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New Government Policies to Boost Renewable Energy Demand

Progress in post-Kyoto framework bodes well for solar, wind power names

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Summary

- Our focus is on the expanding demand for renewable energy in power generation, given the increasingly central role that renewables will likely take over the long term as well as the new medium-term growth period we see on the horizon. A number of factors are making use of renewable energy attractive, but we are especially interested in the need to cut greenhouse gases (GHG). In our view, the increased international debate about the post-Kyoto framework could push renewables more toward center stage.
- We are focusing on wind and solar power in particular. Once final GHG reduction targets for 2020 are set, countries will need to fast-track anti-global warming efforts for a five-year time horizon as well. Wind and solar power are likely to be on the radar in that context, as few other technologies can have a meaningful impact over a relatively short period of time. In fact, the wind power and solar power markets have seen not only brisk growth in recent years but also improving visibility for future advances, despite the economic downturn since the Lehman shock.
- From a policy perspective, focus will be on the big GHG emitters, the countries that rely heavily on coal for their primary energy supply or electricity generation, and nations with wind and solar power markets that are already big enough to have an impact. In our view, this includes Japan, the US, China, India, Russia, Australia, and in Europe, Germany and Spain. Particularly worth watching are the world's two biggest polluters, the US and China, which are likely to have a significant influence on the wind and solar power markets.
- Although the above-noted developments will probably boost the fortunes of players in wind and solar power across the board, we are focusing especially on firms that could benefit from expanded growth in the Chinese and US markets. Among solar cell players, we like Suntech Power (STP US, 2 rating; set to benefit as major player in China; plans to build plant in US) and Ferrotec (6890, 2 rating; could see boosts mainly from higher demand for monocrystalline silicon ingot pulling machines in China). For wind power, we spotlight China High Speed Transmission Equipment (658 HK, no rating assigned; leading player in China for wind turbine gearboxes; possible beneficiary of increased demand in US, given supplier agreement with General Electric).

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1. Summary

Expanding demand for renewable energy in power generation

Our focus is on the expanding demand for renewable energy in the field of power generation, given the increasingly central role that renewables will likely take over the long term as well as the new medium-term growth period we see on the horizon.

A number of factors are making the use of renewable energy more attractive, including (1) soaring prices and price volatility for fossil fuels (amid falling power generation costs for renewables), (2) the growing need to reduce greenhouse gases (GHG), and (3) development of new industries and job creation. These are all acting as tailwinds for renewables right now, but the need to cut GHG emissions is attracting the most attention. Prompted by increased international debate, a number of nations have put forward targets for cutting GHG emissions by 2020. These targets will require new or more aggressive government initiatives, meaning renewables are likely to play a crucial role.

With a final agreement on the post-Kyoto framework (from 2013) in the works, the renewable energy market may now be at a major historical milestone. In the past, the market has seen accelerated growth due to a number of developments. In the 1970s, there were the oil crises and the skyrocketing gas prices they caused. From the mid 80s through the 90s, the public became increasingly aware of global warming issues. Since 2003, the rise of emerging economies has tightened demand for fossil fuels. Finally, efforts to cut GHG emissions have stepped up in the wake of the signing of the Kyoto Protocol (1997) and the release of the Stern Review, the IPCC's Fourth Assessment Report, and the Bali roadmap at COP13.

The ultimate goal of the latter set of developments is an agreement on a post-Kyoto framework. However, that milestone could also represent a new starting point for national-level climate policy. To date, most countries have taken their time with anti-global warming efforts, but they will likely face increasing pressure to speed up going forward. Ramped-up initiatives by emerging economies could goad industrialized nations into following their lead.

Particular focus on wind and solar power generation

We are focusing on wind and solar power in particular. Once final GHG reduction targets for 2020 are set, countries will likely need to raise their 2015 targets to a certain degree as well. In this context, the spotlight in 2009 has been on demand-side technologies, such as electric cars and smart grids. However, we do not think these innovations alone will be enough to meet 2015 goals. On the supply side, nuclear power and CCS (carbon capture and storage) are unlikely to have a meaningful impact on GHG emissions until 2015 at the earliest. Wind and solar power, on the other hand, could play an increasingly central role, as these technologies face few barriers to their adoption in terms of production capacity and technology—construction lead times are short and there are relatively few restrictions on where they can be adopted.

In fact, the wind power and solar power markets have seen not only brisk growth in recent years but also improving visibility for future advances thanks to new government initiatives throughout the world to support expansion in both markets. That said, projections for long-term energy demand have been pared back in the wake of the global economic downturn since 4Q 2008. Also, the resulting fallout in the financing environment has put the brakes on market growth for solar and wind power over the short term. Nevertheless, projections for the two markets continue to rise.

From a policy perspective, focus will be on the big GHG emitters, the countries that rely heavily on coal for their primary energy supply or electricity generation, and nations with wind and solar power markets that are already big enough to have an impact. In our view, this includes Japan, the US, China, India, Russia, Australia, and in Europe, Germany and Spain. Particularly worth watching are the world's

Wind and solar power generation to attract attention again in 2010

two biggest polluters, the US and China, which are likely to have a significant influence on the wind and solar power markets.

In 2009, share price performance of companies involved in wind and solar power has been relatively poor compared to past years. Blame goes partly to earnings erosion after the financial crisis that led to a drop in orders from 4Q FY08, as well as to factors clouding visibility on a meaningful recovery in 2010 and beyond. Specifically, the latter include: (1) delays in agreement on a post-Kyoto framework and the passage of US legislation addressing climate change and energy policy, and (2) concerns about financial constraints in Europe reducing government support for renewables. We also believe that demand-side technologies, such as electric cars (automotive Li-ion batteries) and smart grid networks, may have stolen the spotlight.

That said, earnings and orders appear to have bottomed at many clean tech players. We also think international talks about the post-Kyoto framework should enter the final stages in 2010 as most countries have finished hammering out their emissions reduction targets. This should help industrialized countries to move forward with policies to combat global warming. At the same time, emerging countries are likely to set new targets for the introduction of renewables, just as India and China have begun doing. BRICs and other developing countries could become increasingly attractive new growth markets, once member nations settle on a post-Kyoto framework, including the design of relating market mechanisms as well as subsidies or technology transfers to such nations. Taking into account the above factors, 2010 could be a pivotal year for renewable energy. We look especially for firms involved in wind and solar power technologies to regain favor with investors.

Although the above-noted developments will probably boost the fortunes of players in wind and solar power across the board, we are focusing especially on firms that could benefit from expanded growth in the Chinese and US markets. Among solar cell players, we like Suntech Power (STP US, 2 rating; set to benefit as major player in China; plans to build plant in US) and Ferrotec (6890, 2 rating; could see boosts mainly from higher demand for silicon ingot pulling machines in China). For wind power, we spotlight China High Speed Transmission Equipment (658 HK, no rating assigned; leading player in China for wind turbine gearboxes; possible beneficiary of increased demand in US, given supplier agreement with General Electric).

2. Growing Demand for Renewable Energy

1) Focus on Renewable Energy Demand in Power Generation

Spotlight on renewable energy

Our focus is on the expanding demand for renewable energy in power generation, given the increasingly central role that renewables will likely take over the long term as well as the new medium-term growth period we see on the horizon.

Tailwind from increased international talks about GHG cuts

A number of factors are making the use of renewable energy more attractive, including (1) soaring prices and price volatility for fossil fuels (amid falling power generation costs for renewables), (2) the growing need to reduce greenhouse gases (GHG), and (3) development of new industries and job creation. These are all acting as tailwinds for renewables right now, but the need to cut GHG emissions is attracting the most attention. Prompted by increased international debate, a number of nations have put forward targets for cutting GHG emissions by 2020. These targets will require new or more aggressive government initiatives, meaning renewables are likely to play a crucial role.

Power generation top priority in cuts

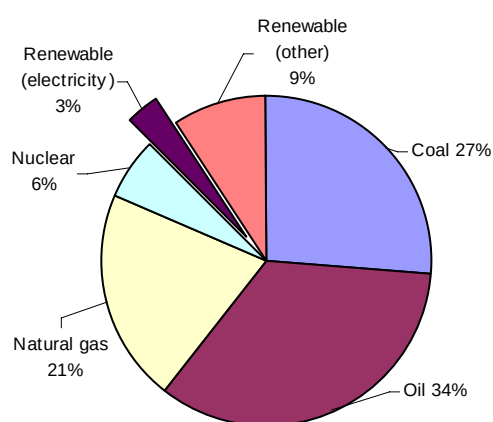
The electric power industry is the biggest GHG emitter and is projected to see the most rapid expansion in emissions ahead. This makes ramped-up measures in power production all the more critical in order to speed up the pace of GHG reductions. Most renewable energy technologies in this field are beyond the

development stages, boast established business models for commercialization, and promise further innovations going forward.

Renewables for power production account for only 3% of total energy

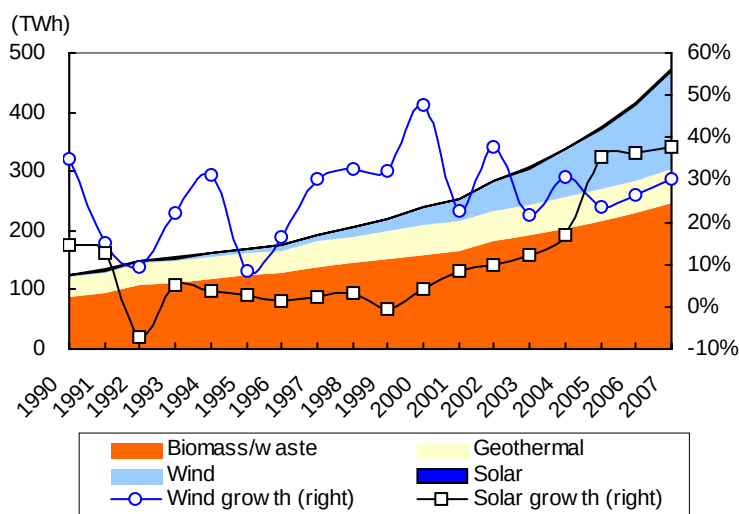
However, renewable energy accounted for 12% of the entire primary energy supply in 2007—3% for electric power production and 9% for other applications (heat or fuel supplied to end market). Hydropower accounts for 86% of the total on an output basis, but growth in that category is trailing the rate for the entire primary energy supply due to a pause in new construction in industrialized nations. Meanwhile, the weightings of other types of energy are as follows: biomass/waste, 7.2%; wind, 4.8%; geothermal, 1.7%; solar, 0.1%. The major driver of growth for renewables in electric power has been wind power since 1990. While we expect wind power to keep up that role going forward, solar power, which has gained momentum from the start of this decade, should gradually play a bigger role ahead.

Primary Energy Supply (2007) Chart 2-1



Source: International Energy Agency materials (IEA); compiled by Daiwa Securities SMBC.
Note: Global breakdown.

Renewable Energy Production (excl. hydro) Chart 2-2



Source: Energy Information Administration (EIA); compiled by Daiwa Securities SMBC.

2) Critical Period for Renewables: Final Talks on Post-Kyoto Framework

A number of developments have significantly affected the renewable energy market in the past.

1970s: oil shock

The oil crises in the 1970s triggered the first major change in the fossil fuel-heavy mix of energy consumption. The period saw a shift toward natural gas, brisk construction of nuclear power plants (alternative energy), and the startup of the wind power market in Denmark and California (renewable energy).

Late 1980s+: increased awareness about environment

In the mid-1980s, the public started to become increasingly aware of global warming issues. The subject became an even hotter topic with the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and the Kyoto Protocol in 1997. The EU nations were early proactive supporters of these moves, setting targets toward achieving the Kyoto Protocol commitments, including goals for cutting GHG emissions and introducing renewable energy. These changes triggered the start of aggressive installations of wind power in such countries as Spain, the UK, Italy, and, most noticeably, Germany.

Energy mix changes from 2003; international talks on global warming

The rise of the emerging economies from 2003 led to a tighter energy supply and demand balance, encouraging an increasing number of countries to reconsider their energy policies. Also, a series of events likely pressured the more reluctant non-EU

countries to take action, including (1) Russia's ratification of the Kyoto Protocol in 2004, which cleared the way for the climate pact to take force; (2) the start of a cap & trade scheme in the EU from 2005, which ushered in emissions trading and increased awareness of carbon costs; and (3) the inclusion of global warming as a top agenda item at the 2005 G8 summit. At this time, installations of onshore wind farms took a breather in Germany and focus began to shift to the growing solar power market, which was starting to gain steam.

Global efforts stepped up ahead of COP15

International talks really started to heat up with the release of the Stern Review (2006), the IPCC's Fourth Assessment Report (2007), and the Bali roadmap at COP13 (Dec 2007). These developments have had a major impact on the startup of renewable energy markets in emerging economies.

COP15 marking start of meaningful international negotiations

The United Nations Climate Change Conference (COP15; Dec 2009) was the ultimate goal of the latter set of developments, but meaningful international negotiations on setting reduction targets (between emerging countries and industrialized nations) are actually just beginning. At this juncture, the targets of major developed countries (reduction targets in absolute amounts vs. base year) and leading emerging economies (chiefly reductions in GHG emissions per unit of GDP; i.e., carbon intensity) are more or less out. The goals of developed nations are still less aggressive than the minimum deemed necessary by the IPCC (25-40% cut vs. 1990 levels by 2020). Meanwhile, the carbon intensity based targets announced by emerging countries have received some praise, but they are hard to swallow given that strong GDP growth could produce enough emissions to cancel out the reduction efforts of developed nations.

Scenarios for Reducing CO ₂ Emissions from Fossil Fuel Combustion			Chart 2-3
GHG concentration stabilization scenario (ppm CO ₂ -eg)	Region	Reduction (vs. 1990)	
		2020	2050
450	Annex 1	-25% to -40%	-80% to -95%
	Non-Annex 1	Marked cut from baseline for Latin America, Middle East, East Asia, former centrally planned Asia	Marked cut from baseline for all regions
550	Annex 1	-10% to -30%	-40% to -90%
	Non-Annex 1	Cut from baseline in Latin America, Middle East, East Asia	Cut from baseline for most regions, especially Latin America, Middle East
650	Annex 1	0% to -25%	-30% to -80%
	Non-Annex 1	Baseline	Cut from baseline for Latin America, Middle East, East Asia

Source: Intergovernmental Panel of Climate Change (IPCC); compiled by Daiwa Securities SMBC.

Raised reduction targets call for new initiatives

Before, most countries' targets allowed them to approach global warming at their own pace, but nations will likely face increasing pressure to adopt more aggressive measures ahead, assuming they lift their reduction targets. This should be especially noticeable for developed nations, which also likely have to provide technology and funds to emerging economies to ensure their own measures do not end up meaningless. The United Nations estimates that by 2030 \$250-382 billion will be needed in the public and private sectors annually, \$201-211 billion for mitigation measures (reducing GHG emissions) and \$49-171 billion for adaption measures (preventing damages from climate change). As a first step, there are recent moves to provide \$10 billion, which should help to push up targets in emerging economies.

3) Why Wind and Solar Power?

2009 spotlight on new technologies to curb energy demand

In 2009, technologies that curb energy demand, most noticeably electric cars and smart grids, appear to have stolen the spotlight from supply-side technologies. There are a number of reasons for this, but what stands out in particular from a GHG reduction perspective is the driving need to make meaningful cuts in CO₂ emissions in construction, housing, and transportation as more aggressive targets became essential, particularly for developed countries. Efforts in these areas of the economy had been lacking, even among advanced nations.

	Cut (Base → Blue)		Additional investment (mil; \$ tril)	R&D completion	Trial completion	Commercialization (meaningful growth)	Cost competitiveness vs. thermal power or conditions for commercialization	Results	Assumptions	
	(Gt)	% of total							2007	2030
Total emission cuts	48	100.0	45.16							
Power generation	18.3	38.0	8.24							
Renewable energy	7.1	14.7	3.66							
Wind	2.1	4.4	1.56		Commercialized		Onshore: Competitive by 2020 Offshore: Competitive by 2030 Retail sales competitive by 2030	96 GW	900 GW (2025)	2,000 GW
Solar PV	1.3	2.7	1.27		Commercialized		Competitive by 2030	9 GW	150 GW	1,150 GW
Concentrating solar power	1.2	2.5	0.55		In practical use	2025-2035	Competitive by 2030		250 GW	630 GW
Biomass IGCC (multi-fuel firing)	1.5	3.0	0.28	~2010	2015-2020	2025-2030	Competitive with favorable location and fuel		-	(2,450 TWh)
Geothermal	0.6	1.2			Commercialized		Competitive with favorable heat source	11 GW	-	200 GW
Hydro	0.4	0.8			Commercialized		Competitive	923 GW	-	1,700 GW
Wave/tidal	-	-			Commercialized		Competitive only with favorable locations	<1 GW	-	500 GW
Nuclear	2.8	5.8	1.91					371 GW		
3G/3G+ plants				~2015+	-	2020-2030	Competitive	-	200 GW	935 GW
4G plants (e.g., fast-breeder reactors)				2010-2020	2020-2030	2040-2045	-	-	-	285 GW
Thermal	3.6	7.4	1.37							
Coal-fired plants	1.4	2.9						1,440 GW		
IGCC	0.7	1.4	0.69	~2015+	-	2020-2030	Competitive by 2030	-	Over 100 GW	Over 550 GW
Critical pressure steam cycle	0.7	1.4	0.69	~2015+	-	2020-2030	Competitive by 2025	-	Over 100 GW	Over 550 GW
Natural gas-fired plants	2.2	4.6						1,168 GW		
Switch from coal-fired plants	1.8	3.7			Being implemented		-	-	-	-
Improve conversion efficiency	0.4	0.8			Being implemented		-	-	-	-
CCS	4.9	10.0	1.31	~2010	2010-2020	2020-2030	Additional cost: \$50/kW or less	-	Covering 12% of energy generated	Covering 30% of energy generated
Transportation	12.5	25.9	21.51							
Improve energy efficiency	6.6	13.6	8.95		Commercialized		-	-	70% of LDVs (incl. HVs, PHVs)	35% share (HV, PHV only) Improve fuel efficiency by 50%
2G biofuels	2.2	4.5	5.20	2015-2020	-	2020-2030		0	Production volume: 62 Mtoe	Production volume: 121 Mtoe
Cellulose ethanol							Production cost: \$0.8 → \$0.5/L Production cost: \$1 → \$0.5/L	0	Production volume: 102 Mtoe	Production volume: 491 Mtoe
BTL							Unit price: \$9,000 → \$2,000	0	60% of LDVs	25% of LDVs
Plug-in hybrid vehicles	2.0	4.1	4.02	Launched from 2008	2015-			Slight	Cumulative sales: 1 mil vehicles	20% of LDVs
Electric vehicles	1.8	3.7	3.34	Mass-produced from 2009	2020-2030	2045-	Unit price: \$3,000 → \$1,500	0		40% of LDVs
Fuel cell vehicles				2010-2020+						
Industrial	9.2	19.0	5.45							
Install CCS	4.3	8.9	1.45	~2010	2010-2020	2020-2030	Additional cost: \$50/kW or less	-	Used in 7% of industrial applications Used for 70% of fuel transport applications	Used in majority of industries (steel, cement, ammonia, chemical, pulp, hydrocarbon refining) 25-30% better efficiency
Optimize industrial motor system	1.4	2.9	4.00		Commercialized		-	-	-	-
Improve fuel efficiency	2.3	4.8			Commercialized		-	-	-	-
Change fuel/materials	1.2	2.5			Commercialized		-	-	-	-
Construction	8.2	17.1	9.96							
Improve efficiency of buildings/appliances	7.0	14.5	6.60		Commercialized		-	-	Mandatory in OECD countries by 2020	-
Heat pumps	0.8	1.6	2.46		Commercialized		-	-	-	Used in 50-70% of buildings in OECD countries
Solar heaters/water heaters	0.5	1.0	0.90		In practical use	2015-2020	Panel cost: \$630 → \$450/m ²	154 GW	650 GW from 2005-2020	3,000 GW

Source: IEA; compiled by Daiwa Securities SMBC (some additions by Daiwa Institute of Research).

