For consumers, however, the clean energy race has been consistently positive, driving down prices and interjecting new renewable energy choices into a marketplace dominated by century-old technologies. Price competition is the defining characteristic of the clean energy race in 2011, spurring investment and deployment, increasing global clean energy capacity, and creating opportunities for innovators, entrepreneurs, and workers.

This report examines key financial, investment, and technological trends in 2011 related to the clean energy economy of G-20 members. Our primary focus is on investment, which drives innovation, commercialization, manufacturing, and installation of clean energy technologies. The data have been compiled and reviewed by Pew's research partner, Bloomberg New Energy Finance, a market research firm focused on renewable energy.

Our research demonstrates that clean energy investment continued a near-decade-long rally in 2011, rising 6.5 percent to a record $263 billion.[2] Excluding research and development, investment in the sector is more than 600 percent higher than in 2004. The G-20 member countries continue to dominate the sector, accounting for 95 percent of all global investments in clean energy. Future growth is anticipated in the emerging markets of developing nations, however. Annual investment growth rates of 10 to 18 percent are projected for parts of Asia, Africa, the Middle East, and Latin America in the next 10 years.

Although prices declined and overall investment increased, 2011 was a year of mixed results across the G-20, with as many countries experiencing losses as gains. Investment increases of 42 percent in the United States and 15 percent in Brazil offset declines in Mexico and Argentina and enabled the Americas region to grow by more than 21 percent to $63.1 billion—the fastest rate of growth in any region of the world. Investment growth in Italy, Spain, and the United Kingdom offset declines in other parts of the European Union,

2 All monetary values are 2011 United States dollars (USD) unless otherwise noted. This figure includes all investment, public and private (including research and development), in G-20 and non-G-20 countries.

Photo courtesy of whitehouse.gov

G-20 Summit in Cannes.

helping to maintain the Europe, Middle East, and Africa region as the aggregate leader in clean energy investment, with $99.3 billion recorded in 2011. Similarly, investment growth in India, Australia, and Japan offset a flat year in China and declining investments in South Korea's market. Overall, the Asia/Oceania region held second place for clean energy investments at $75 billion in 2011.

G-20 investments in the solar sector continued to soar in 2011, increasing 44 percent to $128 billion and accounting for more than half of all clean energy technology investments in the G-20. Solar gains offset a 15 percent decline in both wind and energy efficiency investments in 2011 compared with the previous year.

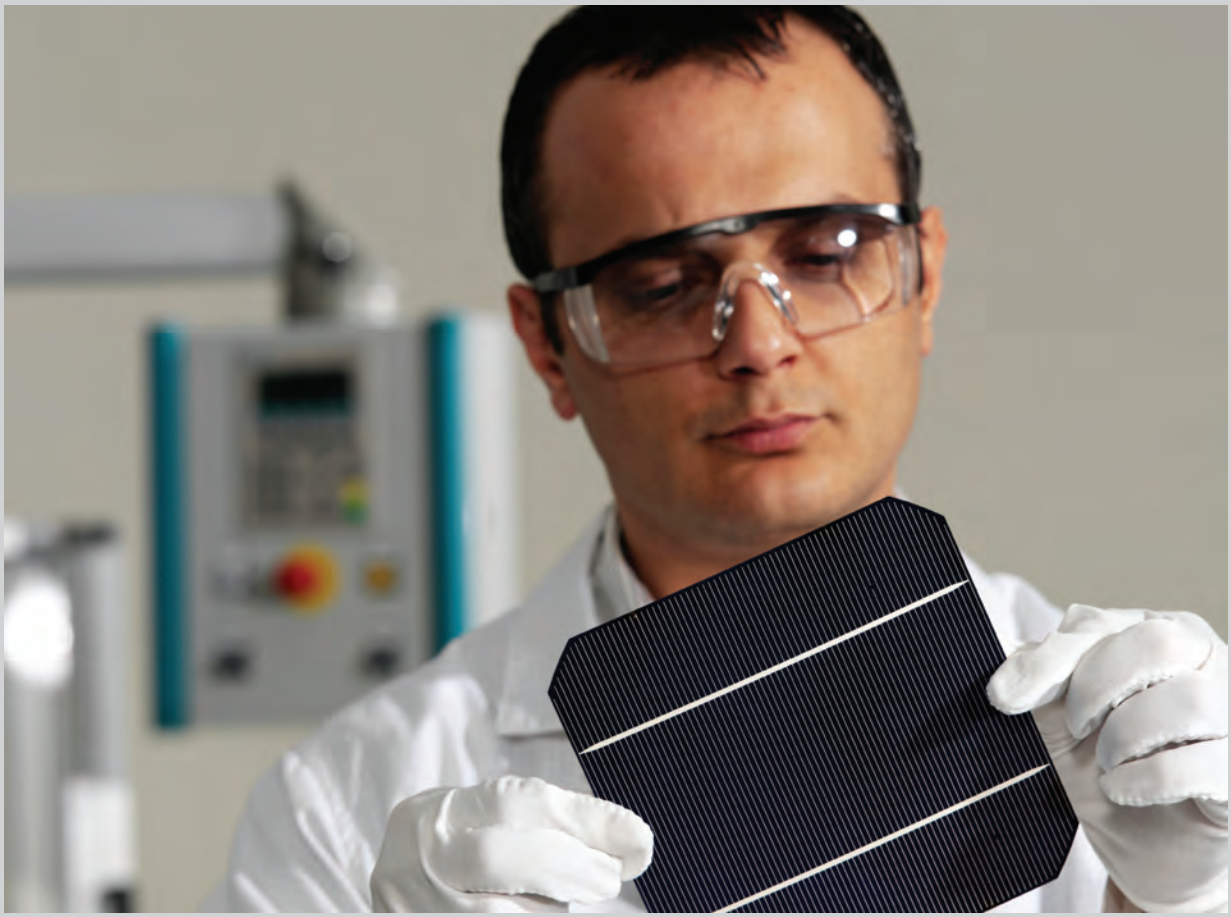
Asset finance and small distributed capacity investments accounted for $212 billion of the $225 billion worth of nongovernmental, non-research clean energy investments in 2011, signaling the priority that investors have placed on deploying existing technologies over developing or scaling up new technologies and companies in the G-20. Asset finance increased by 12 percent to $141 billion, while investments in small distributed photovoltaic projects grew 25 percent to $71.5 billion. Venture capital and private equity investments were up 8.6 percent in 2011 to $8.6 billion, while public and private research and development investments fell 18 percent to $26 billion. The United States continues to lead the world in both venture capital and research and development investments.

