GERMANY

Germany got to the front of the clean energy pack early and continues to be a top performer, thanks to its government subsidies and national policies. Although Germany obtained an early lead and has had significant deployment of renewable energy assets across the country, it is the only G-20 member in which investments decline over the next decade under all policy scenarios. Under the enhanced policies scenario, for example, renewable energy investments in Germany decline 40 percent from 2010 to 2020. These numbers reflect the reality that Germany has had major success in deploying clean energy assets domestically. Still, large amounts of capital will be invested in renewable energy in Germany over the next decade. In the enhanced policy scenario, the cumulative investment potential in Germany over the next decade is projected to be $208 billion, which would leverage installation of 80 GW of renewable energy generating capacity.

Today, the country sources roughly 29 percent of its electricity from renewables, and is on a path to more than double their solar power generation by the end of 2010. Its generation-based programs and commitment to reduce its emissions at least 20 percent from 1990 levels by 2020 have supported its booming renewable energy generation sectors.

After years of success, Germany has begun to scale back the benefits of its feed-in tariff program, particularly in the solar sector where equipment prices are falling rapidly, making government support less needed. For wind, the country is nearing the saturation point for onshore projects, but opportunities remain for repowering existing projects with newer, more efficient equipment, and substantial potential offshore wind capacity remains. Still, Germany's grid now experiences serious overloads in the northern parts of the country at times because of its large installed wind capacity. This issue has the potential to hamper Germany's otherwise strong clean energy market if not properly addressed.

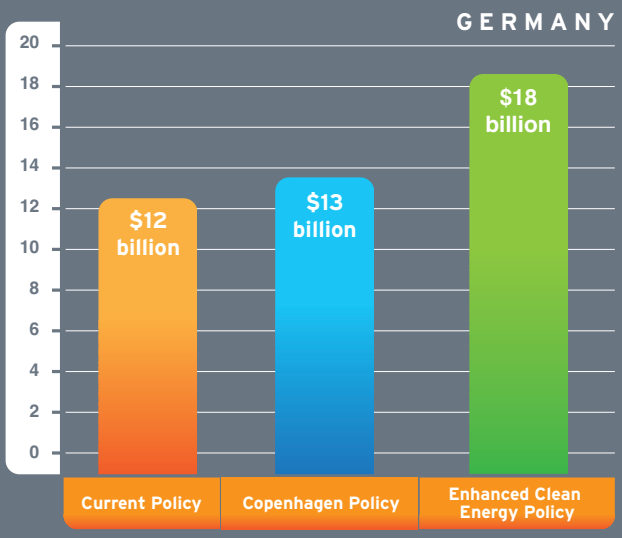
The German government has for years placed economic growth and job creation at the heart of its push to scale up renewable energy, setting clear clean energy goals, and has a generous green stimulus program totaling $15.3 billion (the fourth highest worldwide). However, its clean energy equipment manufacturing industry, once an exporting powerhouse, has come under increased pressure from Asian competitors.

Germany's clean energy investment decline comes chiefly from a substantial drop in solar investment although it is compensated, in part, by a small increase in wind financing. The decline comes from two factors. First, the high levels of solar in Germany seen today are unsustainable in the long term as at some point demand will run out as the best sites are claimed. Second, costs could fall by 40 percent from 2010 to 2020 due to experience curve effects. The more frequently a task is performed or a product is made, the lower is the cost. So even if the number of solar installations in Germany remains stable, investment will fall as capital expenditure per watt of electricity falls.

While most other countries could consider adopting new, more aggressive policies to promote renewables, Germany faces a different challenge. It is grappling with how to keep current subsidies cost-effective, given market dynamics. In the face of rapidly falling equipment prices, it will have to consider how to make sure that its feed-in tariff program tracks cost curves effectively to prevent a bubble of new installations. The program will continue to focus on distributed generation, offering the added incentive of having high local labor content that would make extending the incentives more palatable to Germans. As an additional incentive for distributed generation development, the country could offer tax breaks, public investment and new building standards for small-scale photovoltaic, biomass and energy efficiency.

At the same time, Germany must address how its grid will manage an unprecedented load of renewable energy. One possibility would be to adopt smart grid technologies to integrate the distributed generation capacity evenly. Commercial-scale power storage projects could also help ease congestion. Finally, plug-in electric vehicles can play a similarly important role in power storage and allow further adoption of renewable capacity.

FIGURE 32. INVESTMENT IN RENEWABLE ENERGY ASSETS, 2020 (BILLIONS OF $)



NATIONAL CLEAN ENERGY POLICIES	
Carbon Cap	
Carbon Market	✓
Renewable Energy Standard	✓
Clean Energy Tax Incentives	✓
Auto Efficiency Standards	✓
Feed-in Tariffs	✓
Government Procurement	✓
Green Bonds	

FINANCE AND INVESTMENT (2009)*	
Total Investment	$4.3 billion
G-20 Investment Rank	7
Percentage of G-20 Total	3.7%
5-Year Growth Rate	75.3%

INSTALLED CLEAN ENERGY (2009)	
Total Renewable Energy Capacity	36.2 GW
Total Power Capacity	29.0%
Percentage of G-20 Total	14.6%
5-Year Growth Rate	14.4%
Key Renewable Energy Sectors	
Wind	23,900 MW
Solar	7,757 MW
Biomass	3,631 MW

KEY CLEAN ENERGY TARGETS (2030)	
RE Heat	Procure 14% of heating resource from renewable energy
RE Electricity	Procure 25% to 30% of electricity resource from renewable energy

KEY INVESTMENT INCENTIVES	
Wind, Solar, Biomass	Feed-in tariffs
Renewable Energy	Favorable credit terms with interest rates fixed in the 4% to 7% range
Solar PV	Commercial installations exempt from VAT

*Includes investments in venture capital and public markets, and asset finance for all clean energy technologies including biofuels and energy efficiency.