Notes: 1) BTL stands for biomass to liquid, LDVs for light-duty vehicles.

2) Emission reductions show difference between baseline scenario (emissions of 62 GW in 2050 without additional measures) and "blue" scenario (24 GW, half the 2005 level in 2050).

Few technologies effective for hitting 2015 targets

However, these demand-side innovations are unlikely to have a meaningful impact on GHG emissions over the short or medium term. Given more aggressive 2020 GHG reduction targets, nations will likely need to lift their 2015 goals as well. It is hard to imagine sufficient use of technologies such as next-gen cars, second generation biofuels, or smart grids by that time. Furthermore, though there may be additional efforts to promote energy conservation, such as switchovers to next-gen consumer electronics or green building renovations, it would be difficult to mandate shorter service lives for equipment and facilities. Turning to the supply side of the equation, CCS is not expected to meaningfully gain traction until 2015-

2020 and hardly any nuclear power plants should be up and running by 2015 even if the industry sees additional projects. (Chart 2-4)

Renewables effective means of meeting short-term targets

Taking the above into account, we believe that as countries raise their targets for 2015-200, they will have no choice but to pursue measures to accelerate the spread of renewable energies, with a focus on wind and solar power generation. Renewable energies are seen as a relatively low-cost approach to cutting GHG emissions compared to other technologies, excluding energy conservation measures. Also, the electric power industry is a bigger polluter than other sectors and is expected to see the sharpest increase in emissions ahead, so stepping up reduction efforts in that area can help substantially to reducing overall emissions. We thus expect renewables to play an increasingly crucial role in power production ahead.

Wind, solar power relatively easy areas to accelerate

We expect wind and solar power to have an edge in this context given that they (1) can be installed in a relatively wide range of locations (though quality can differ by location), (2) face limited restrictions in terms of installed capacity (above 100 MW possible), and (3) present few risks in terms of capacity and technology thanks to a developed industry (Chart 2-5).

Renewable Energy Comparisons						Chart 2-5
	Wind	Photovoltaics	Solar Concentrating solar	Geothermal	Biomass	Microhydro
Market growth potential	★★★★	★★★★		★★★	★★★	★★
Market size (2007)	94 GW	10 GW	<0.5 GW	10 GW	45 GW (2006)	73 GW (2006)
Supply						
Convenience	★★★★ Can be installed in wide range of locations, but careful selection of site, height needed to ensure sufficient operating rates	★★★★★ Operations affected by weather, but can be used in wide range of locations—most freedom in terms of site		★ Potential sites limited. Each project must be tailored to specific site.	★★★ Site should be close to cheap source of fuel to reduce costs. Projects must be tailored to type of material to be burned, scale.	★★ Potential sites severely limited. Projects must be tailored to individual sites.
Output limitations (per project)	★★★★★ Large outputs possible if space available: projects in excess of 100 MW not rare. Larger projects proceeding offshore.	★★★★ Large outputs possible if space available. Some projects over 100 MW appearing.		★★ Up to roughly 100 MW (limited by heat at site)	★★★ Typically up to 20 MW. Restricted by limits on local fuel supplies, reactor size. Larger plants possible if burned alongside other fuels or using IGCC technology.	★★ Typically up to 10 MW as larger projects have negative impact on water quality, surrounding ecosystems
Sustainability/flexibility of output	★★ Operation likely not always continuous	★★ Operation not continuous—generation not possible at night		★★★★★ Continuous operation possible; output can be adjusted	★★★★★ Continuous operation possible; output can be adjusted	★★★ Continuous operation if water storage sufficient
Generation costs						
Current costs (¢/kWh)	5-8 (land-based), 8-12 (offshore)	20-80	12-18	4-7	5-12	4-7
Potential for cost cuts	Grid parity already achieved in some countries. Could be competitive vs. thermal power by 2020-25.	Some believe grid parity possible by 2012 for photovoltaics. Could be competitive vs. thermal power by 2030.		-	-	-
Factors likely to reduce costs	Larger turbines (currently 5 MW); weight reductions; scale economies	Lower material costs; higher conversion efficiencies; scale economies		-	Larger plants using IGCC technology	-

Source: Various materials; compiled by Daiwa Securities SMBC.

4) IEA Continues to Brighten Outlook for Wind and Solar Power

Wind and solar power are taking on increasing significance judging from the International Energy Agency's (IEA) annual *World Energy Outlook*. We have excerpted key points from its energy forecasts below.

Wind and solar upgraded despite downgrades to overall energy demand

- Between 2007 and 2009, the IEA continued to upgrade its 2015 and 2030 projections for both wind and solar power from its year-earlier estimates. The upward revisions are significant in a broader context, considering the negative impact of the financial crisis on funding and successive downgrades to the IEA's total energy supply forecasts in 2008 and 2009.

Timeline for nuclear power prevented upgrade to 2015 forecast

- In both 2008 and 2009, the IEA upgraded its 2030 outlook for nuclear power, touted as another alternative for reducing carbon emissions. However, it left its 2015 estimate virtually intact. Even in its 2009 report, the IEA continues to peg average annual growth in the nuclear power supply at 1.7%, below the growth rates for coal-fired plants and overall energy supply. This view seems consistent with the construction period for nuclear power facilities, which can take 5-6 years in addition to the time required for site selection/approval.

IEA Revisions to Energy Supply Forecasts															Chart 2-6		
	Revision to 2015 E (%)			Revision to 2030 E (%)			Average growth: 2007-2015 (%)				Average growth: 2015-2030 (%)				2009 report		
	2007	2008	2009	2007	2008	2009	2006	2007	2008	2009	2006	2007	2008	2009	2007	2015 E	2030 E
Primary energy supply (Moe)	2	-2	-4	4	-4	-1	2.0	2.3	2.0	1.5	1.3	1.4	1.3	1.5	12,013	13,488	16,790
Output (TWh)	3	-2	-2	5	-6	3	2.9	3.3	3.0	2.6	2.1	2.2	1.9	2.3	19,756	24,352	34,292
Thermal	3	-4	-3	6	-11	4	3.0	3.4	2.9	2.4	2.1	2.3	1.8	2.3	13,459	16,302	22,982
Coal	4	0	-6	7	-8	5	3.2	3.8	3.8	3.1	2.2	2.4	1.8	2.5	8,216	10,461	15,259
Oil	-2	-10	-18	-1	-15	-16	0.8	0.5	-0.8	-3.2	-1.6	-1.5	-1.8	-1.7	1,117	859	665
Natural gas	2	-11	5	4	-17	5	3.0	3.3	1.7	2.4	2.7	2.8	2.4	2.3	4,126	4,982	7,058
Nuclear	-1	2	-1	-1	6	6	1.7	1.6	1.8	1.7	0.4	0.4	0.7	1.1	2,719	3,107	3,667
Renewable	5	2	-1	4	5	-1	3.4	4.0	4.2	4.1	2.8	2.7	3.0	2.9	3,578	4,944	7,642
Hydro	3	-2	-1	2	-1	-3	2.3	2.7	2.4	2.3	1.7	1.6	1.7	1.6	3,078	3,692	4,680
Excl. hydro	11	13	1	9	17	2	8.9	10.3	12.0	12.2	5.7	5.6	5.8	5.9	500	1,252	2,962
Biomass/waste	-4	3	-2	4	3	-3	6.3	5.8	6.2	5.8	4.4	4.9	5.0	4.9	259	408	839
Wind	27	21	2	14	16	3	12.2	15.5	18.3	18.6	6.6	5.8	5.5	5.6	173	678	1,535
Geothermal	-1	-1	-1	-1	2	-2	6.2	6.0	5.9	5.8	3.8	3.8	4.0	3.9	62	97	173
Solar	23	43	26	13	119	14	25.1	28.4	34.3	38.3	10.9	10.3	13.5	12.7	5	67	402
Tidal/wave	0	100	0	0	17	-7	0.0	0.0	9.1	9.1	18.0	18.0	13.9	13.3	1	2	13

Source: IEA; compiled by Daiwa Securities SMBC.

Note: Revision data for 2015 and 2030 represents percentage change vs. previous-year forecast.

E: IEA estimates.

Room for further upgrades

Under its reference scenario (2009), the IEA projects installed capacity for wind and solar power of 600 GW and 244 GW in 2030. However, its earlier *Energy Technology Perspectives 2008* report had argued that higher capacity would be needed to reduce GHGs to half of the 2005 level by 2050 (in line with minimum requirements for mitigating impact of climate change outlined in IPCC *Fourth Assessment Report*). Specifically, it cited installed wind capacity of 900 GW by 2025 and 2,000 GW by 2050, as well as solar capacity of 400 GW (150 GW solar PV, 250 GW concentrating solar) and 1,780 GW (1,150 GW, 630 GW). As such, we see considerable room for upward revisions to the IEA's 2030 projections for growth in wind and solar capacity, assuming the international debate on global warming prompts countries to raise emission reduction targets to the levels outlined in the IPCC report.

5) Wind Market

Growth spreading from Germany and Spain to US and China

Global installed wind capacity accelerated sharply from around 2005, following the steady uptrend seen in the latter part of the 1990s (Chart 2-7). The core markets for wind energy are the US, China, India, Germany, and Spain (charts 2-9 and 2-10). Germany and Spain fueled initial expansion in demand until the mid-2000s, but the US and China seem to be the main drivers now (Chart 2-8).

Tax credits, feed-in tariffs and subsidies backing expansion

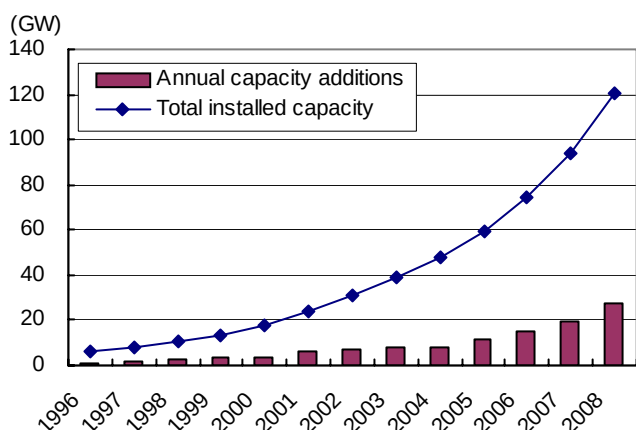
Growth has been driven largely by government policy, including tax credits and state-sponsored programs in the US; feed-in tariffs (FIT) in Germany and Spain; FIT schemes and clean development mechanisms (CDM) in China; and CDM, tax credits, state-sponsored programs in India (Chart 2-11).

Global installed capacity to triple by 2013 on back of Asian investment

The Global Wind Energy Council (GWEC) estimates global wind capacity (total installed capacity) will swell to 330 GW in 2013, compared to just 120 GW in 2008. The recent financial crisis has slowed growth in 2009, but installation should recover from 2010, driven by expansion in Asia. In addition to China, the wind market is growing in India, Japan, Taiwan and South Korea. Stimulus measures are helping jump-start capacity expansion in the US. In Europe, the GWEC is projecting growth in Italy, France, Portugal and the UK, in addition to Germany and Spain.

Global Wind Power Capacity

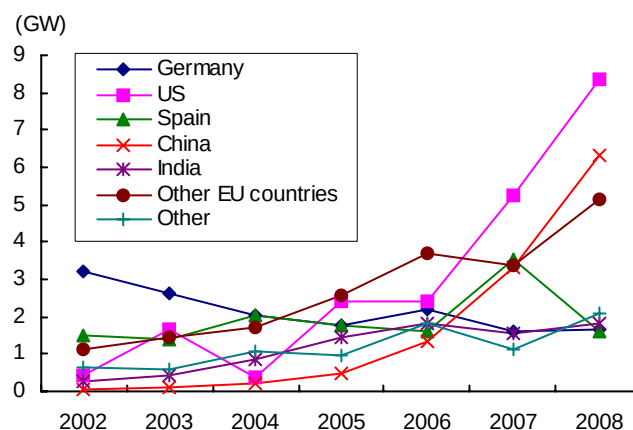
Chart 2-7



Source: Global Wind Energy Council (GWEC); compiled by Daiwa Securities SMBC.

Annual Wind Capacity Additions

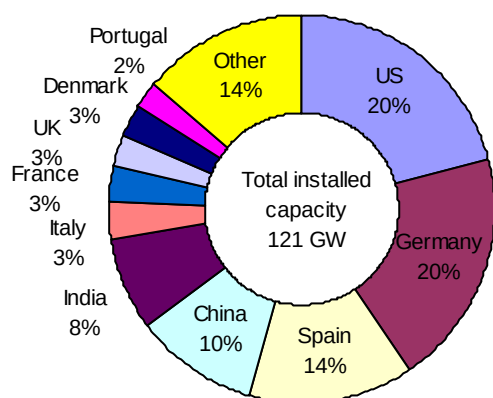
Chart 2-8



Source: GWEC; compiled by Daiwa Securities SMBC.

Total Wind Capacity (2008)

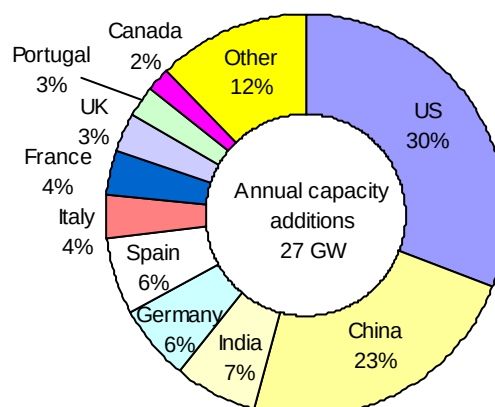
Chart 2-9



Source: GWEC; compiled by Daiwa Securities SMBC.

Annual Wind Capacity Additions (2008)

Chart 2-10



Source: GWEC; compiled by Daiwa Securities SMBC.

Wind Capacity Targets, Additions, Key Initiatives

Chart 2-11

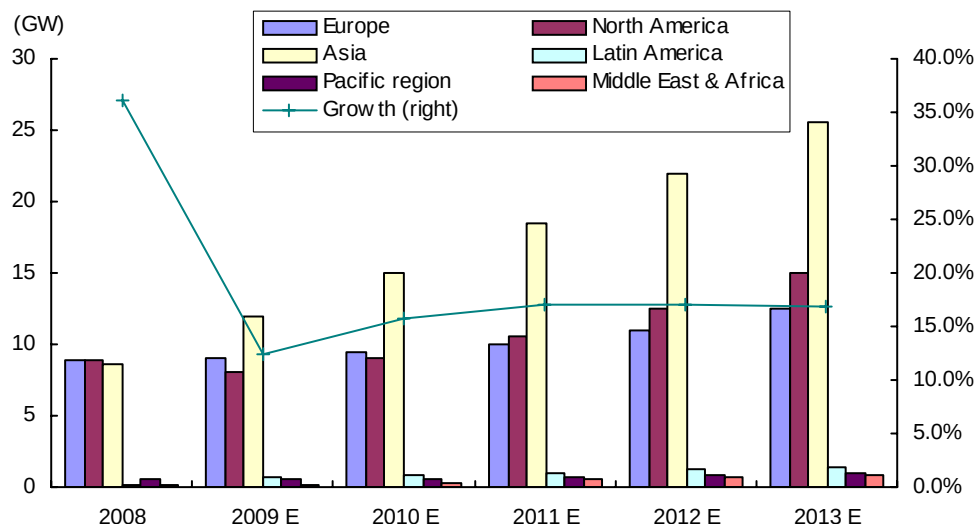
	Target	2008 capacity additions (GW)	Key initiatives
US	Supply 20% of US electricity with wind by 2030*	25	Tax credits, state government initiatives such as renewable portfolio standards
Germany	28 GW of wind capacity by 2020*	24	Feed-in tariffs
Spain	20 GW of wind capacity by 2010	17	Feed-in tariffs
China	10 GW of wind capacity by 2010	12	Renewable portfolio standards (at set price), wind farm subsidies, CDM
India	70 GW of wind capacity by 2012	10	Tax credits, state government initiatives (e.g., feed-in tariffs, RPS), CDM

Source: GWEC; compiled by Daiwa Securities SMBC.

* Estimates, not targets.

Global Wind Capacity Outlook (total installed)

Chart 2-12



Source: GWEC; compiled by Daiwa Securities SMBC.
 Note: Growth rate based on annual capacity additions.
 E: GWEC estimates.

6) Solar Market

Japan was early leader, but expansion rate now higher in US, Germany and Spain

Like wind, solar saw a steady rise in installed capacity from the late 1990s, before demand picked up sharply in the latter half of the current decade (Chart 2-13). Key players include Spain, Germany, the US and Japan (charts 2-15 and 2-16). Japan took an early lead from 2000 in terms of annual expansion, but fell behind Germany after the latter began ramping up investment in 2004. Spain also saw sharp expansion in capacity in 2007-08. Note that the US also began ratcheting up solar capacity from 2007 (Chart 2-14).

Tax credits, feed-in tariffs and subsidies backing expansion

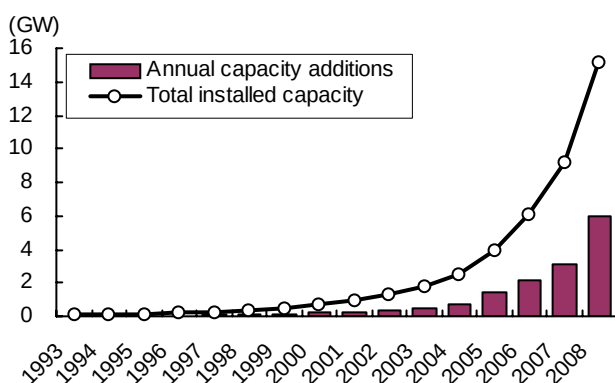
Here too, government policies are fueling expansion. Japan subsidizes solar installation and encourages power companies to set their own renewable portfolio standards. Germany and Spain have imposed feed-in tariffs, while the US relies on tax credits and initiatives from state governments (Chart 2-17).

Global installed capacity to grow sevenfold by 2020

We estimate global solar capacity (total installed capacity) will jump from 15 GW in 2008 to 690 GW in 2020 (Chart 2-18). The global financial crisis and feed-in tariff revisions in Spain probably slowed expansion in 2009, but we envision renewed growth from 2010 backed by installations in the US, Germany, other European nations (particularly Italy, France and Portugal), and Japan.

Global Solar Capacity

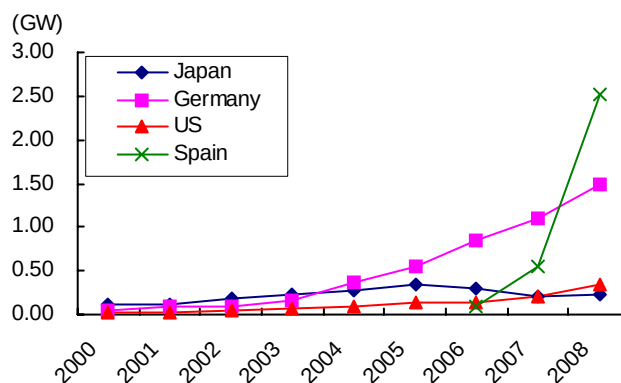
Chart 2-13



Source: Solarbuzz; compiled by Daiwa Securities SMBC.

Annual Solar Capacity Additions

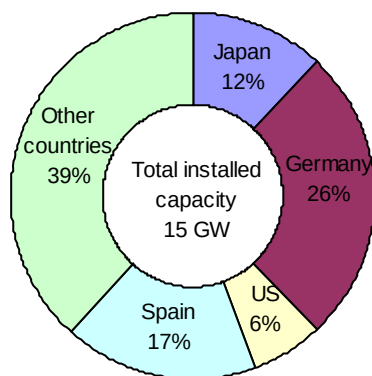
Chart 2-14



Source: Solarbuzz; compiled by Daiwa Securities SMBC.