A series of wind turbines off the shore of Great Yarmouth in the United Kingdom.

The combination of falling prices and growing investments in asset finance and small distributed clean energy projects fueled worldwide installation of a record 83.5 gigawatts (GW) of clean energy generating capacity in 2011, including 78 GW in the G-20 countries. Solar module prices fell 50 percent in the past year, spurring deployment of an unprecedented 29.7 GW of new capacity—10 times the level recorded in 2007. Although wind energy investment levels declined to $72 billion, more than 43 GW of new wind energy capacity was deployed in 2011, surpassing 2010 installation levels. At the end of 2011, more than 565 GW of clean energy generating capacity was in place globally, 50 percent more than installed nuclear generating capacity.

In response to the global economic crisis in 2008-09, government stimulus plans allocated more than $194 billion for clean energy efforts. By the end of 2011, almost three-fourths of those funds ($142 billion) had reached the sector. More than $46 billion in stimulus funding for clean energy was spent in 2011, more than half of that by the United States and China together. Of the $53 million that remains, 67 percent ($35.7 billion) is expected to be spent in 2012.

After slipping to second place in Pew's 2009 report on the G-20 clean energy race and to third place the next year, the United States reclaimed its leadership position in the G-20 in 2011 with $48.1 billion worth of clean energy investments,



A worker with a solar panel.

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Two workers install a solar panel at a photovoltaic farm.

a 42 percent increase. With investors taking advantage of key policies that were about to expire, the United States led all nations in financing for solar, energy efficiency, and biofuel technologies. In addition, the United States led in venture capital/private equity and research and development investments. In five-year rate of investment growth, however, the United States is not even in the top 10, and it lags other nations in deployment of clean energy assets. The contrast between venture capital investments and capacity additions in the United States highlights a persistent phenomenon in which the country fails to deploy into the marketplace the clean energy innovations it creates in the laboratory.

Meanwhile, China has adopted clean energy policies that encourage manufacturing and deployment. Those trends continued in 2011, although overall investment levels grew by only 1 percent, to $45.5 billion, far from the rapid growth rates of recent years. Nonetheless, China remains a dynamic hub of clean energy activity, leading the world in wind energy investment and deployment and in wind and solar manufacturing.

The third clean energy powerhouse is Germany, where a 5 percent drop in investment did not deter record levels of solar energy deployment. Germany now obtains more energy from renewable sources than it does from nuclear power, coal, or natural gas. Elsewhere in Europe, Italy surpassed Germany's deployment of 7.4 GW of solar, installing 8 GW as investments grew 38 percent to $28 billion and largely offset declines in other parts of the region.

India continues to emerge as a premier clean energy market, with investments growing 54 percent in 2011 to $10.2 billion, vaulting that country from 10th to sixth place among the G-20 leaders. Indonesia recorded the fastest rate of growth of any G-20 nation—520 percent—as investments in clean energy eclipsed $1 billion for the first time.

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Geothermal power station in Iceland.