

Overview of indices: Issue 35

The Ernst & Young Country Attractiveness Indices (CAI) score 40 countries on the attractiveness of their renewable energy markets, energy infrastructure and the suitability for individual technologies. The indices provide scores out of 100 and are updated on a quarterly basis.

The CAI take a generic view and different sponsor or financier requirements will clearly affect how countries are rated. Ernst & Young's renewable energy advisors can provide detailed studies to meet specific corporate objectives. It is important that readers refer to the guidance notes set out on page 36 referring to the indices.

Forward-looking indices

The ARI and technology-specific indices are forward-looking and take a long-term view (up to five years). This time period forms the basis of both quantitative and qualitative analysis.

All renewables index

This index provides an overall score for all renewable energy technologies. It combines individual technology indices as follows:

1. Wind index – 55% (comprising onshore wind index and offshore wind index)
2. Solar index – 32% (comprising solar photovoltaic (PV) index and concentrated solar power (CSP) index)
3. Biomass and other resources index – 13%

Individual technology indices

These indices are derived from scoring:

- ▶ General country-specific parameters (the renewables infrastructure index), accounting for 35%
- ▶ Technology-specific parameters (the technology factors), accounting for 65%

Renewables infrastructure index

This provides an assessment, by country, of the general regulatory infrastructure for renewable energy (see page 36).

Technology factors

These provide resource-specific assessments for each country.

Long-term wind index

This index is derived from scoring:

- ▶ The onshore wind index – 80%
- ▶ The offshore wind index – 20%

Long-term solar index

This index is derived from scoring:

- ▶ The solar PV index – 85%
- ▶ The solar CSP index – 15%

For parameters and weightings, see page 36.

Ernst & Young was ranked the leading project finance advisor in the Americas, Europe, Middle East and Africa (MENA) between 2001 and 2011 by **Project Finance International**.

Also ranked Renewables Financial Advisor of the Year and Power Financial Advisor of the Year by **Infrastructure Journal** for 2012

Comments and suggestions

We would welcome your comments or suggestions on any aspect of the indices. Detailed attractiveness surveys and market reports can be provided, taking account of specific corporate objectives.

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Bloomberg subscribers can access historical CAI scores through the Ernst & Young Renewable Energy – Total Renewable CAI page: {ALLX EYRE<GO>}. Each value can be evaluated to reveal history.

A shift in the global power base is under way

By Ernst & Young's Gil Forer and Phil Dominy

This year marks a turning point for renewable energy markets across the world. The latest investment data at Q3 indicates that total investment in 2012 is likely to be lower than that in the previous year, a situation that has not arisen for at least eight years. The last decade has witnessed significant growth and capacity build out in Europe, and significant financing and investment growth in the US. However, the next phase of renewable energy market leadership is likely to take place across a wide range of emerging markets in countries where economic growth and revised energy priorities will drive a sustained increase in the deployment of wind, solar, biofuels, smart transportation and energy-efficiency technologies. Further, these markets are likely to influence the direction and execution of cleantech financing, partnerships and transactions across the world.

Emerging markets get back to basics

The prediction that these emerging countries will be at the forefront of growth in the sector underscores the importance of the long-term drivers of the resource-efficient, low-carbon transformation that is under way globally. Resource scarcity, urbanization, population growth, energy security concerns and economic development objectives are key drivers that continue to propel the global market for cleantech solutions. These drivers are most acutely felt in emerging markets and therefore it is no surprise that the contribution of renewable energy is forecast to rise across many countries in Asia Pacific, Middle East, Africa and Latin America.

Energy security

Long-term security of energy supply remains a national priority for both governments and corporates operating in these emerging high-growth economies, especially where fossil fuel resources are scarce. Countries that are primarily dependent on petroleum – both domestically produced and imported – are seeking strategies to diversify their energy mix and have already begun formulating national strategies to invest in the build out of renewable projects.

At a secondary level, companies that find themselves processing materials such as water, cement, pulp, steel and aluminium, will need to secure significant amounts of energy to continue to produce and export these materials. Further, optimal resource sites for new generating assets – especially in resource-rich countries – may well be in remote environments away from key demand centers, where the build out of grid and existing capital-intensive infrastructure is likely to be difficult. As such, distributed generation such as wind and solar is likely to become increasingly attractive. Distributed renewable energy, also referred to as “on-site” or “off-grid” energy, addresses the potential challenge faced by some emerging markets of providing energy access to remote or less developed communities where there is a lack of national or regional infrastructure. However, the scale of such installations is inevitably smaller than grid-connected projects.

Employment

Emerging markets have also seen the clean energy sector as a means of developing an increasingly entrepreneurial market and workforce. The development and deployment of a range of different renewable technologies is seen as an important vehicle for creating high quality jobs and developing a diverse set of employment skills that are particularly critical for countries with a younger workforce and rising middle class.

Cost

Finally, as a result of continuous technological innovation across all regions and increasing efficiencies and improvements across the value chain of clean technologies, the cost of renewable energy is falling rapidly. With solar module prices falling over 75% in the past four years and wind turbine prices dropping 25% in three years, emerging markets are poised to take advantage of the falling costs as these countries become a growing consumer of global renewable energy.