Total Solar Capacity (2008)

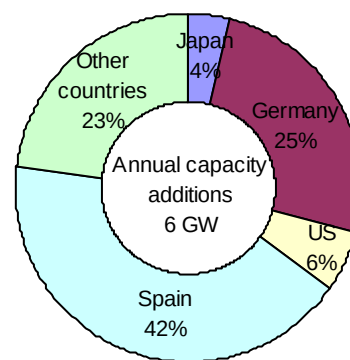
Chart 2-15



Source: Solarbuzz; compiled by Daiwa Securities SMBC.

Annual Solar Capacity Additions (2008)

Chart 2-16



Source: Solarbuzz; compiled by Daiwa Securities SMBC.

Solar Capacity Targets, Additions, Key Initiatives

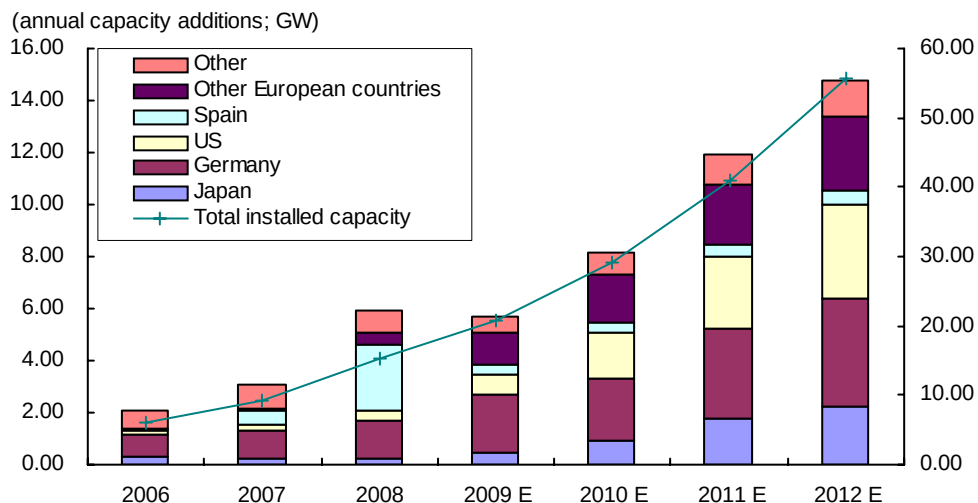
Chart 2-17

	Target	2008 capacity additions (GW)	Key initiatives
Japan	Solar power generation 20X current levels by 2020, 40X by 2030	2.19	Subsidies for installation, utilities to pay for surplus solar-power electricity produced by households
US	3 GW of rooftop solar energy supply by 2010	1.15	Tax credits, state government subsidies/incentives
Germany	NA	4.79	Feed-in tariffs
Spain	Solar capacity of 1.2 GW by 2010	3.17	Feed-in tariffs
China	Solar capacity of 1.8 GW by 2020	0.15	Subsidies for installation
India	Solar capacity of 20 GW by 2020, 100 GW by 2030, and 200 GW by 2050	0.09	State government subsidies/incentives such as feed-in tariffs

Source: Compiled by Daiwa Securities SMBC.

Global Solar Capacity Outlook (GW)

Chart 2-18

Source: Compiled by Daiwa Securities SMBC.
E: Daiwa Securities SMBC estimates.

3. Factors Behind Rising Demand for Renewables

1) Fossil Fuel Price Spikes and High Price Volatility

Increasingly competitive power production costs; insulation from price fluctuations

Fossil fuel price spikes result in losses for countries that heavily import such resources. In addition, high price volatility undermines the stability of price indices, clouding visibility on economic trends. Renewable energy sources (excluding biomass) can generally be procured domestically and at almost no cost. For that reason, renewable energy looks increasingly attractive when fossil fuel prices spike.

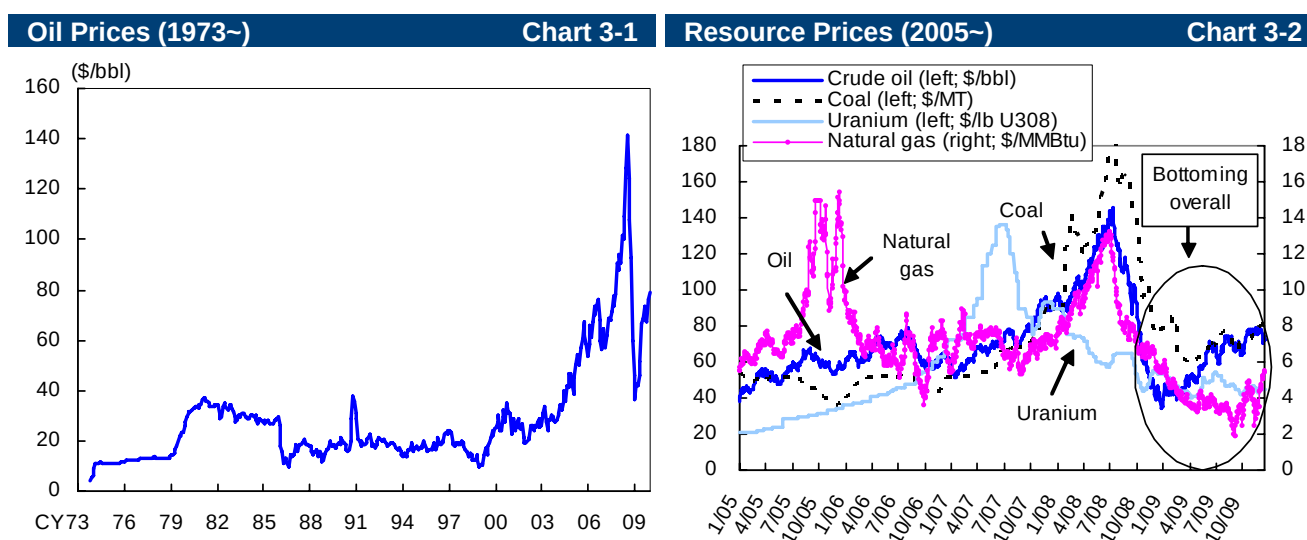
Full-fledged adoption on horizon as costs fall

Interest in renewables has risen twice in the past when oil prices spiked: (1) the oil shock of the 1970s and (2) the across-the-board rise in fossil fuel prices from 2003 on.

The former mainly involved supply-side issues (political unrest in Middle East, moves by oil-producing countries to raise prices). At that time, wind and solar power were still budding technologies, so power production costs were relatively high. Denmark and California (US) made efforts to adopt these technologies, but neither gained traction worldwide

Meanwhile, demand-side issues (anticipated higher demand for fossil fuels from emerging economies over long term) were responsible for the latter spike in fuel prices. However, since the oil shock of the 1970s, costs for renewable energy technologies have fallen to a point where future advances could conceivably bring such costs in line with those of coal-fired power plants. Both developed and emerging economies have thus taken greater interest in renewables as a means of (1) reducing dependence on fossil fuels by diversifying energy sources and (2) providing stable domestic supplies of energy (thereby increasing energy self-sufficiency) over the long term.

We are expecting Brent crude oil prices to rise to \$101/bbl in 2012, which could further increase the attraction of renewable energy over the medium term.



Source: Datastream, Bloomberg; compiled by Daiwa Securities SMBC.

2) Climate Policies

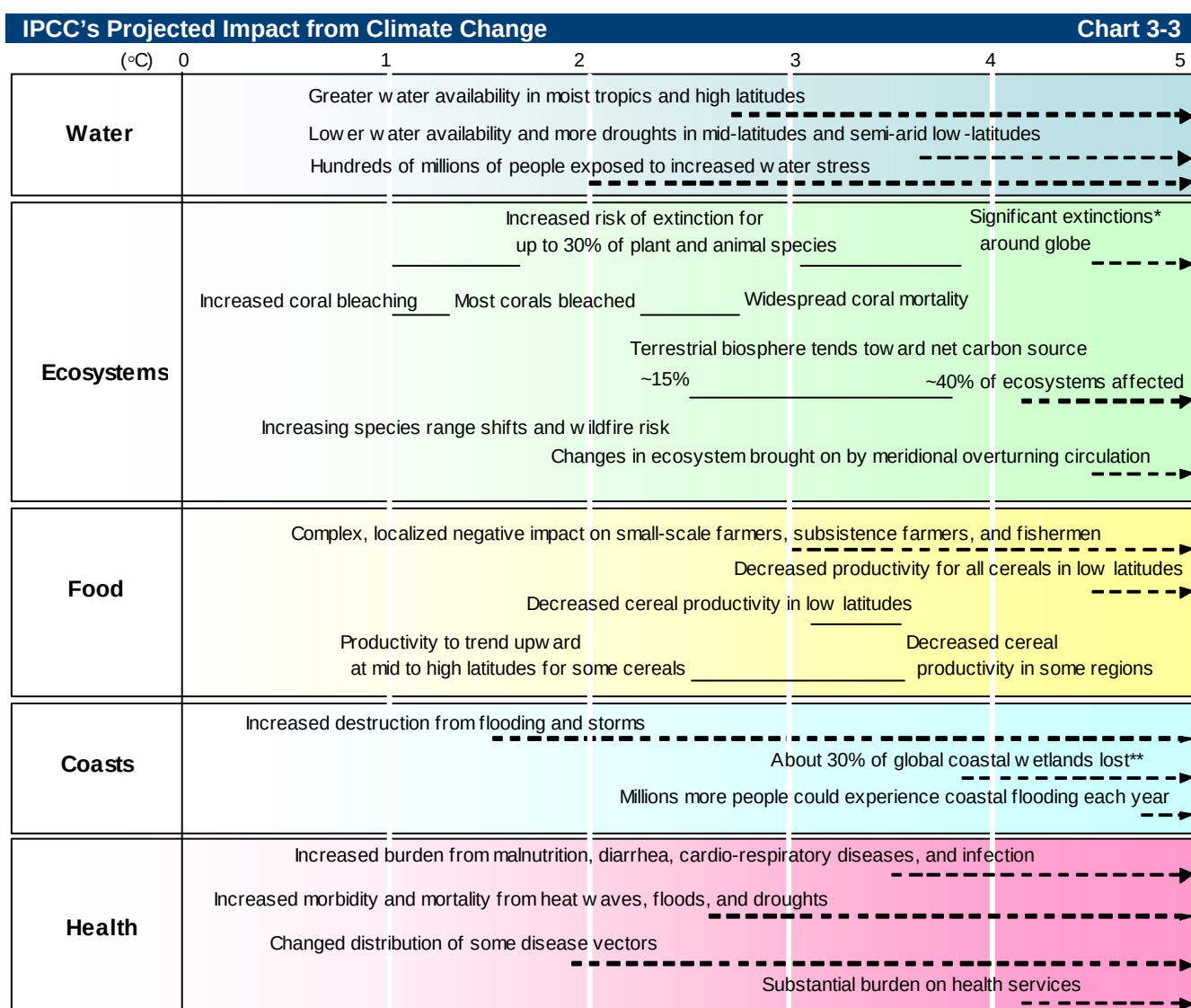
IPCC estimated impacts from climate change

The Intergovernmental Panel on Climate Change's (IPCC) *Fourth Assessment Report* (2007) asserted that there was one issue in the debate over global warming with almost no room for discussion—that man was most likely responsible for the

recent increase in GHG emissions (report suggests over 90% certainty). The report claimed that during this century, climate change could cause: (1) average temperatures to rise from between two to six degrees vs. 19th century levels; (2) sea levels to rise by 0.4-3.7m; (3) water shortages and extinction of various plant and animal species; (4) increased incidence of forest fires; (5) crop damage; (6) unusual weather conditions, including floods and severe storms; and (7) deterioration in public health from the spread of infectious diseases or malnutrition (Chart 3-3). This report has served as the scientific basis for many national-level climate policies and could play a meaningful role in fostering the adoption of renewable energies.

Awareness of possible impact on national security

Countries may have yet to factor in all risks from climate change, but they have probably already recognized its potential impact on national security. In 2006, the UK government released the *Stern Review*, a report commissioned by the Treasury that estimated the damage from climate change (e.g., global GDP could fall by 5-20%). Elsewhere, the White House released its *Global Climate Change Impacts in the United States* report in June 2009, and the CIA established a Center on Climate Change and National Security in September. In Japan, a May 2009 study commissioned by the Ministry of the Environment estimated that annual flood damage from climate change could reach ¥1.3 trillion in 2030.



Source: Intergovernmental Panel on Climate Change; compiled by Daiwa Securities SMBC.

* Significant means over 40%.

** Based on average rate of sea level rise of 4.2 mm/year from 2000-2080.

Countries setting emission reduction targets

Countries have been setting emission reduction targets, eyeing potential impacts from climate change (Chart 3-5). Before the recent COP15 meeting, both Japan and the US raised their targets, while emerging economies (China, India, Brazil) and developing countries (such as Indonesia) apparently made progress toward setting their own emission reduction objectives. Note that many countries are finding even the emission reductions outlined in the Kyoto Protocol challenging to achieve, which suggests they may need to consider additional means for reaching such targets.

Renewable energies possible pillar of climate change policy.

Energy production is responsible for approximately one-fourth of GHG emissions worldwide, so increased adoption of renewables has become an important component of each country's climate policy. In 2007, the International Energy Agency (IEA) indicated that renewable energy technology would be instrumental in efforts to halve CO₂ emissions by 2050, achieving around 21% of the necessary reductions.

Carbon pricing to provide tailwind for renewables

Countries are now discussing GHG reduction targets for 2013 and beyond under a post-Kyoto framework. Reaching agreement on final targets is expected to be tough. Still, countries are apparently making headway in formulating national-level climate policies. Emissions trading could debut in Japan and Australia in 2011 and in the US in 2012, pending approval by their respective legislative bodies (Chart 3-4). Current emission credit prices (¥2,000-3,000 per MT of CO₂) are probably not high enough to help lift adoption rates for renewable energies directly. However, broader acceptance of carbon pricing would make fossil fuels more costly given their high volume of GHG emissions, offering tailwinds for the increased use of renewables. Agreement on a post-Kyoto framework could help accelerate the spread of carbon pricing to a point where such fees would directly affect demand for renewables.

Timeline for Introduction of Carbon Emissions Trading Scheme (ETS)						Chart 3-4	
	2008	2009	2010	2011	2012	2013	2014
International	First commitment period of Kyoto Protocol					Second commitment period of Kyoto Protocol? Next framework?	
US	Regional Greenhouse Gas Initiative (RGGI): ETS in ten Northeastern states						
				Midwestern Greenhouse Gas Reduction Accord (MGGA; ETS in 12 Midwestern states; may not begin until 2010)			
				Western Climate Initiative (WCI) Phase I (7 Western states)			
				Introduction of federal ETS? (presidential policy/bill being deliberated)			
EU	EU-ETS Phase II					EU-ETS Phase III (-2020)	
Japan	Voluntary ETS						
				ETS to be introduced in Tokyo			
				ETS to be introduced? (ruling party's plan)			
Australia				ETS to be introduced? (ruling party's plan)			
New Zealand	ETS introduced						
Canada			ETS to be introduced				

Source: Various materials; compiled by Daiwa Securities SMBC.

Greenhouse Gas Reductions: Targets and Actual Figures			Chart 3-5
	Kyoto Protocol targets (2008-2012; vs. GHG emissions in 1990)	Reductions in GHG emissions (1990-2007)	Medium-term targets (until 2020)
US	-7% (but not ratified)	16.80%	Down 3% from 1990 level (17% below 2005 level)
EU	-8%	-4.3%	Down 20% from 1990 level (down 30%, contingent on international consensus)
Japan	-6%	8.20%	Down 25% from 1990 level (contingent on international consensus)
Russia	0%	-33.9%	Down 22-25% from 1990 level
Canada	-6%	26.20%	Down 20% from 2006 level
Germany	-21%	-21.3%	Down 40% from 1990 level
Australia	8%	30%	Down 25% from 2000 level
France	0%	-5.3%	Down 14% from 2005 level
UK	-12.5%	-17.3%	Down at least 34% from 1990 level
Italy	-6.5%	7.10%	Down 13% from 2005 level
Spain	15%	53.50%	Down 10% from 2005 level
China	No target	-	Cut CO ₂ emissions by 40-45% per unit of GDP vs. 2005 levels
India	No target	-	Cut CO ₂ emissions by 20-25% per unit of GDP vs. 2005 levels
South Korea	No target	-	Down 30% from business-as-usual (BAU) levels (up 100% vs. 1990 level)
Brazil	No target	-	Down 36-39% from BAU levels (down 20% vs. 2005 level)
Indonesia	No target	-	
Mexico	No target	-	NA

Source: United Nations Framework Convention on Climate Change; compiled by Daiwa Securities SMBC.

Note: Areas shaded in blue indicate countries that failed to meet Kyoto Protocol targets.

3) Interest in Developing New Industries, Creating Jobs

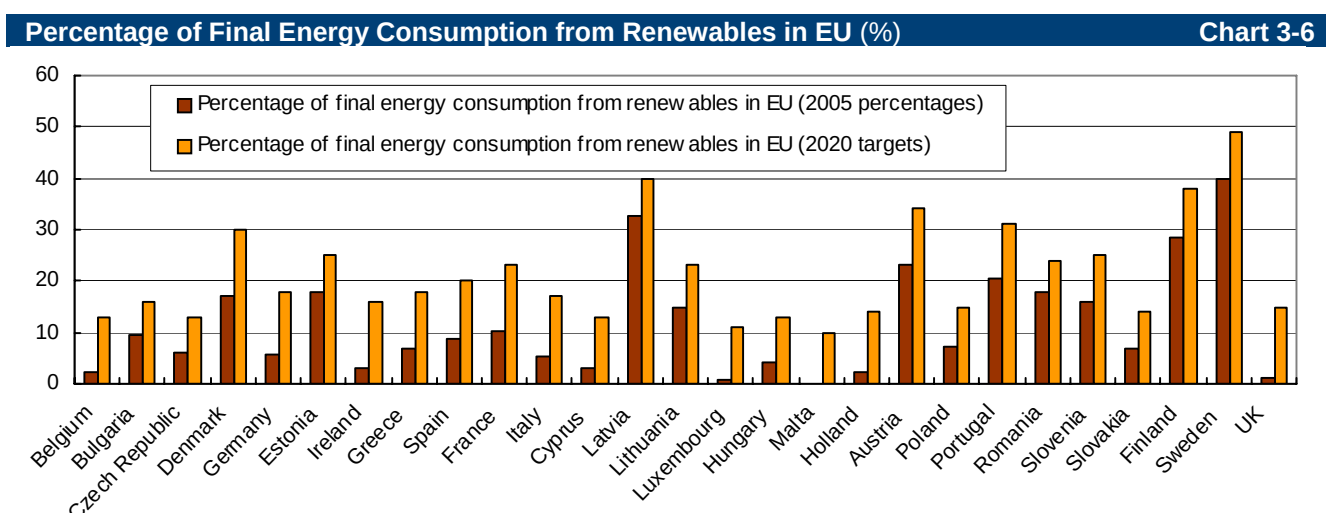
US aiming to create 5 million jobs via energy-related investment

Just as the Obama administration has pledged \$150 billion in clean energy investment, with a goal of creating five million jobs over the next ten years, many countries and regions view renewables as both a potential growth industry and a source of job creation.

Growth industry, so countries seeking first-mover advantage

Although it may be tough to precisely measure the size of the clean energy industry, a US research organization estimated the market for wind and solar power and biofuels at around \$115.9 billion (as of 2008). The market for such energy sources is still relatively small compared to that for conventional sources. However, clean energy has enjoyed robust growth recently, raising expectations for it to become the next growth industry. Anti-global warming policies are helping to feed this new market, so national policies probably reflect countries' ambitions to gain first-mover advantage in this expanding field.

Europe was one of the first regions to throw its hat into the ring. In December 2008, the European Parliament adopted a comprehensive policy on climate change and energy. Ahead of the rest of the world, the region outlined plans to slash GHG emissions by 20% vs. the 1990 level and to eventually obtain 20% of energy needs from renewable energy sources. Targets for renewables have been parceled among each member state, with each likely to consider various means of achieving such goals (Chart 3-6).



Source: European Parliament materials; compiled by Daiwa Securities SMBC.

**Europe also viewing
shift to renewables as
source of new jobs**

In 2008, the European Commission proposed that adoption of renewable energies would (1) help reduce CO₂ emissions, (2) enable countries to reduce fossil fuel consumption, and (3) develop new industries and create new jobs. Specifically, it suggested that the renewable energy industry in the EU could produce around 350,000 new jobs and generate around €30 billion in additional revenue annually. A 2007 UN report also estimated that employment in clean energy industries had risen in countries that had made progress in adopting renewable energies, pegging the number of such jobs in Germany at 260,000 and those in Spain at around 90,000 (Chart 3-7).

**US aiming to create jobs
in clean tech industries**

Besides the EU, the US is also pouring efforts into developing new clean energy industries. According to the above-noted UN estimates, clean energy firms employed around 450,000 people in 2006. The US boasts the largest wind power operations worldwide, which collectively employ 85,000 people (according to estimates from 2008 Global Wind Energy Council report). As noted previously, the Obama administration is seeking to create five million new jobs in the clean energy industry. Note that economic stimulus measures apparently include appropriations of around \$100 billion for investment in environmental and energy-related research.

According to the United Nations Environment Programme (UNEP), the renewable energy industry was responsible for more than two million jobs worldwide in 2006 (Chart 3-7). Since the 2008 financial crisis, economic stimulus measures in various countries have included funding for renewable energy-related projects. Efforts to make use of renewables a key pillar of a long-term energy policy will likely expand as countries hammer out individual climate change policies.

Renewable Energy-related Employment (2006)			Chart 3-7
Energy source	Number of jobs	Breakdown by country	
Wind power	300,000	Germany	82,100
		US	36,800
		Spain	35,000
		China	22,200
		Denmark	21,000
		India	10,000
Solar photovoltaic	170,000	China	55,000
		Germany	35,000
		Spain	26,449
		US	15,700
Solar thermal	624,000	China	600,000
		Germany	13,300
		Spain	9,142
		US	1,900
Biomass	1,174,000	Brazil	500,000
		US	312,200
		China	266,000
		Germany	95,400
		Spain	10,349
Hydroelectric	39,000	Europe	20,000
		US	19,000
Geothermal	25,000	US	21,000
		Germany	4,200
Total	2,332,000	-	

Source: United Nations Environment Programme; compiled by Daiwa Securities SMBC.

4. Countries to Watch from Policy Perspective

Key indicators: GHG emissions; reliance on coal; size of renewables markets

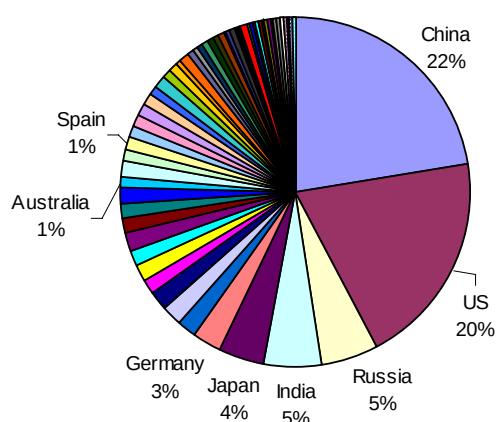
Going forward, our focus on the policy front will be on countries with (1) high GHG emissions, (2) a high weight of coal in electricity generation and primary energy supply, and (3) significant markets for wind and solar power. Stricter limits on GHG emissions will ramp up pressure on countries with high emissions to cut them, as well as increase the need for a shift in energy sources in countries with high reliance on coal. Therefore, stricter GHG emission limits could translate into stronger renewables policies in countries falling into these categories. Meanwhile, for countries that already have noteworthy markets for renewables, renewables policies naturally significantly impact these markets.

Our focus is on China, the US, Russia, India, and Japan as nations with high emissions; China, the US, India, and Australia as countries with high levels of reliance on coal ; and on Japan, the US, China, India, and Germany and Spain within the EU as nations with noteworthy markets for wind and solar power.

Focus particularly on US, China

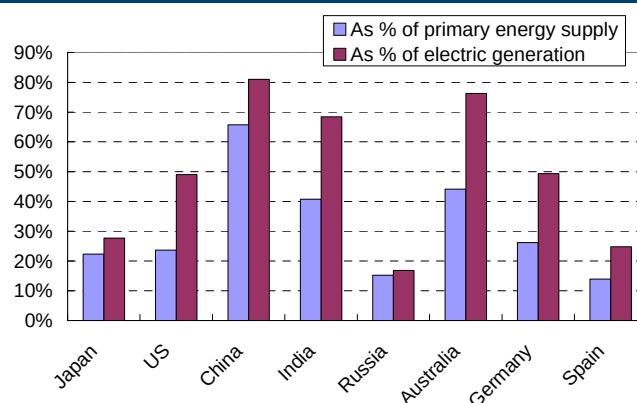
Below, we will comment on trends and key points in renewables policies in all these countries. In particular, the US and China are major emitters (together account for just over 40% of global emissions; Chart 4-1), have high levels of reliance on coal (Chart 4-2), and also have significant presences in renewable energy markets. Furthermore, it is likely that they will step up renewable energy policies as a result of international negotiations. As such, we will be concentrating on those two nations especially.

Global CO₂ Emissions Volume (2007) Chart 4-1



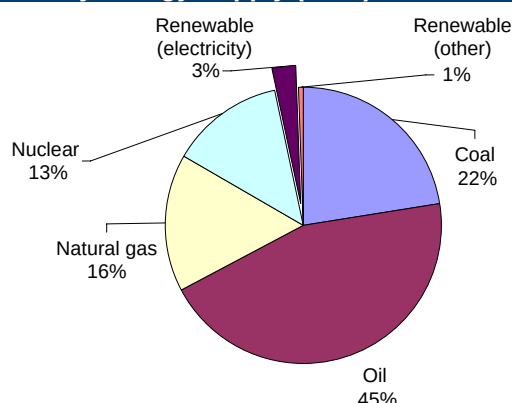
Source: Oak Ridge National Laboratory; compiled by Daiwa Securities SMBC.

Reliance on Coal Chart 4-2

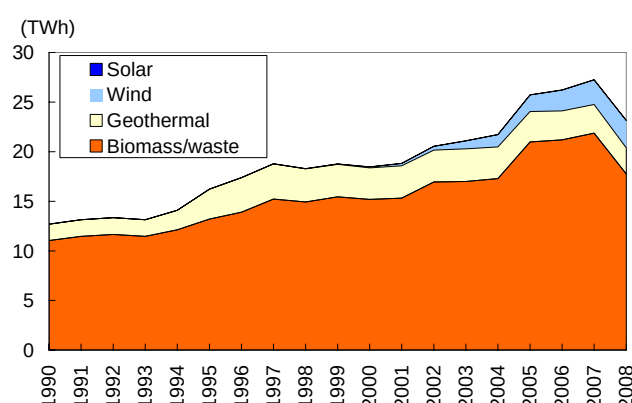


Source: IEA; compiled by Daiwa Securities SMBC.

1) Japan

Primary Energy Supply (2007)
Chart 4-3


Source: IEA; compiled by Daiwa Securities SMBC.

Renewable Energy Supply (excl. hydro) Chart 4-4


Source: EIA; compiled by Daiwa Securities SMBC.

Focus on enhancing energy self-sufficiency, nurturing renewables industry

Japan has few energy resources, resulting in a dismal energy self-sufficiency ratio of 4%. Because of this, Japan has been developing alternative energy sources in order to boost energy security since the oil crises of the 1970s. The solar power industry in particular has received strong policy support—Japan boasted the highest installed capacity in the world through 2005 and Japanese firms accounted for roughly 50% of global solar cell production in the first half of this decade.

Bold measures needed to achieve emissions cut targets

Under the Kyoto Protocol, Japan agreed to reduce GHG emissions by an average of 6% vs. the 1990 level in 2008-12, but even in 2008, when production volumes slumped, emissions were still 1.9% above the 1990 figure (preliminary data; down 6.2% y/y). In September 2009, the incoming DPJ administration announced its medium-term target of lowering GHG emissions 25% from the 1990 level by 2020, which will require far-reaching measures to attain.

Only 0.8% of electric power supply from RPS sources

Renewables accounted for 6% of Japan's primary energy supply in 2008 and 9% of electric power production in 2007. However, the majority of this is from hydroelectric power, so the weight of renewable energy tends to fluctuate in line with hydroelectric output. Limiting the definition of renewables to those sources fulfilling certain environmental criteria and included in the renewables portfolio standard system (RPS; part of 2003 Law on Special Measures Concerning New Energy Use by Electric Utilities), renewable sources only accounted for 0.8% of total electric power supply in 2008. That said, this proportion has been climbing since 2003, with output from RPS sources showing the strongest growth among all generation sources.

Policies to promote renewables in place since 1990s

Japan started implementing meaningful renewable energy policies in the 1990s. In the Law on Special Measures Concerning New Energy Use by Electric Utilities, it set legal obligations for electric power companies to produce certain amounts of electricity from renewable sources (RPS). That said, the law only called for 0.4-0.8% of total electricity supply to be from RPS sources, low compared to Europe and the US. In fact, electric utilities have consistently exceeded the legal minimums since the law's institution (Chart 4-6)

Japan's Renewable Energy-related Policies

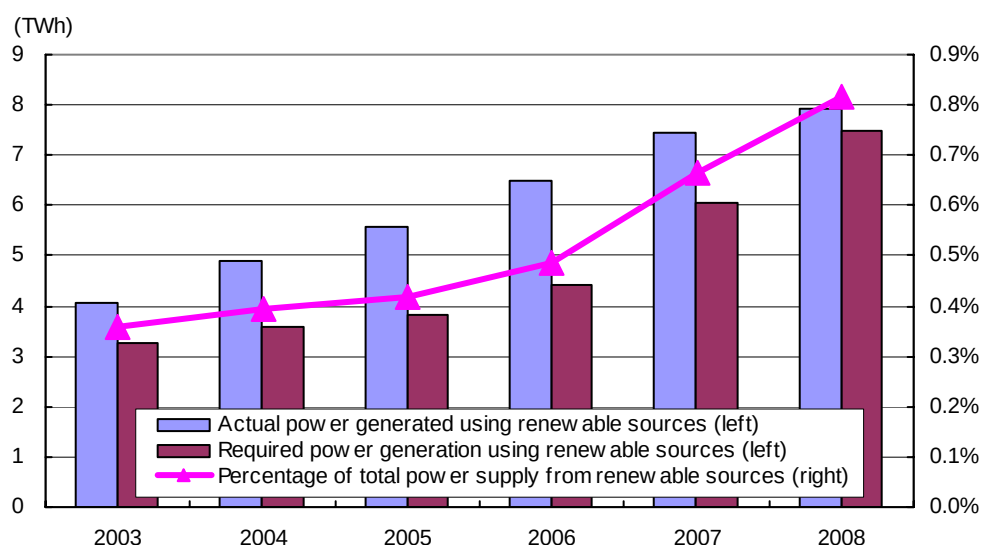
Chart 4-5

Year	Event
1992	Japanese electric utilities begin program to buy extra power generated by customers' solar, wind, waste power facilities
1994	General Policy for Introduction of New Energy Sources formulated Former Ministry of International Trade & Industry starts subsidies for residential photovoltaic (PV) system installations
1997	Law Concerning Special Measures to Promote the Use of New Energy (New Energy Law) enacted, implemented
1998	Electric utilities start procurement from commercial wind power operators using long-term contracts
2000	Basic Act on Energy Policy enacted Electric utilities set up Green Power Funds and Green Power Certification System
2002	Basic Act on Energy Policy enacted Law on Special Measures Concerning New Energy Use by Electric Utilities (Renewable Portfolio Standards [RPS] Law) enacted
2003	Renewable Portfolio Standards Law implemented
2005	End to subsidies for PV system installations
2008	<i>Action Plan for Achieving a Low Carbon Society</i> adopted by Cabinet, goals for PV power generation set (increase by 10-fold by 2020, 40-fold by 2030)
2009	Government reinstates subsidies for PV system installations <i>Measures to Address Economic Crisis</i> adopted by Cabinet, goals for PV power generation raised (increase 20-fold by 2020, 40-fold by 2030) Bill on the Promotion of the Use of Non-fossil Energy Sources and Effective Use of Fossil Energy by Energy Suppliers enacted Start of feed-in tariff scheme for surplus electricity (purchase price set at double previous price used by electric utilities)

Source: Various materials; compiled by Daiwa Securities SMBC.

Japan's RPS Mechanism: Requirements vs. Actual Performance

Chart 4-6



Source: Agency for Natural Resources & Energy materials; compiled by Daiwa Securities SMBC.

**Solar power market
grew on back of
voluntary tariffs,
subsidies**

Total installed solar power capacity in Japan has been growing since the start of the 1990s (Chart 4-7), largely thanks to (1) voluntary tariffs by electric utilities (surplus electricity purchase; from 1992), and (2) subsidies for installations from METI from 1994-2005. These measures, combined with lower prices for generation systems, made it possible to recover initial investments within 20 years, prompting growth in new installations. However, annual capacity additions have declined since 2005, when government subsidies were terminated. As the solar power market and industry have grown in Germany and Spain, the presence of Japanese firms in the market has weakened.

**Beefing up initiatives
again since 2008**

The Japanese government moved to step up support measures for installation of renewable generation systems again in 2008. The Fukuda administration announced a goal of increasing solar power capacity tenfold by 2020 in June 2008, and subsidies were reintroduced by the Aso administration in January 2009. The

Aso administration hiked the 2020 target to 20-fold in April 2009, and unveiled plans for a feed-in tariff on surplus electricity purchases from November at double the rate electric utilities were paying. As a result of these measures, new solar power installations returned to growth—we estimate capacity additions will roughly double y/y in 2009 to a record 0.45 GW (Chart 4-7).

Wind power market also growing on subsidies, tariff schemes

On the other hand, Japan was a relatively late mover for wind power, with installed capacity only starting to increase from the second half of the 1990s. The growth can largely be attributed to: (1) introduction of subsidies for wind power schemes from 1997 (capped at one-third of initial costs); (2) a long-term voluntary tariff scheme for commercially produced wind power implemented by electric utilities from 1998. The advent of the RPS system in FY03 probably also provided somewhat of a boost (one-third of certified schemes are wind power; installed capacity grew after implementation), but some electric utilities also lowered their tariffs and restricted the amounts of wind power purchased to the legal minimums set out in the law. As a result, capacity additions have tended to vary markedly by year (Chart 4-8).

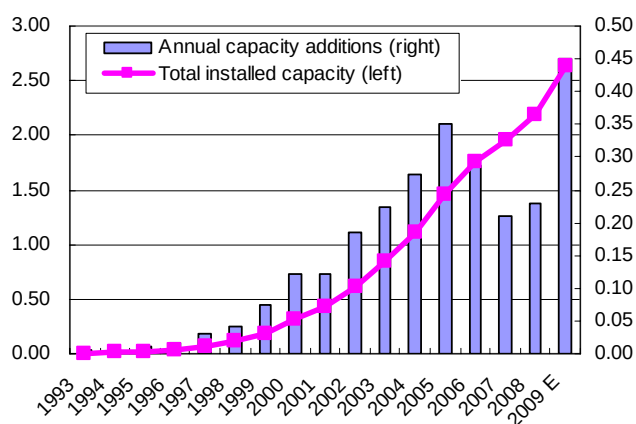
Focus on implementation of feed-in tariff system

The recent change in government has brought Japan to a major turning point in terms of renewables policy. The DPJ's manifesto set a target of increasing the weight of renewables in total primary energy supply from 6% presently to 10% in 2020, and included a pledge to introduce a full feed-in tariff system. In a full feed-in tariff system, all electricity produced by renewable sources is purchased by power companies, not just the surplus portion. The details of this system are the main point of focus for Japan.

Demand to grow for megasolar, wind power, biomass, microhydro, geothermal

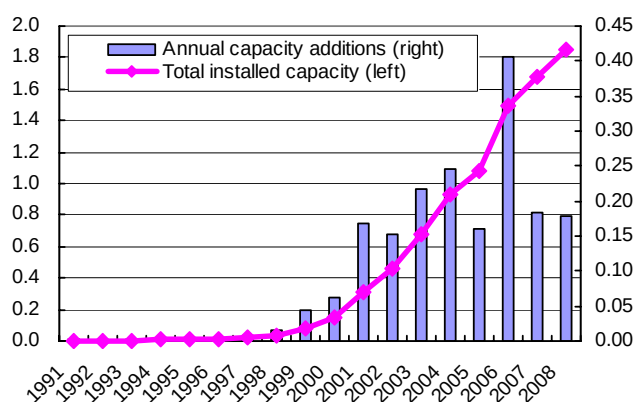
The previous LDP administration placed the emphasis of its policies on residential solar power. However, if the DPJ fulfills its election pledges, demand should grow for other renewables as well, such as megasolar, wind power, biomass, microhydro, and geothermal. Demand will depend on the eligibility criteria for feed-in tariffs as well as the tariff rates. A well-designed tariff system could trigger rapid growth similar to that seen in Germany and Spain. Meanwhile, the Government Revitalization Unit recommended postponing budget allocations for subsidies for residential solar power in FY10. We anticipate a short-term negative impact on the domestic market if subsidies are stopped in April 2010. We will be keeping a careful eye on the details and timetable of the tariff system.

Solar Power Capacity in Japan (GW) Chart 4-7



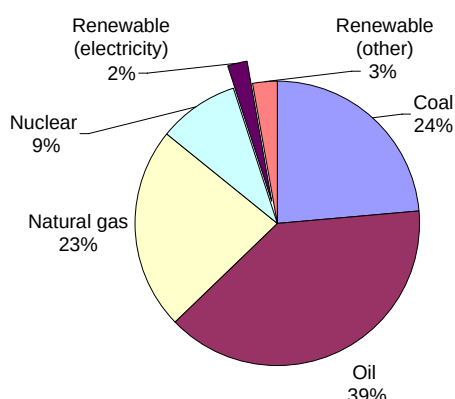
Source: Solarbuzz; compiled by Daiwa Securities SMBC.
Note: 2009 estimate taken from 8 Dec 2009 *Nikkei* article.

Wind Power Capacity in Japan (GW) Chart 4-8

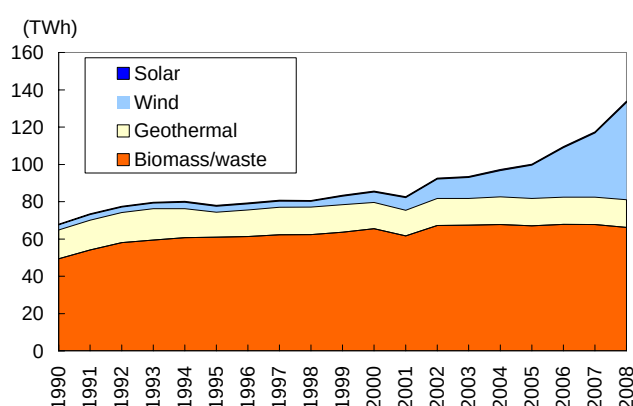


Source: New Energy and Industrial Technology Development Corporation (NEDO); compiled by Daiwa Securities SMBC.

2) United States

Primary Energy Supply (2007)
Chart 4-9


Source: IEA; compiled by Daiwa Securities SMBC.

Renewable Energy Supply (excl. hydro) Chart 4-10


Source: EIA; compiled by Daiwa Securities SMBC.

Accelerating introduction of renewables

The US has rich coal resources, giving it roughly 70% energy self-sufficiency. Coal accounts for just over 20% of primary energy supply and 50% of electricity supply. The US government is currently trying to accelerate adoption of renewable energy sources in order to (1) further improve energy self-sufficiency, (2) nurture new industries, and (3) combat global warming. As of 2008, the US was No. 1 in the world for installed wind power capacity and No. 4 for solar. As the domestic market expands, related industries are also growing.