However, at the same time, emerging markets play a key role as manufacturers of wind and solar components. In this increasingly competitive environment, lower cost production has resulted in the oversupply of capacity globally at levels that are unsustainable. This environment of shrinking margins poses challenges for many equipment manufacturers located both in developed and emerging markets.

National policy commitments

China, India and Brazil were the first emerging markets to refocus their national energy strategies toward renewable energy, but over the next five years we expect to see major shifts in the growth drivers of those countries that have signaled significant national commitment to clean energy. In the past year alone, we have witnessed Saudi Arabia's US\$100b solar development plan, while South Africa announced new electricity market plans and a commitment to develop 42% of new additional capacity in renewables by 2030.

By far the biggest shift in national energy policy has been in Japan, which has recently announced its commitment to phase out nuclear by 2040 and in July introduced a very generous feed-in tariff (FIT) scheme that, for some technologies, represents roughly three times the nation's electricity prices. Over the next decade, other countries such as Morocco, Chile, Thailand, Jordan, Pakistan and the UAE are likely to follow suit by realigning their respective energy strategies to incorporate an increased focus on renewable energy, in order to address resource scarcity, job creation and national competitiveness.

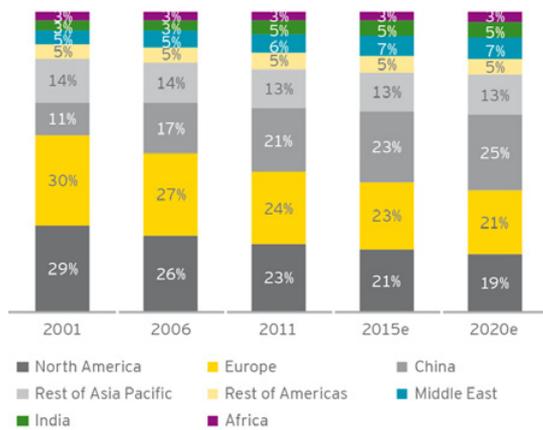
Global energy demand at a crossroads

The global energy landscape has shifted considerably in the last decade. By the end of 2011, North America and Europe no longer consumed the lion's share of global energy. Looking forward to the decade ahead, global energy consumption is expected to grow on an average 3% per year, though this will be primarily driven by emerging markets, with demand in some developed markets even shrinking incrementally. Emerging markets' decisions around managing this growth will be a critical factor in determining the next phase of the global clean energy transformation.

A shift in the global power base is under way (cont'd)

Looking back over the last decade, China has been a clear driver of shifted global energy dynamics, jumping from consumption of 11% of global energy in 2001 to 21% by 2011. But China isn't alone – energy consumption in India and the Middle East has also grown rapidly in the last five years. Between 2007 and 2011, China's energy consumption grew 34%, while India's increased by 35% and the Middle East by 22%. Looking ahead to the next five years, energy usage in these markets is not expected to slow down, with double-digit growth rates forecast across all three of these areas.

Figure 1: Global energy consumption (Mtoe)



Source: BP Statistical Review 2012 and Energy Outlook 2030; Ernst & Young analysis

On the other hand, the overall contribution of North America and Europe to the global energy mix is likely to remain the same. The global recession saw energy consumption fall across all markets, but by 2011, energy use in developed markets had still not returned back up to 2008 levels. Energy intensity, or the unit of energy used relative to GDP, indicates that these markets have over time been able to use energy more productively. Realizing higher rates of energy efficiency in industrial and manufacturing processes as well as in buildings, has become a critical strategy for developed markets and has arguably been a cornerstone for continued growth in the cleantech industry. The pursuit to identify and deploy more energy-efficiency innovations and technologies remains both a challenge and a priority across the globe. Between 2005 and 2010, the US and Japan spent more on energy-efficiency R&D than most other major economies, followed by Italy, Finland and South Korea.

Renewable energy growth set to change direction

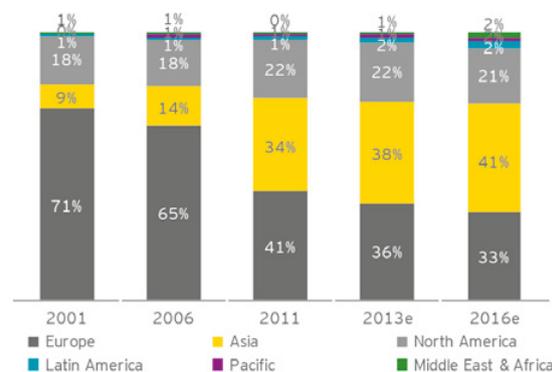
Renewable energy generation over the past decade has experienced remarkable double-digit year-on-year growth, averaging 11% for developed markets and almost 15% in emerging markets. Since 2011, however, these paths have started to diverge, with European and North American markets forecasting an average of only 5% year-on-year growth in renewable energy generation, compared with an average 13% year-on-year growth across emerging markets.