United States' Renewable Energy-related Policies
Chart 4-11

Year	Event
1976	California state government introduces investment tax credit for renewable energy
1978	National Energy Act enacted Public Utility Regulatory Policy Act (PURPA) enacted: Requires electric utilities to purchase energy generated from renewable sources above certain price (through 1985) - Income tax credits given to private residents who use solar, wind power as energy sources - Tax credits (15%) given to commercial entities to introduce solar, wind, geothermal, or ocean thermal energy conversion technology
1992	Energy Policy Act of 1992 passed Renewable energy production tax credit (PTC, applied to wind, biomass power generation from 1994-1999) - Net metering system started in California
1999	Federal PTCs expire, are extended
2001	Federal PTCs expire
2002	Federal PTCs extended
2003	California introduces renewable portfolio standards (RPS)
2003	Federal PTCs expire
2004	Federal PTCs extended
2005	Energy Policy Act of 2005 passed - Extends PTCs - Requires that 7.5% or more of total annual power consumption come from renewable energy sources by 2012 - Expand use of renewable fuels (primarily ethanol) to 7.5 billion gallons annually by 2012 - Establishes 20-year investment tax credit for residential PV system installation, expands tax credit for commercial solar power generation
2006	Department of Energy launches Solar America Initiatives Aims to make solar power generation cost competitive with other energy sources by 2015 California launches California Solar Initiatives
2008	Federal PTCs extended
2009	Tax credits, loan guarantees for renewable energy included in economic stimulus package Investment tax credit for wind power extended three years Waxman-Markey Bill (energy, climate, carbon cap & trade) passes the US House of Representatives

Source: Various materials; compiled by Daiwa Securities SMBC.

Facing international pressure to lower emissions

The US is a major GHG emitter, accounting for around 20% of total global emissions. It is also the only developed nation that failed to ratify the Kyoto Protocol. As a result, international pressure for the US to curb emissions is

extremely strong. The nation's high reliance on coal means that per capita emissions are a lofty 16 MT, and emissions have essentially been rising in line with growth in energy consumption. Even in 2008, when economic activity contracted sharply due to the financial crisis, GHG emissions were 14% higher than 1990 (down 2.2% y/y). The Obama administration has set a target of cutting emissions by 17% from the 2005 level by 2020 (down 3% from 1990 level), which will require radical measures.

Wind, solar power installations growing

Supply volumes from renewables other than hydroelectricity have been rising in the US since 2000, with wind and solar power achieving particularly strong growth.

Demand growing thanks to federal tax breaks, state-level initiatives

Following the oil crises, the US introduced a tariff system forcing electric utilities to purchase energy from renewable sources at or above a fixed rate in 1978 (Public Utilities Regulatory Policies Act), which promoted the spread of renewables to an extent. That said, new installations did not take off until the 1990s, on the back of federal tax breaks and initiatives at state level.

Tax breaks for wind power

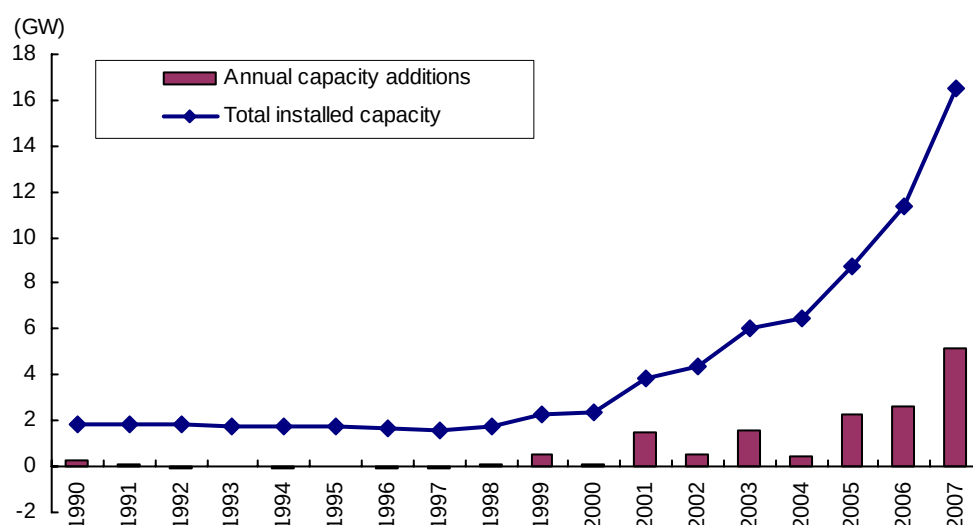
Growth was particularly high for wind power. Installation of wind power generation systems started increasing from the late 1990s, and had grown to account for 40% of total capacity additions in 2008. This was largely driven by (1) federal tax breaks (production tax credits—fixed tax credit per kWh of renewable energy produced over fixed period), and (2) state-level measures. That said, the production tax credit schemes have been allowed to lapse several times before undergoing extensions, which led to an unstable cycle with capacity additions surging ahead of expiry dates and then falling back the following year (Chart 4-12). The American Recovery and Reinvestment Act enacted in February 2009 extended the production tax credits to 2012, creating a more stable policy environment. However, apparently the financial crisis has negatively impacted availability of funding for wind power projects.

Synergies with state initiatives

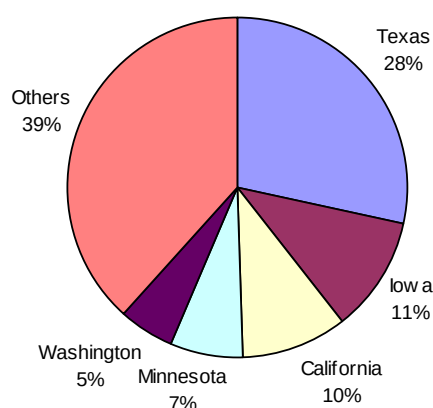
Notably, Texas, Iowa, and California accounted for half of total installed wind power capacity in the US as of 2008 (Chart 4-13). These three states have set goals for all renewable energy sources and have introduced renewables portfolio standards for power companies (Chart 4-14). It appears that these measures, in combination with the federal tax breaks, have driven growth in annual capacity additions.

Wind Power Capacity

Chart 4-12



Source: EIA; compiled by Daiwa Securities SMBC.

Wind Power Capacity by State (2008) Chart 4-13

Source: GWEC; compiled by Daiwa Securities SMBC.

Renewable Portfolio Standards by State Chart 4-14

State	Renewable energy policies	Targets
Texas	RPS	5,880 MW by 2015
Iowa	RPS	105 MW
California	RPS	20% by 2010
Minnesota	RPS	25% by 2025
Washington	RPS	15% by 2020

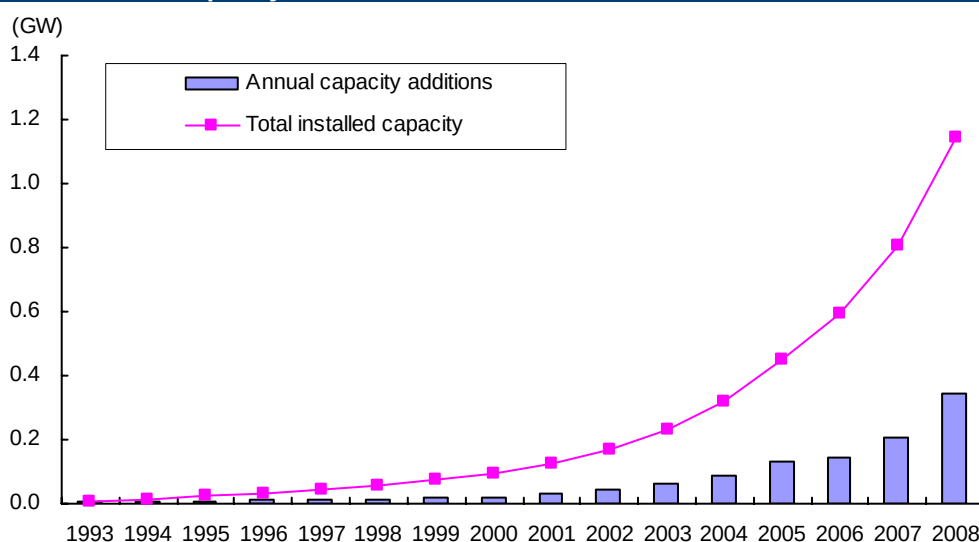
Source: Interstate Renewable Energy Council (IREC) materials; compiled by Daiwa Securities SMBC.

Non-residential solar power installations expanding on tax breaks

Meanwhile, installation of solar power in the US has been rising since the second half of the 1990s, once again largely because of federal tax breaks and state-level initiatives. Federal tax breaks were first instituted in the 1970s, and have been periodically extended and expanded since. Solar power capacity in the US is concentrated in the non-residential sector (70% of total), likely because of preferential treatment for that sector over the residential sector*.

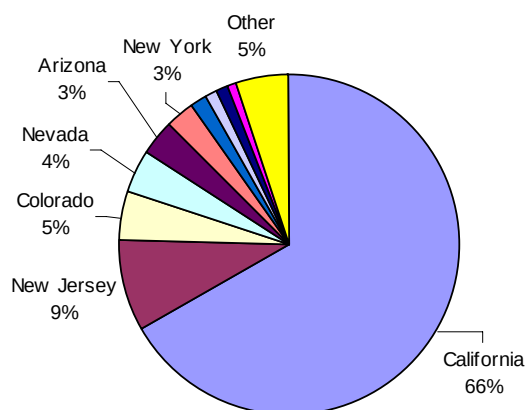
State initiatives fueling installation growth in California

Notably though, solar power in the US is heavily concentrated in California, which hosts 70% of total installed capacity. As such, it appears that state-level initiatives have greater impact than federal tax breaks. California has implemented renewables portfolio standards, and started up an independent program, the *California Solar Initiative*, in 2007 (Chart 4-17). In our view, a substantial portion of installation growth in the US since 2007 can be attributed to this program.

Solar Power Capacity Chart 4-15

Source: Company materials; compiled by Daiwa Securities SMBC.

* Non-residential solar power systems eligible for investment tax credits since 1978, but residential solar not made eligible until 2006. Though tax credit for 30% of investment introduced for residential solar in 2006, credit was capped at \$2,000 (cap abolished in 2009). Residential sector also not eligible for accelerated depreciation.

Solar Power Capacity by State (2008) Chart 4-16

Source: IREC; compiled by Daiwa Securities SMBC.

California Solar Initiative Chart 4-17

	Managed by California Energy Commission	Managed by California Public Utilities Commission
Budget	\$400 mil	\$2.2 bil
Capacity installation target	360 MW	1,940 MW
Eligible	New residential buildings	Existing residential buildings, commercial/agricultural/industrial facilities
Subsidies	\$2,500-2,600/kW for installations of 1 kW or higher	For installations below 100 kW: \$2,500/kW for residential/commercial, \$3,250/kW for non-profit/government For installations generating over 100 kW: \$0.39/kWh for residential/commercial, \$0.5/kWh for non-profit/government

Source: IEA; compiled by Daiwa Securities SMBC.

Impact of Obama administration policies

The Obama administration, formed in 2009, pledged to invest \$150 billion in clean energy over ten years with the aim of creating five million jobs. The economic stimulus package enacted in February (American Recovery and Reinvestment Act of 2009) earmarked roughly \$24 billion for renewables (Chart 4-18). The US was already making efforts to introduce renewables before the advent of the Obama administration, but the new administration has stepped up the focus on the renewable energy sector as a measure to stimulate the economy.

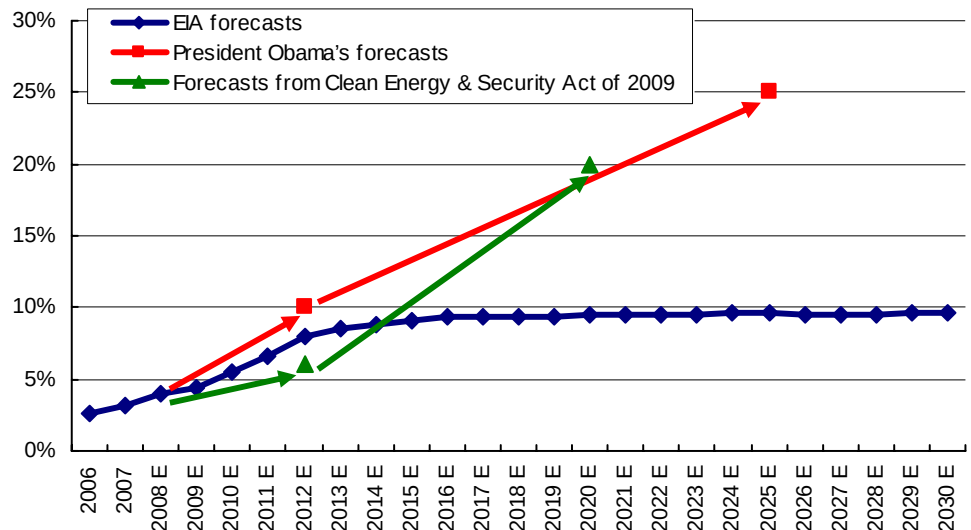
Renewable-related Measures in American Recovery & Reinvestment Act of 2009 (ARRA) Chart 4-18

Category	Amount (\$ bil)
Spending	
Loan guarantees for renewable energy and electric transmission technologies	6.0
Study into renewable energy supply for military facilities	0.3
Surveys/research into energy-saving, renewable energy-related fields	2.5
Job training for energy-saving, renewable energy-related fields	0.5
Tax credits	
Three-year extension of production tax credits for renewable energy production	13.1
Allowing choice between production tax credits or investment tax credits for renewable energy producers	0.3
Loosening requirements for investment tax credits for renewable energy	0.9
Renewable energy bonds	0.6
Total	24.2

Source: US Congress materials; compiled by Daiwa Securities SMBC.

Climate and energy law

The key point going forward is the likely fate of the climate and energy law currently under consideration in Congress. This law is a comprehensive set of environmental and energy policies, centered on the introduction of emissions trading and renewables portfolio standards. The proposed law was approved by the House of Representatives at the end of June, and is currently under consideration in the Senate. The bill passed by the lower house established goals of 6% of electricity supplies from renewable sources in 2010 and 20% in 2020, and includes renewables portfolio standards. If the bill is implemented in its current form, it is estimated that renewable generation capacity will rise from 17 GW in 2007 to 209 GW in 2020 (Chart 4-19).

Outlook for US Renewables as % of Total Generation Capacity Chart 4-19

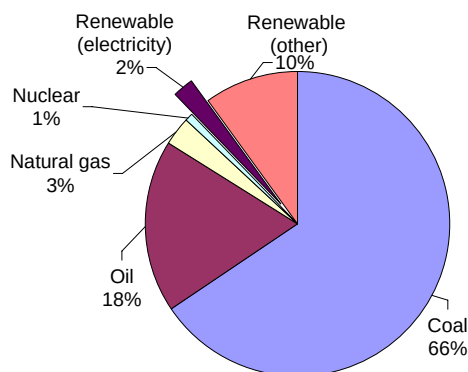
Source: EIA's *Annual Energy Outlook*; compiled by Daiwa Securities SMBC.

Note: EIA forecasts adjusted for ARRA impacts. Data for renewable energy sources exclude hydroelectric power.

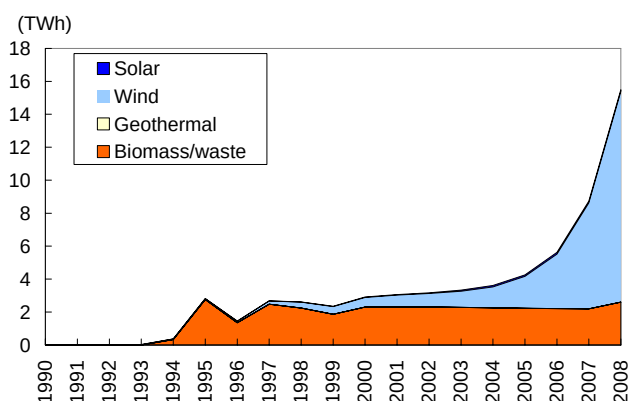
Focus on passage of law, details of initiatives

Given the stalled debate on healthcare reform and split opinion within the Democratic Party, the law faces significant hurdles. That said, the introduction of emissions trading is partly aimed at securing funds, so the Obama administration may well tighten emissions caps based on the Clear Air Act even if the climate and energy law fails. Given that parts of the industrial sector are in favor of the more flexible emissions trading system rather than direct restrictions, the law will likely be passed in the medium term. Our focus is on the passage of the law and the details of the measures contained in it.

3) China

Primary Energy Supply (2007) Chart 4-20

Source: IEA; compiled by Daiwa Securities SMBC.

Renewable Energy Supply (excl. hydro) Chart 4-21

Source: EIA; compiled by Daiwa Securities SMBC.

Rapidly Stepping up Efforts to Secure Stable Energy Supplies Since 2003

Overhauling energy mix

China has rich reserves of coal, which accounts for approximately 70% of primary energy supply and 80% of electricity production. Consequently, energy self-sufficiency is over 90%. However, the country is being forced to overhaul its coal-heavy energy mix due to (1) risk to the stability of energy supplies from rapid economic growth since 2003, and (2) intensifying international criticism of soaring CO₂ emissions. Meanwhile, alternative energy is still a developing field, so China

does not face such a large technology and infrastructure gap to developed countries. China is aiming to utilize growth in the domestic renewables market to develop related industries domestically, thereby nurturing internationally competitive firms. Since 2004, the Chinese government has adopted and implemented numerous policies to promote alternative energy (renewables and nuclear) and ease global warming.

Rapidly laying legal groundwork for renewables since 2004

The major renewables policies enacted by the Chinese government are: (1) the Renewable Energy Development and Utilisation Law (promulgated in Jul 2004), (2) the Renewable Energy Promotion Law (enacted in Jan 2006), and (3) the Medium and Long-term Development Plan for Renewable Energy in China (announced in Sep 2007). The Medium and Long-term Development Plan included capacity targets for each generation format to be met by 2020—300 GW for hydroelectricity, including large-scale projects; 30 GW for wind power; 1.8 GW for solar power—and a goal of 15% of primary energy supply from renewable sources by the same date. The government also released a medium- to long-term development plan for nuclear power in October 2007, aiming to install 40 GW in nuclear power capacity by 2020.

Also ramping up energy efficiency measures

On the demand side, China announced the Medium and Long-term Special Plan for Energy Conservation in November 2004, targeting a 2.2% annual decline in its carbon intensity (energy consumption per unit of GDP) in 2003-10 and a 3% annual reduction over 2003-20. Following that, the 11th Five-year Plan for National Economy and Social Development (2006-10) called for a 20% reduction in carbon intensity over the five year period, which works out to a 4.4% annual decrease.

Taking leading role in international global warming debate

Meanwhile, amid the intensifying international global warming debate since 2007, China has been publicizing its standpoint to the world. In June 2007, it released its National Climate Change Program, outlining its stance and initiatives regarding global warming. In December 2007, it released a declaration of its energy policy that explained current energy consumption trends in China as well as refuting the China-threat thesis. In October 2008, it released a white paper, *China's Policies and Action for Addressing Climate Change*, which officially laid out China's view on the global warming problem and its positive steps to tackle the issue. Then in November 2009, it announced that it would cut its carbon intensity in 2020 by 40-45% from the 2005 level, its first quantifiable CO₂ emissions target.

Hike in alternative energy installation targets likely

Currently, China is revising its installation targets for alternative energy sources. We anticipate significantly higher targets for wind, solar, and nuclear power. An upgrade for wind power is probably necessary to reflect the massive growth in that market over the past few years, while higher goals for solar and nuclear power are likely required to factor in policy measures, particularly measures to promote installation of solar power systems. We expect the new targets to be set at 150 GW for wind power, 20 GW for solar power, and 100 GW for nuclear power.

Primary Energy Supply

Chart 4-22

Chinese government targets

Energy source	Unit	Operational capacity				Total primary energy supply (mil MT SCE)				Annual operational capacity growth (%)	
		CY05	08	10	20	05	08	10	20	06-20	11-20
Renewables						166	251	300	576	8.7	6.7
Hydro	GW	110	172	190	300	141	203	233	368	6.6	4.7
Biomass	GW	2.0	3.0	5.5	30	2.2	2.6	8	43	21.8	18.5
Wind	GW	1.26	12.2	10	30	0.9	5.3	8	23	24.3	11.6
Solar	GW	0.07	0.15	0.3	1.8	0	0.08	0	1.15	24.2	19.6
Tidal	GW	0.0	0.0	0.0	0.1	0	0	0	0		
Methane gas	Bil m ³	8	14	19	44	6	10	13	31	12.0	8.8
Thermal solar	Mil MT SCE	15	25	30	60	15	25	30	60	9.7	7.2
Geothermal	Mil MT SCE	0.0	3.2	4.0	12	0	3	4	12		
Solid biofuels	Mil MT	-		1.0	50	0		1	26		
Liquid biofuels	Mil MT	1.02	1.6	3.0	10	1	2	3	9	16.4	12.8
Biodiesel	Mil MT	0.05		0.2	2	0		0	2	27.9	25.9
Nuclear	GW	6.6	8.6	11	40	19	25	32	115	12.7	13.7
DIR estimates											
Renewables								343	679	9.9	7.1
Hydro	GW			210	300			257	368	6.6	3.6
Biomass	GW			5.5	30			8	43	21.8	18.5
Wind	GW			35	150			27	115	38.3	15.7
Solar	GW			0.8	20			1	13	45.8	38.0
Tidal	GW			0.0	0.1			0	0		
Methane gas	Bil m ³			19	44			13	31	12.0	8.8
Thermal solar	Mil MT SCE			30	60			30	60	9.7	7.2
Geothermal	Mil MT SCE			4.0	12			4	12		
Solid biofuels	Mil MT			1.0	50			1	26		
Liquid biofuels	Mil MT			3.0	10			2	9	16.4	17.5
Biodiesel	Mil MT			0.2	2			0	2	27.9	25.9
Nuclear	GW			11	100			32	287	19.8	24.6

Assumptions: Capacity factors for 2010-2020—hydro, 38.5%; biomass, 45%; wind, 22%; solar, 20%; tidal, 90%; nuclear, 90% (vs. net capacity); coal, 33.8%. Average thermal to electrical conversion efficiency for methane gas, 56%. 15 GJ of heat produced per ton of solid biofuel burned.

Unit equivalencies: 1 TWh = 8.6×10^4 toe; biodiesel—1 MT = 0.86 toe; bioethanol—1 Mt = 0.64 toe; methane—1 m³ = 0.497×10^{-3} toe (0.03718 GJ/m³, 56% average thermal to electrical conversion efficiency, 41.87 GJ/toe); solid biofuels—1 MT = 0.358 toe (15 GJ/MT, 41.87 GJ/toe); 1 MT SCE = 0.7 toe.

Source: Chinese government materials, NEDO; compiled by Daiwa Securities SMBC.

Notes: 1) SCE: standard coal equivalent; toe: tonne oil equivalent.

2) Shaded figures are Daiwa Securities SMBC estimates.

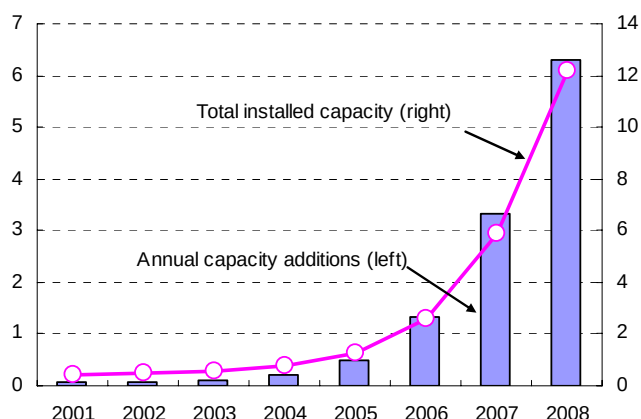
Wind power capacity growing much faster than planned

Among alternative energy sources, wind power has been making especially strong progress relative to the Chinese government's targets. The government initially set a goal of 5 GW of installed capacity in 2010 and 30 GW in 2020, but capacity had already reached 6.3 GW at end-2008. Following the enactment of the Renewable Energy Promotion Law in January 2006, the government issued detailed regulations for its implementation in April 2006 and started disclosing benchmark prices based on successful bid rates in auctions for central government projects. Pricing continued to vary significantly for a while, but gradually settled down in 2007 as more auctions were held, yielding more data for setting benchmark rates. Prices settled at around 0.51-0.61 yuan/kWh. In 2009, it was decided to set fixed tariffs by region rather than merely benchmark rates. Two other factors have likely contributed to market growth: first, designation as CDM projects gave access to additional revenues, which has improved project returns. Second, the Chinese government required power companies with over 5 GW capacity to install a certain amount of renewables capacity (i.e., RPS system).

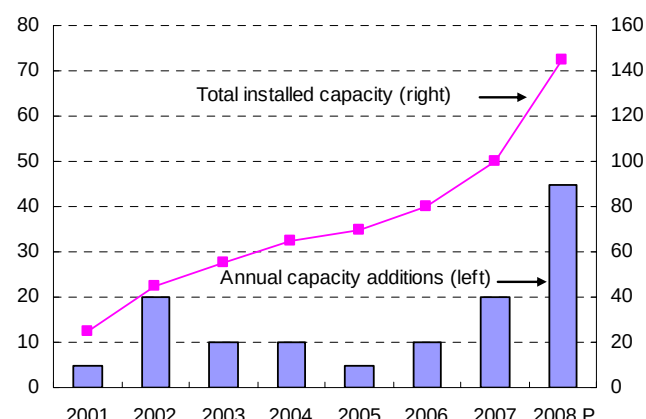
Solar power market to enter meaningful growth stage in 2010

On the other hand, solar power has been lagging, with total installed capacity only reaching 150 MW through 2008. This is partly because the Chinese government was against promoting solar power through 1H CY08 due to the excessively high costs. However, from 4Q CY08, the falling cost of solar power systems (lower initial investment expenses, plunging silicon prices) and the need to support

domestic industry (China was leading global solar cell producer, but almost all exported) prompted the government to consider promoting solar power generation as well. In March 2009, the government announced a 20 yuan/W subsidy for new systems with over 50 kW capacity. After that, it announced that it would subsidize 50% of initial costs for grid-connected systems and 70% for non-connected systems. We also expect a feed-in tariff to be introduced in 2010.

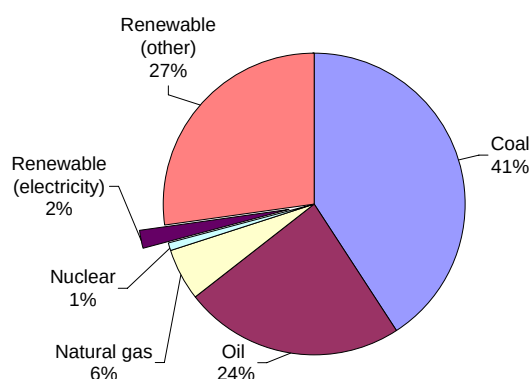
Wind Power Capacity in China (GW) Chart 4-23


Source: GWEC; compiled by Daiwa Securities SMBC.

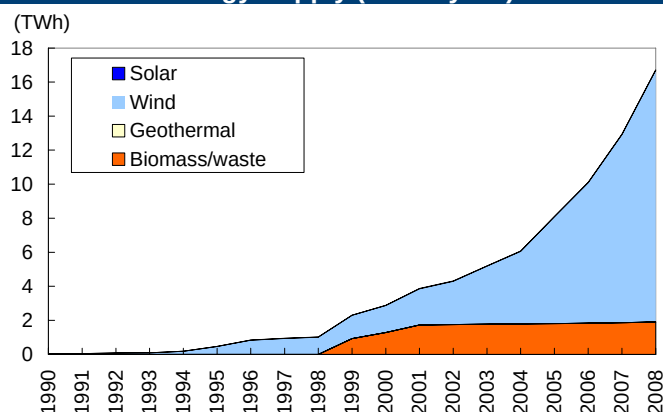
Solar Power Capacity in China (MW) Chart 4-24


Source: National Development and Reform Commission; compiled by Daiwa Securities SMBC.
P: Preliminary estimates.

4) India

Primary Energy Supply (2007) Chart 4-25


Source: IEA; compiled by Daiwa Securities SMBC.

Renewable Energy Supply (excl. hydro) Chart 4-26


Source: EIA; compiled by Daiwa Securities SMBC.

Access to fossil fuels failing to keep up with energy demand

India has seen rapid economic expansion, and a proportional rise in energy demand, since it embraced free markets in the '90s. In addition to relatively abundant deposits of coal, India boasts domestic sources of oil and natural gas. However, domestic production of these fossil fuels has failed to keep up with the sharp rise in energy demand, forcing India to import an increasing share of fossil fuel. Against this backdrop, India's energy policies have focused on (1) deregulation to attract private investment in domestic fossil fuel development and investment in the foreign production of such fuels, (2) expansion of nuclear and renewable energy infrastructure, and (3) energy efficiency.

The Indian government unveiled its *National Action Plan on Climate Change* in June 2008. Not wanting to disrupt India's rapid economic growth, the government

focused primarily on mitigation and adaption measures. India, like other emerging nations, objects to absolute emissions targets, asserting that advanced nations should bear the brunt of responsibility for climate change. Even so, India aired its own 2020 target on the heels of China's in December 2009, citing its intention to reduce carbon intensity (CO₂ emissions per unit of GDP) by 20-25% of the 2005 level. In our opinion, this suggests India is stepping up its commitment to the fight against global warming.

Early wind energy advocate

With the aid of government support for wind power, renewable energy began gaining traction in India in the early '90s, but lost steam in the latter half of the decade as the economy slowed and problems arose (complaints of unreliable service, underdeveloped power grid). However, in 2000, India unveiled its *Hydrocarbon Vision 2025*, positioning the diversification of its primary energy mix as a key objective. Also, in its *Tenth Five Year Plan* (Apr 2002 thru Mar 2007), the national planning commission spelled out an agenda for boosting renewable energy output, primarily through investments in wind energy (targeting expansion of 2.2 GW vs. 3.6 GW overall), but also in small-scale hydro and biomass projects (25 MW or lower). India introduced drastic reform thereafter, reshaping the power industry through legislation passed in 2003 (Electricity Act) and national energy policies launched in 2005. It began participating in CDM projects from 2003 under the Kyoto Protocol, and aims to increase renewable capacity by another 14 GW (10.5 GW through wind power; unrelated goal of 50 MW for solar) under its *Eleventh Five Year Plan* (Apr 2007 thru Mar 2012).

Aiming to lift share of renewable energy to 5-6%

India set long-term objectives as part of energy policies established in 2006, and is targeting a fortyfold expansion in renewable energy capacity by FY31 (ending Mar 2032), which should translate into a 5-6% share of its primary energy demand according to government estimates. Based on specific forecasts, it envisions total installed capacity of 30 GW for wind, 10 GW for solar, and 50 GW for biomass. However, the Indian government seems to view solar power as the most viable alternative (excluding hydro), calling for a market of 10 Mtoe for wind energy, vs. 2,000 Mtoe for solar power (1,000 Mtoe solar PV, 1,000 Mtoe concentrating solar).

Solar expansion central to long-range energy goals

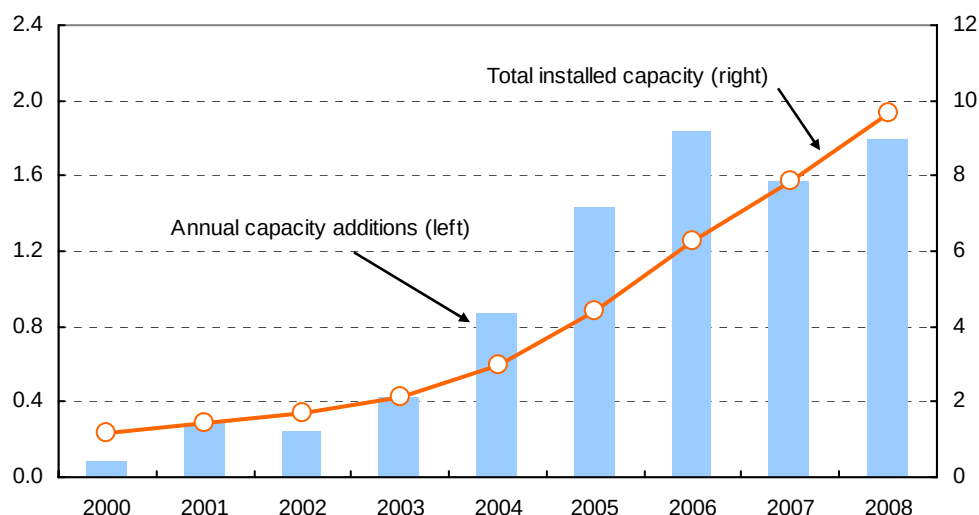
Note that India put solar power at the top of its 2008 *National Action Plan on Climate Change* agenda. The Indian government, perhaps motivated by India's latent solar potential (abundant sunlight) and development in the solar industry, unveiled new solar power targets in June 2009, targeting total installed capacity of 20 GW by 2020, 100 GW by 2030, and 200 GW by 2050. Core tenets include promoting increased use of solar power and developing the domestic solar industry.

Long-term growth potential possibly higher than in China

The UN forecasts that India will surpass China as the most populated nation in 2030. India seems to boast higher growth potential than China based on current economic performance and population growth, meaning it might become the bigger GHG emitter. Thus, we expect it to take on increasing significance in the global debate on climate change. Still, India lacks the fiscal might of the Chinese Politburo, and is behind the curve in terms of renewable energy technology (excluding wind). In that sense, the current debate over technology transfer and funding for emerging economies is likely to have a significant impact on the development of India's renewable energy market.

Wind Power Capacity Outlook (GW)

Chart 4-27

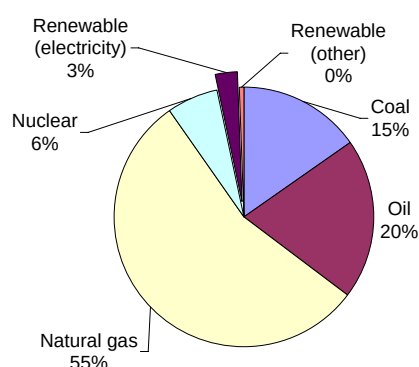


Source: GWEC; compiled by Daiwa Securities SMBC.

5) Russia

Primary Energy Supply (2007)

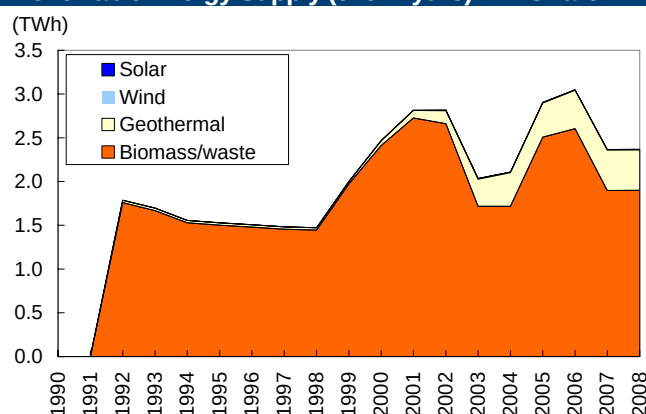
Chart 4-28



Source: IEA; compiled by Daiwa Securities SMBC.

Renewable Energy Supply (excl. hydro)

Chart 4-29

Source: EIA; compiled by Daiwa Securities SMBC.
Note: Data from 1992.

GHG emissions have not been pressing concern

GHG concerns ranked low on Russia's energy agenda in the first half of this decade, possibly for three reasons. First, economic expansion was a key priority under the Putin administration, which sought to leverage abundant fossil fuel deposits to boost its economy (and thus foreign currency). Secondly, Russia had significant wiggle room in view of GHG emissions, which were trending well below its 2012 reduction target. Lastly, Russia was not a leader in clean technology (excluding nuclear power). Based on end-2008 data, Russia ranked first for its share of global natural gas deposits, second for coal, seventh for oil (or second excluding Middle East), and third for uranium. Russia agreed to reduce its carbon footprint to the 1990 level when it joined the Kyoto Protocol, and seems to have a considerable buffer considering 2007 emissions were already 33.9% less than its official target.

Nuclear power at core of alternative energy strategies

While the spread of nuclear power has taken a pivotal role in Russia's alternative energy policies, the government has done little to promote renewable energy research. In addition, some argue that Russia has been channeling investments into nuclear power not so much to reduce emissions, but rather to free up natural gas for export amid the rise in fossil fuel prices. In 2003, Russia unveiled its energy

strategy through 2020, highlighting the introduction of new technologies as part of its core agenda (in addition to stable energy supply, energy efficiency, and sustained access to funding). Unlike global peers, though, Russia stopped short of spelling out any specific legislative action to promote clean energy technology.

New policies unveiled from 2008

However, Russia has introduced a series of climate initiatives in response to the growing debate over global warming. In June 2008, President Medvedev announced plans to reduce Russia's relatively high energy intensity (total energy consumption per unit of GDP) by 40% of the 2007 level by 2020, and to lift the share of renewable energy in total power output to 4.5% (by raising capacity from 2.2 to 22 GW, with less than 25 MW from hydro). He followed up with an emissions target in June 2009, citing Russia's intention to reduce GHGs by 10-15% of the 1990 level by 2020. President Medvedev moved to upgrade that target in November, calling for a 25% cut for the same period and citing Russia's intention to forfeit any leftover credits earned through 2012 (under Kyoto Protocol framework).

Under pressure to reduce carbon footprint as third largest emitter

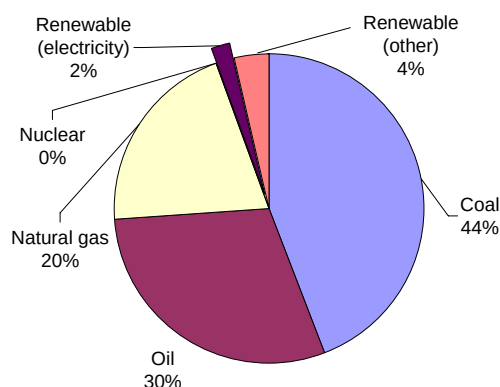
The new target seems aggressive at first blush, but could be relatively easy considering average annual emissions growth was just 1.1% from 2000-07, and was probably lower during the recent economic slump. As the third largest emitter of GHGs, Russian is under increasing pressure to curb its growing carbon footprint. While Russia is sometimes afforded emerging economy status, it is classified as an Annex 1 Party (industrialized nation) under the Kyoto Protocol. Progress in climate negotiations, primarily in relation to the US and China, could lead to increased pressure for deeper cuts from Russia.

Clean energy initiatives possible in the future

Viewed in terms of economic potential, geothermal, biomass and hydropower may be a better fit for Russia than wind or solar. Still, Russia has an abundance of land, much of which is likely suitable for wind or solar farms. We see potential for both of these technologies, if Russia moves to provide regulatory support and incentives.

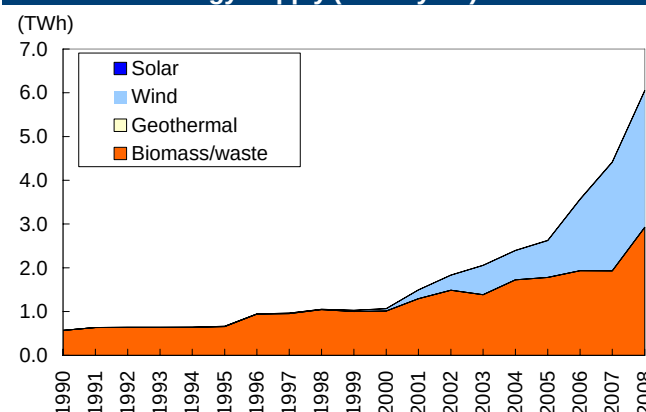
6) Australia

Primary Energy Supply (2007) Chart 4-30



Source: IEA; compiled by Daiwa Securities SMBC.

Renewable Energy Supply (excl. hydro) Chart 4-31



Source: EIA; compiled by Daiwa Securities SMBC.

Rapid increase in use of renewables following change in government

Australia is a net exporter of resources, blessed with reserves of crude oil, natural gas, and coal. Its energy self-sufficiency rate is above 100% but is based mainly on coal, which generates large volumes of GHG. At the end of 2007, the Labour Party swept into power. Its support for increased use of renewables as a means of combating global warming led to a sharp increase in use of such energy sources in 2008.

GHG emissions still well above Kyoto targets

Australia had failed to ratify the Kyoto Protocol, which called for emissions cuts of 6% vs. the 1990 level during 2008-12, until after the Labour Party took power in 2007. However, at that point, emissions had actually increased 30% from the 1990 level. The Labour government pledged to reduce GHG emissions by 25% vs. the 2000 level (or 11% vs. 1990 level). Additional initiatives will most likely be needed in order to reach such targets.

Renewables target had been announced in 2001

In 2001, the Australian government announced that it would attempt to raise renewable energy power production to 9,500 GWh by 2010, introducing a renewables portfolio standard (RPS) known as the Mandatory Renewable Energy Target (MRET). Although wind and solar power production increased on net between then and 2007, both technologies were unable to sustain y/y increases in output volumes.

Targets lifted in 2008; policies boosted demand

From 2008, wind and solar power production rose dramatically on the back of initiatives by the Rudd administration, which took power at the end of 2007. The new government significantly lifted existing targets, aiming for renewable energy production of 45,000 GWh and to have 20% of its energy supply come from renewables in 2020. It also introduced subsidies for solar power installation.

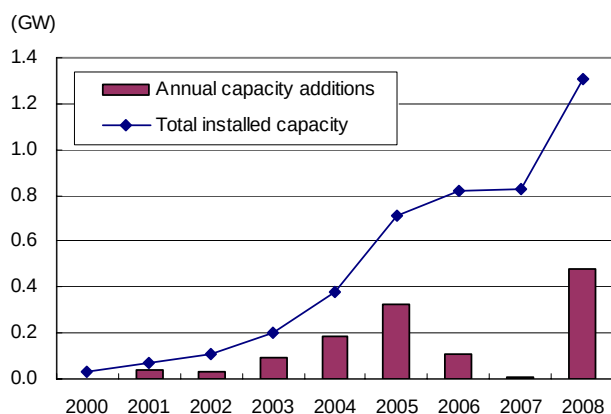
Investment of A\$4.5 billion announced in 2009

In May 2009, the Australian government announced investment of A\$4.5 billion for clean energy initiatives. It plans to spend A\$1.5 billion of this amount on solar power-related projects. In order to reach its emission reductions targets, the government revised its existing RPS scheme and indicated it would adopt a new Renewable Energy Target (RET).

Focus on general election

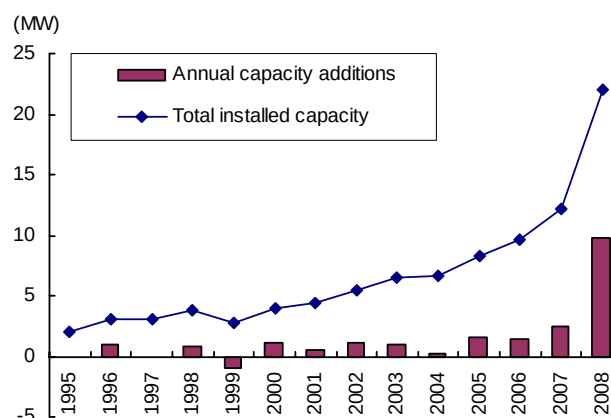
However, climate policies could shift again on a change in the political situation. In December 2009, a Labour bill on climate change failed to gain approval in the Senate. Meanwhile, the Parliament could be dissolved in 2010 and a snap election called. Anti-global warming policies are fiercely opposed by the coal industry, and the direction of renewable energy policy will probably hinge heavily on trends in public sentiment.

Wind Power Capacity **Chart 4-32**



Source: GWEC; compiled by Daiwa Securities SMBC.

Solar Power Capacity **Chart 4-33**



Source: IEA; compiled by Daiwa Securities SMBC.

7) EU (Germany, Spain)

Region most proactively addressing climate change

The European Union (EU) was the first among major countries and regions to address climate change, and its targets remain among the most aggressive today. The Kyoto Protocol required 15 EU member states to cut emissions in 2008-2012 by 8% from the 1990 level. According to preliminary 2008 figures, these states had

actually trimmed emissions by about 6.2%. Although these EU countries fell short of the aggregate target, emissions have been falling for four consecutive years, suggesting that its policies are proving somewhat successful.

Renewables to account for 20% of energy needs in 2020

In December 2008, the European Parliament adopted a comprehensive policy on climate change and energy, outlining plans to (1) reduce GHG emissions by 20% vs. the 1990 level and (2) have renewable energy sources supply 20% of total energy needs. As of 2005, renewables provided around 8.5% of total energy consumption, suggesting that the EU has raised the bar substantially with its new target.

New targets to also provide boost to industries

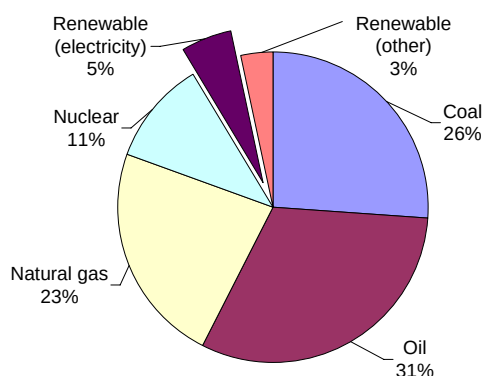
The EU has made its policy on renewables part of broader efforts to nurture new industries and create jobs. According to the European Commission, the renewable energy industry in the EU could produce around 350,000 new jobs and generate around €30 billion in additional revenue annually. The EU has taken the lead worldwide in aggressively adopting renewable energies, aiding efforts to reduce fossil fuel consumption and improve energy security. Such moves have also helped it nurture new industries within the region. These efforts will likely form the basis of a post-Kyoto framework and position the region to benefit from expanded demand for clean energy technologies as countries around the world move to tighten emissions regulations.

In the following sections, we will look at two EU countries that have made meaningful efforts to promote the use of renewable energy: Germany and Spain.

Germany

Primary Energy Supply (2007)

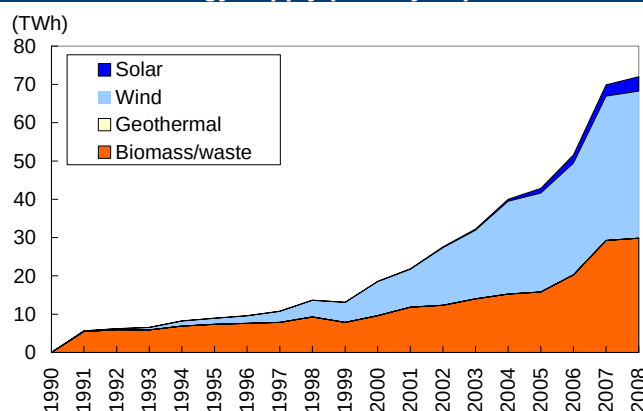
Chart 4-34



Source: IEA; compiled by Daiwa Securities SMBC.

Renewable Energy Supply (excl. hydro)

Chart 4-35



Source: EIA; compiled by Daiwa Securities SMBC.

Setting the pace for broader adoption of renewables

Environmental consciousness has traditionally been high in Germany. It was one of the first countries to address global warming within Europe, which was itself ahead of the curve. One of the first to expand the use of renewables, Germany has contributed significantly to the global development of solar and wind power industries. Factors behind Germany's stance on renewables include: (1) low energy self-sufficiency, given the fact that its fossil fuel reserves consist mainly only of brown coal (lignite); (2) legislation passed in 2002 by a coalition government of the Social Democratic Party (SDP) and Greens calling for a gradual phase-out of existing nuclear reactors; and (3) rising concerns about the country's high dependence on Russian natural gas supplies. However, Germany's stance probably also reflects increased interest in leveraging advanced clean technologies to develop new industries and create jobs.

Taking most aggressive stance among developed nations in cutting GHG emissions

Germany has taken an extremely aggressive stance on reducing GHG emissions. In November 1990, it set a goal of reducing emissions by 25% from the 1990 level before 2005. Under the Kyoto Protocol, it was also obligated as a member of the EU to cut GHG emissions by 21% vs. the 1990 level during 2008-12. Under the EU's medium- to long-term strategy on climate change adopted in March 2007, the country is obligated to reduce emissions by 17% vs. the 2005 level before 2020 (equivalent of approximately 34% decrease vs. 1990 level). To make progress toward these targets, Germany assembled a comprehensive package in December 2007 that called for slashing emissions by 40% vs. the 1990 level in 2020. As of 2007, the country had reduced emissions by 21.3% vs. the 1990 level, meaning that it had already met its 2008-12 target.

Renewables compatible with aggressive strategy to cut emissions

Under the EU Directive on Electricity Production from Renewable Energy Sources, Germany was required to derive 12.5% of its energy supply from renewable energy sources by 2010. In 2007, the previously-noted EU strategy on climate change also mandated that Germany raise the share of renewable energy in final energy consumption to 18%. In response, Germany issued its own comprehensive targets in December 2007 calling for renewables to make up 18.2% of the total. These plans also call for raising the percentage of renewables to 52.1% in 2050, which should help enable it achieve a 78.5% reduction in GHG emissions vs. 1990 levels.

Making effective use of feed-in tariffs

To encourage the spread of renewables, Germany began adopting feed-in tariffs from the early 1990s. The 1991 adoption of the *Stromeinspeisungsgesetz für Erneuerbare Energien* (StrEG; Act on Feeding into the Grid Electricity Generated from Renewable Energy Sources) required electric power companies to purchase renewable energy at 65-90% of regular electricity tariffs. In 2000, the *Erneuerbare-Energien-Gesetz* (EEG; Act on Granting Priority to Renewable Energy Sources) adopted a system under which purchase prices for electricity would be determined using a comprehensive pricing model. It also allowed electric power utilities to pass on some of these costs to customers. A 2004 revision of the EEG lowered purchase prices for wind power, which had seen meaningful expansion since the introduction of the tariffs, but raised those for solar power. Purchase prices were again revised in 2009, with those for solar power reduced to reflect lower production costs. Meanwhile, tariffs for offshore wind energy were lifted to reflect the perceived need to accelerate its use.

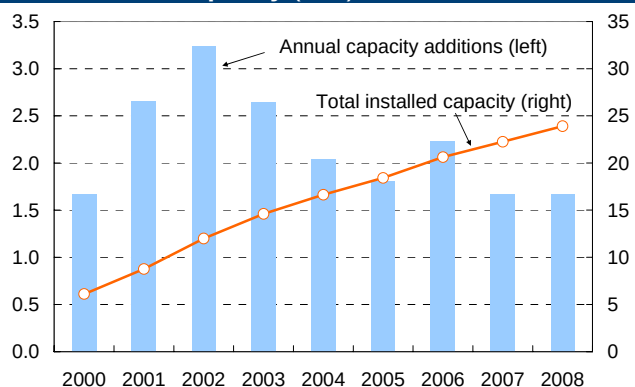
However, increased costs meant higher electricity tariffs

Under the feed-in tariff scheme, higher electricity costs from mandated purchase prices were passed on to end users. By 2008, that amount had ballooned to €9 billion. Prices of electricity had fallen until 2000 after deregulation began in 1998, bringing tariffs closer in line with those in neighboring countries. However, in 2008, electricity prices soared to above the 1998-1999 level due to several factors: (1) above-noted costs from efforts to promote renewables and CHP (co-generation) technologies; (2) an environmental tax; and (3) spiking fuel prices. These factors caused a widening in the gap between electricity tariffs in Germany and those in France and Sweden, which had managed to keep prices at relatively lower levels. Feed-in tariffs were again revised in 2009, with revised prices reflecting upwardly revised production cost estimates.

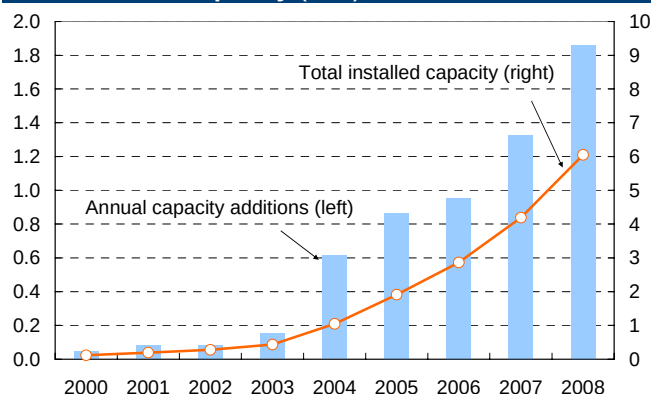
Possible shift in energy policy following change in ruling coalition

We will be watching for shifts in energy policy following the recent government reshuffle. In September 2009, the Christian Democratic Union/Christian Social Union (CDU/CSU) bloc opted to form a coalition with the Free Democratic Party (FDP), rather than the Social Democratic Party (SPD). The coalition agreed to rethink plans to scrap the country's nuclear reactors, provoking vocal responses both in support of and opposing such moves. However, we think debate over the future of nuclear power will probably not result in the construction of new reactors, given recent newsflow (accidents at Vattenfall and Krümmel power plants in June 2009; controversy over shipments of depleted uranium by Urenco to Siberia, Russia). Over the near term, talks will probably be limited to extending the life of existing nuclear plants (individual assessments of each plant and searches for ways to extend average operating life of 32 years).

The mainstream view now appears to be that there is no need to speed up adoption of renewables in order to top the EU-mandated targets, in light of the excessive burden it might place on the state's finances. There are also moves underway to revise feed-in tariffs for solar power in mid-2001, to reflect the sharp drop in equipment costs since the 4Q 2008 financial crisis.

Wind Power Capacity (GW) Chart 4-36


Source: GWEC; compiled by Daiwa Securities SMBC.

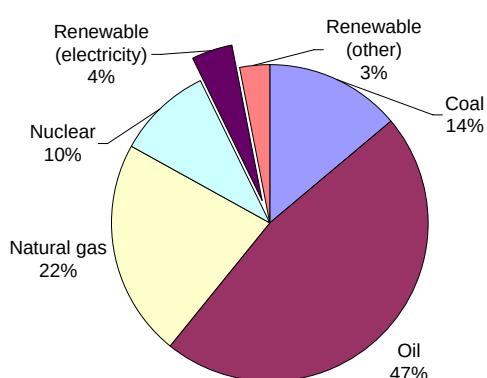
Solar Power Capacity (GW) Chart 4-37


Source: IEA; compiled by Daiwa Securities SMBC.

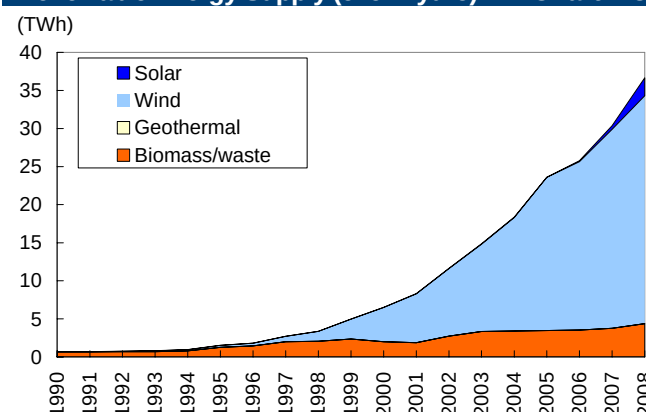
International opinion key to accelerating use of renewables

In our view, Germany is unlikely to hammer out additional policies to encourage the use of renewables over the short term, given (1) the slight leeway built into its GHG emission reduction targets, (2) a rethink of the current move away from nuclear power, and (3) a desire to avoid an excessive drag on the state's finances. However, depending on international opinion on the global warming problem, the EU could lift its GHG reduction targets sharply above the current 20%. Such a move would probably entail higher use of renewables, creating a need for new energy policies.

Spain

Primary Energy Supply (2007) Chart 4-38


Source: IEA; compiled by Daiwa Securities SMBC.

Renewable Energy Supply (excl. hydro) Chart 4-39


Source: EIA; compiled by Daiwa Securities SMBC.

Substantial gap between reduction targets and actual progress

Spain is one country with a large gap between GHG reduction targets and actual emissions cuts. Despite a target of limiting the rise in emissions in 2012 to only 15% vs. 1990 levels, 2007 emissions had actually risen 53.5%. The elevated levels reflect the fact that Spain was one of the largest beneficiaries among developed nations from the integration of the EU, enjoying annual real GDP growth of 3.9% from 1993-2007 (accompanied by 4.9% yearly rise in electricity consumption). The

higher emissions also resulted from the country's decision to satisfy this urgent need for greater stable supplies of energy with expanded imports of natural gas. In principle, Spain is apparently seeking to uphold the EU targets. Firms belonging to sectors covered by the European Union Greenhouse Gas Emission Trading System (EU-ETS) are making efforts to reduce emissions, while the government is providing assistance to those sectors not covered by the scheme.

***Paucity of fossil fuels
but abundance of
renewable energy
sources***

Spain's domestic fossil fuel resources amount mainly to meager supplies of coal, which have poor cost competitiveness. However, the country boasts numerous mountainous regions suitable for hydroelectric power, with annual capacity of 16.7 GW (2008 data; equivalent to 18% of electricity produced annually). That said, precipitation is low and water levels in dams fluctuate substantially, making it difficult to rely on them for stable supplies of power (electricity actually generated is only 8% of total power produced). Meanwhile, the country reversed its policy of expanding the number of nuclear power plants in its 1983 national energy policy, and even today construction of new nuclear plants remains suspended. However, compared to other countries, Spain is relatively well-suited for wind and solar power. Since the 1980s, Spain has made efforts to reduce its dependence on crude oil by increasing use of natural gas, and has also made moves to encourage use of renewables. Under a 1999 EU directive, Spain is expected to have renewables account for 12% of primary energy consumption in 2010.

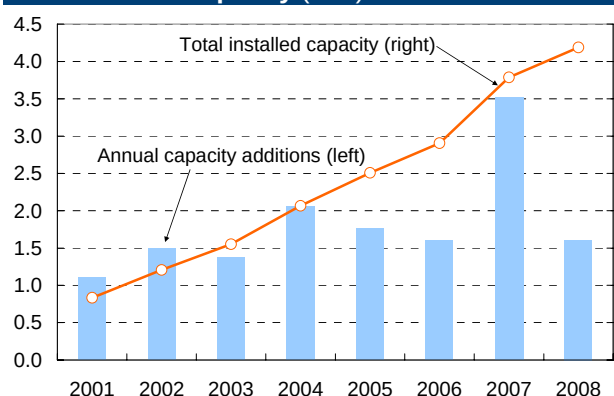
***Sharp expansion of
wind power in late
1990s and solar power
since 2007***

Under policies passed in 1994 encouraging the use of renewables, Spain obliged electric power companies to purchase clean energy at elevated prices. The country later made 1997 EU directives on electric power part of its new national energy law. In 1998, new support measures under a revised emission reduction scheme helped accelerate growth in the market for renewables, mainly wind power. Later, the market for solar power took off sharply from 2007 after feed-in tariffs for solar power were raised substantially. However, the market for solar power contracted meaningfully after limits on the amount of purchased power were reduced in 2009.

***Adoption of renewables
to hinge on progress in
reducing national
budget deficit***

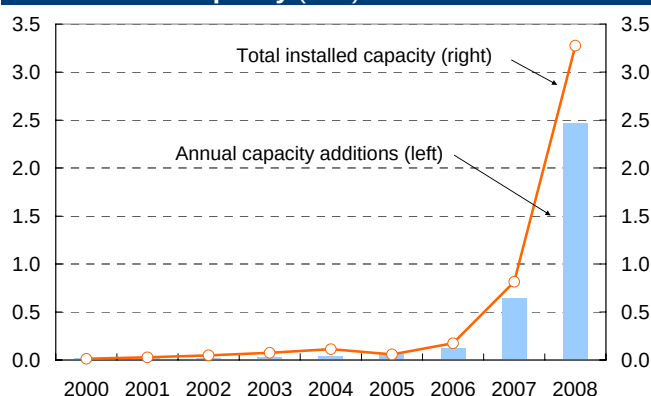
Spain has no choice but to increase its use of renewable energies, meaning that the government would probably like to extend the support necessary to realize this goal. However, the government's finances have rapidly deteriorated with the virtuous cycle behind the country's recent economic growth (population increases fueled partly by immigration, as well as increased spending on housing and public projects, resulting in economic growth) brought to a standstill. Policies to encourage greater use of renewables will entail higher costs, making it difficult for the country to adopt them. For that reason, future progress will hinge largely on improved visibility on an economic recovery and efforts to reduce the fiscal deficit.

Wind Power Capacity (GW) Chart 4-40



Source: GWEC; compiled by Daiwa Securities SMBC.

Solar Power Capacity (GW) Chart 4-41



Source: IEA; compiled by Daiwa Securities SMBC.

5. Future Policy Changes and Our Picks

1) 2009 Share Price Performance

2009 share price performance of companies involved in wind and solar power has been relatively poor worldwide compared to past years. In our view, the following factors are to blame.

Poorer financing environment

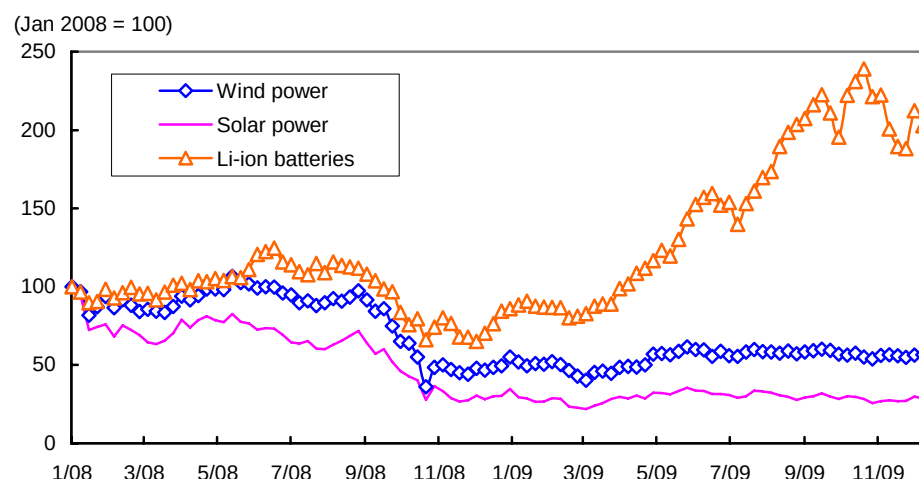
Uncertainties about 2010

Focus more on new technologies

- The economic downturn in late 2008 made it harder to finance investments, which in turn depressed orders and eroded earnings of players in solar and wind power.
- Although the market looks set to return to a growth trajectory from 2010, a number of developments have clouded visibility on how strong that recovery will be. This includes delays in post-Kyoto negotiations as well as difficulties in getting climate and energy legislation passed in the US before the end of the year. Also, in Europe, an important market for renewable energies, there were concerns about fiscal restraints reducing government support for renewables.
- Demand-side technologies, such as electric cars (Li-ion batteries) and smart grids, may have stolen the spotlight.

Share Price Performance Since Jan 2008

Chart 5-1



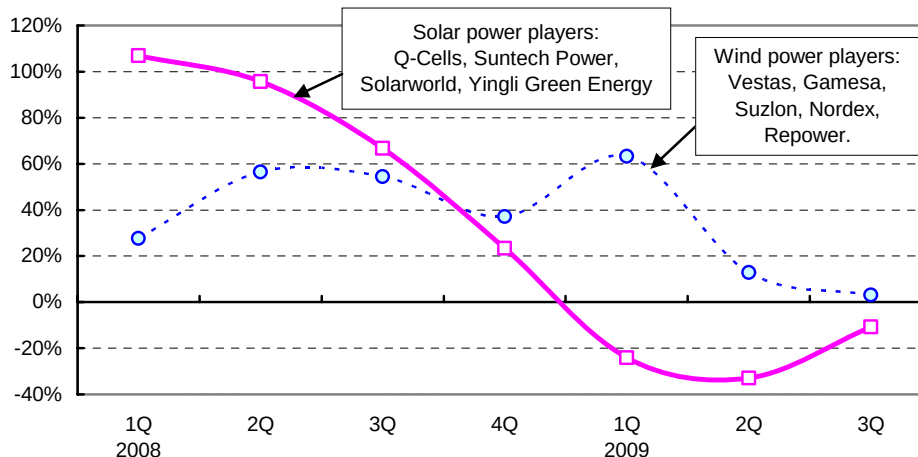
Source: Datastream; compiled by Daiwa Securities SMBC.

Notes: 1) Based on simple average of peer group on local currency basis, indexed to early 2008.

2) Peer groups include Vestas, Gamesa, Suzlon, Repower, Nordex, Acciona, Iberdrola Renovables, FPL Group, EDF Energies Nouvelles for wind power; Conergy, MEMC, Motech, Q-Cells, Renewable Energy, Solarworld, Suntech Power, Sunpower, Tokuyama for solar power; and Panasonic, GS Yuasa, Tanaka Chemical, Toda Kogyo, Stella Chemifa, Hirano Tecseed, BYD, Samsung SDI for Li-ion batteries.

Sales of Wind, Solar Power Players (Avg. y/y)

Chart 5-2



Source: Company materials; compiled by Daiwa Securities SMBC.

2) Possible Changes in 2010

However, there are a number of potential positives on the horizon for 2010.

Global warming talks closer to starting more concrete negotiations

- International talks about the post-Kyoto framework finally have material for negotiations now that countries have released GHG reduction targets. This should allow concrete negotiations to start going forward.

Headway in policy changes possible in 2010

- We anticipate advances in policies at the national level as well. China could introduce feed-in tariffs as early as March and the US climate and energy bill could pass in mid-2010 if all goes well.

Europe's fiscal deficit

- We expect the eurozone's fiscal deficit as a percentage of GDP to peak in 2010 and show moderate improvement thereafter. Although a wait-and-see stance is likely for a while going forward, actual signs of a cresting in the figure should ease concerns about cutbacks in government support for clean energy.

Perception relative to other technologies

- Demand-side technologies, such as those for electric cars, have been a popular investment theme in the equity market, but the buzz seems to have died down. Focus will likely to shift to individual plays reflecting actual strong demand. In contrast, players in wind and solar power are likely to attract greater investor attention as current negatives or uncertainties fade.

Expected Policy Developments in 2010						Chart 5-3	
Focus		Description	Outlook	Key point	Chance of success	Impact of success on market	
						Wind	Solar
Int'l	Negotiations on post-Kyoto framework	Goal is agreement on post-Kyoto framework (2013 and beyond). Focus on establishment of 2020 targets; design for market mechanisms; funds for & tech transfers to emerging/developing nations	If no agreement is reached at COP15, another meeting in Jun likely. Major subsequent events include G8 Summit (Canada) in Jul , COP16 (Mexico) in Dec .	Will big emitters US and China agree to participate?	Little chance of final agreement at COP15	A	A
	Global warming legislation	Law to set general framework for feed-in tariffs, raised 2020 targets for renewables, carbon tax	Could be submitted at ordinary Diet session in Jan		Very likely		
Japan	Introduction of feed-in tariffs	Likely to introduce full feed-in tariff system like Germany's (currently only excess power purchased)	Project team report expected in Mar ; full feed-in tariff system likely in Aug		Likely, but timing somewhat cloudy		B
	Other		National growth strategy announcement in Apr Upper House elections in Jul	Possible unveiling of green strategy LDP victory to mean toned-down eco strategy			
US	Climate/energy bill	Focus on RPS, cap & trade scheme; cleared House in Jun 2009; amended bill to be debated in Senate going forward	If bill is approved in committee, Senate in Apr or later, law could come into effect in Jul	Revised version to include nuclear power support (Republican Party)	Cloudy	A	A
	EPA-based emissions trading	Obama has approved final report setting GHG as pollutant under Clean Air Act; reduction measures possible even if climate/energy bill fails to pass	EPA to introduce emissions regulations in Mar	Could mean more rigid regulations than under climate/energy bill, so bill could be selected	Very likely	A	A
EU	Adjustments to medium-term targets	EU has stated that it would deepen 2020 cuts from 20% to 30% vs. 1990 if other world powers sign up to similar action on global warming	Depends on outcome of negotiations on global warming	Higher renewable energy use could be needed to achieve targets	Depends on international talks	A	A
China	New targets for introducing renewable energy	Announced plans to raise targets set in 2007; could mean new specific measures	Revised targets may show up in international talks (bargaining chip); solar feed-in tariff scheme could be introduced in Mar	New targets could spark meaningful growth in domestic market	Timing somewhat cloudy	B	A

Source: Various materials; compiled by Daiwa Securities SMBC.

Note: Under Impact column, A refers to major impact, B mild impact.

Focus on policy moves in US, China

As for policy moves in 2010, focus is on the US and China. At this juncture there are still no signs of either country being on board with a post-Kyoto clean energy framework. However, China has lifted its target for installation of renewable energy and is considering the introduction of feed-in tariffs as a measure for that purpose. Meanwhile, the Democrats in the US hope to find room for further negotiation, aiming for a 20% cut vs. 2005 by 2020. Climate legislation has cleared the House of Representative in the US and is evolving into something more passable in the Senate with the addition of provisions pleasing the nuclear power

proponents within the Republican Party. This bill is also strongly supported by the United States Climate Action Partnership, formed by major electric power and oil companies. Accordingly, the legislation looks more likely to be successful than past cap-and-trade bills.

Eurozone Fiscal Deficits and Public Debt (% of nominal GDP)											Chart 5-4		
	Fiscal deficit									Public debt			
	Actual					Estimates				Actual	Estimates		
	CY04	05	06	07	08	09	10	11	09		10	11	
Greece	-7.5	-5.1	-2.9	-3.7	-7.7	-12.7	-12.2	-12.8	105.8	114.6	116.7	117.8	
Ireland	1.4	1.7	3.0	0.3	-7.2	-12.5	-14.7	-14.7	99.2	112.6	124.9	135.4	
Spain	-0.3	1.0	2.0	1.9	-4.1	-11.2	-10.1	-9.3	89.8	97.2	101.2	104.0	
France	-3.6	-2.9	-2.3	-2.7	-3.4	-8.3	-8.2	-7.7	66.3	77.4	84.6	91.1	
Portugal	-3.4	-6.1	-3.9	-2.6	-2.7	-8.0	-8.0	-8.7	67.4	76.1	82.5	87.6	
Slovenia	-2.2	-1.4	-1.3	0.0	-1.8	-6.3	-7.0	-6.9	65.9	73.1	76.7	79.7	
Slovakia	-2.3	-2.8	-3.5	-1.9	-2.3	-6.3	-6.0	-5.5	62.6	69.1	73.9	77.0	
Belgium	-0.2	-2.6	0.3	-0.2	-1.2	-5.9	-5.8	-5.8	63.8	68.5	70.9	72.5	
Italy	-3.5	-4.3	-3.3	-1.5	-2.7	-5.3	-5.3	-5.1	44.1	65.8	82.9	96.2	
Netherlands	-1.7	-0.3	0.5	0.2	0.7	-4.7	-6.1	-5.6	58.2	59.8	65.6	69.7	
Malta	-4.7	-2.8	-2.6	-2.2	-4.7	-4.5	-4.4	-4.3	39.7	54.3	66.3	74.0	
Austria	-4.4	-1.5	-1.6	-0.6	-0.4	-4.3	-5.5	-5.3	48.4	53.2	58.6	63.4	
Cyprus	-4.1	-2.4	-1.2	3.4	0.9	-3.5	-5.7	-5.9	34.1	41.3	47.4	52.7	
Germany	-3.8	-3.3	-1.6	0.2	0.0	-3.4	-5.0	-4.6	22.5	35.1	42.8	48.2	
Finland	2.4	2.9	4.0	5.2	4.5	-2.8	-4.5	-4.3	27.7	34.6	39.2	42.7	
Luxembourg	-1.2	-0.1	1.3	3.7	2.5	-2.2	-4.2	-4.2	13.5	15.0	16.4	17.7	
Eurozone	-2.9	-2.5	-1.3	-0.6	-2.0	-6.4	-6.9	-6.5	69.3	78.2	84.0	88.2	

Source: European Commission (autumn 2009 forecasts); compiled by Daiwa Securities SMBC.

3) Our Picks

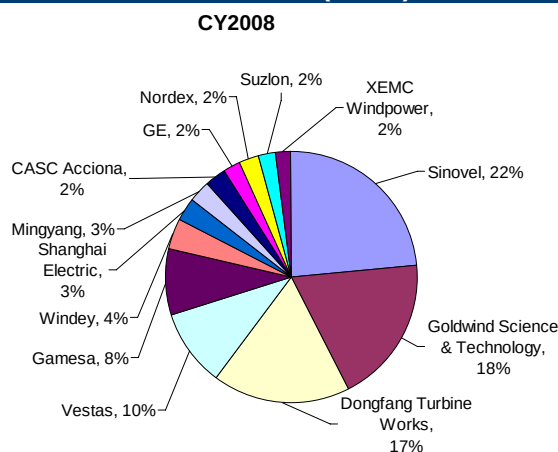
US and China to be market drivers

Fewer uncertainties surrounding the outlook for wind and solar power would likely help to attract investor attention to the medium-term growth prospects of those two markets. China and the US in particular look promising, providing they show positive developments on the policy front.

US, China boast world's largest wind power markets

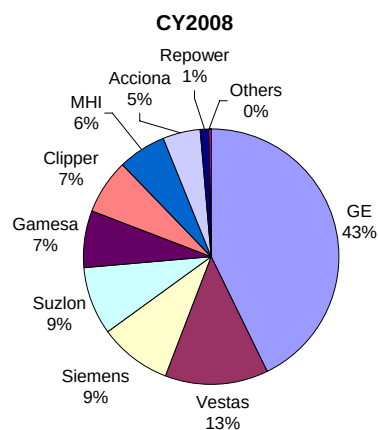
The US and China already rank No. 1 and 2 in terms of annual installation capacity for wind power, suggesting a significant impact on the industry overall should there be growth in either country. The US in particular could prove a strong boon for players in the industry given the likely easy y/y comparison following the projected market contraction in 2009. The players' shares in the wind power generator market vary significantly by country.

New Wind Turbine Installations (China) Chart 5-5



Source: NWTC; compiled by Daiwa Securities SMBC.

New Wind Turbine Installations (US) Chart 5-6



Source: AWEA; compiled by Daiwa Securities SMBC.

Less reliance on solar power, but potential significant

Meanwhile, China and the US do not chart as high when it comes to the solar power market. In terms of new installation capacity, the US and China only accounted for 6% and 0.8% of the global market in 2008. However, there is huge potential for growth in both markets, particularly in China, where momentum should really pick up as the market revs into full gear, mimicking the beginnings of the wind power market in that country. Our colleagues at Daiwa Securities SMBC expect the US and Chinese solar power markets to rank second (global share of 18%) and fourth (7%) in terms of new installation capacity in 2011. This would help improve the supply and demand balance in the industry overall and should be an even bigger boon for domestic firms in China. In China's wind power market, domestic firms saw their combined market share rise from 25% to 75% over just four years from 2005, when the market really started to gain traction. China boasts the world's largest production capacity for solar power and is already seeing industry expanding. Another positive is the fact that few players in other countries have operations in China.

Although wind and solar power players across the board are all likely to see improved investor attention, we are focusing especially on firms that could benefit from expanded growth in the Chinese and US markets. Among solar cell players, we like Suntech Power (STP US, 2 rating) and Ferrotec (6890, 2 rating). For wind power, we spotlight China High Speed Transmission Equipment (658 HK).

Suntech Power

In 2008, Suntech Power was China's largest producer of solar cells and ranked third worldwide. It is thus well positioned to be a strong beneficiary of growth in its home market. Also, it plans to complete construction of a module production facility in the US in October 2010, allowing it to assemble its products locally to better tap demand in the US market.

Ferrotec

Ferrotec manufactures equipment for producing monocrystalline silicon ingots, a key material in the production of solar power systems. Its edge lies in monocrystalline silicon-growing furnaces, where it commanded 30% of the market in FY08 in terms of unit sales. Production of such equipment is done completely at a Chinese subsidiary and its major clients are Chinese firms. In FY08, Ferrotec entered the market for polysilicon ingot-growing equipment and business there has been expanding. Although sales to SPE and LCD panel makers are likely to be the drivers of an earnings recovery in 2H FY09, orders from solar power system makers have started to pick up from 2Q FY09, suggesting earnings boosts from FY10 and beyond.

China High Speed Transmission

China High Speed Transmission is China's largest maker of wind turbine gearboxes and a consistent beneficiary of growth in its home market. It also has inked a supplier agreement with General Electric, which commands a strong share (43% in 2008) of the wind turbine market in the US, making market growth there a positive for the Chinese firm. It stands to benefit even further from US demand if a key client, Chinese turbine major Goldwind Science & Technology, follows through with its announced plans to establish a new production plant there.

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Issues are rated 1, 2, 3, 4, or 5 as follows:

- 1: Outperform TOPIX/benchmark index by more than 15% over the next six months.
- 2: Outperform TOPIX/benchmark index by 5-15% over the next six months.
- 3: Out/underperform TOPIX/benchmark index by less than 5% over the next six months.
- 4: Underperform TOPIX/benchmark index by 5-15% over the next six months.
- 5: Underperform TOPIX/benchmark index by more than 15% over the next six months.

Benchmark index: TOPIX for Japan, S&P 500 for US, DJ STOXX 600 for Europe, HSI for Hong Kong, STI for Singapore, KOSPI for Korea, TWII for Taiwan, and S&P/ASX 200 for Australia.

Japan

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"1": the security could outperform the local benchmark index by more than 15% over the next six months.

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Additional information may be available upon request.

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(Notification items pursuant to Article 37 of the Financial Instruments and Exchange Law)

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- In addition to the purchase price of a financial instrument, our company will collect a trading commission* for each transaction as agreed beforehand with you. Since commissions may be included in the purchase price or may not be charged for certain transactions, we recommend that you confirm the commission for each transaction.
- In some cases, our company also may charge a maximum of ¥ 2 million (including tax) per year as a standing proxy fee for our deposit of your securities, if you are a non-resident.
- For derivative and margin transactions etc., our company may require collateral or margin requirements in accordance with an agreement made beforehand with you. Ordinarily in such cases, the amount of the transaction will be in excess of the required collateral or margin requirements.
- There is a risk that you will incur losses on your transactions due to changes in the market price of financial instruments based on fluctuations in interest rates, exchange rates, stock prices, real estate prices, commodity prices, and others. In addition, depending on the content of the transaction, the loss could exceed the amount of the collateral or margin requirements.
- There may be a difference between bid price etc. and ask price etc. of OTC derivatives handled by our company.
- Before engaging in any trading, please thoroughly confirm accounting and tax treatments regarding your trading in financial instruments with such experts as certified public accountants.

* The amount of the trading commission cannot be stated here in advance because it will be determined between our company and you based on current market conditions and the content of each transaction etc.

When making an actual transaction, please be sure to carefully read the materials presented to you prior to the execution of agreement, and to take responsibility for your own decisions regarding the signing of the agreement with our company.

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