Wind and solar markets on the move

The shift toward Asia is particularly distinct in the wind and solar markets. Forecasts show Asia's share of global cumulative installed wind energy capacity growing from 12% in 2006 to 32% in 2011, and again to 40% in 2016. Solar capacity, meanwhile, has experienced a slightly slower expansion in the Asian markets. Over the past ten years, Europe has dominated the solar PV landscape, with the industry growing by an average of more than 40% per year and production costs decreasing by around 60%. Underlying this progress has been the European Union's (EU) commitment toward PV systems as a critical means of achieving its goal to generate 20% of energy from renewable sources by 2020. However, solar in European markets has arguably now reached a saturation point relative to other regions, and forecasts show other players such as the US and countries in Asia Pacific expanding their share incrementally by 2016.

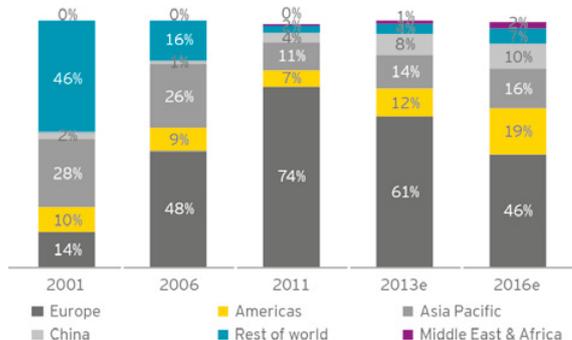
These technologies have been particularly sensitive to certain drivers over the past ten years; specifically the policy and regulatory environment in different countries has clearly influenced the uptake of wind and solar projects in terms of both scale and total capacity. The US is still slated to increase its base of installed capacity for both wind and solar in the years ahead, however, the future short-to medium-term growth of the domestic wind market is arguably at the mercy of the production tax credit (PTC) being renewed beyond its current 31 December 2012 expiry date.

Figure 2: Cumulative installed wind capacity (GW)



Source: GWEC Global Wind Report 2011; GWEC Global Wind Report 2006, EPIA Global Outlook to 2016; Ernst & Young analysis

Figure 3: Cumulative installed solar capacity (GW)



Sources: GWEC Global Wind Report 2011; GWEC Global Wind Report 2006; EPIA Global Outlook to 2016; Ernst & Young analysis

The role of emerging markets in renewables

The remaining question, therefore, is how emerging markets will grow and what energy choices they will make in the short to medium term. The competitive dynamics of many such markets are becoming highly attractive – the availability of land and relatively low cost labor, and the abundance of natural resources or materials that make the manufacturing and installation of components commercially viable (e.g., wind turbines or PV panels). At the same time, this competitive environment has resulted in overcapacity, particularly in the wind and solar markets, drawing a rationalization and consolidation of supply chains.

The role of emerging markets as global manufacturing centers for renewable technologies, as well as their own adoption to diversify their energy mix, will depend on a range of factors including (i) the regulatory environment; (ii) level of political support; (iii) access to finance; and (iv) the infrastructure readiness of a particular country.

Policy and access to finance

Energy policies and regulatory frameworks are still evolving across many countries, with some key markets such as Chile, Mexico, Poland and Austria recently announcing new national targets for clean energy generation or reaffirming government support through incentive schemes. Policy developments have also encouraged different financing structures; for example, the loans and guarantees provided by Brazil's national development bank (BNDES) have supported many of the wind projects emerging from the country's various alternative energy auctions in recent years, and have proven to be an effective measure to provide stable access to debt financing.

Development bank financing is expected to increase in a number of markets. In late October, the Development Bank of Southern Africa (DBSA) approved loan facilities worth US\$980m (€757.05m) that are earmarked for 13 solar projects in South Africa with a total capacity of 762.6MW. This was shortly after US development finance institution, the Overseas Private Investment Corporation (OPIC), approved US\$250m (€193.13) for a 60MW solar project in South Africa, the agency's first such solar project in the country.

Attempts to attract financing for renewable energy deployment has also led some countries to seek more innovative ways to provide indirect support through promotion programs, such as that adopted by Taiwan in late March. Taiwan's Ministry of Economic Affairs has begun providing professional technical assistance and information on financing, insurance and maintenance services in a bid to increase and integrate the adoption of renewable sources into its energy network, in particular rooftop solar. While improving technical assistance, better information and the removal of administrative hurdles may not be direct project investments, it is hoped such measures will allow for the expansion of off-grid renewable sources and act as a foundation for energy data crucial for the uptake of energy efficiency or smart grid technologies.

Infrastructure

For renewable energy uptake to increase to those levels required to meet projected long-term energy demand, in developing countries in particular, the investment in electricity infrastructure and the ease of grid connection must grow commensurately. Even where renewable energy is becoming increasingly cost-competitive, grid reliability and network integration may become a substantial hurdle. As shown in China and Brazil, government-backed transmission projects have experienced delays which have, in some cases, left installed wind capacity stranded and without connection, incurring additional government costs and wasting potential electricity. In addition, failure to secure power offtake can be a substantial barrier in some developing markets where utilities are unable to readily integrate and balance intermittent power loads.

A turning point for clean energy investment

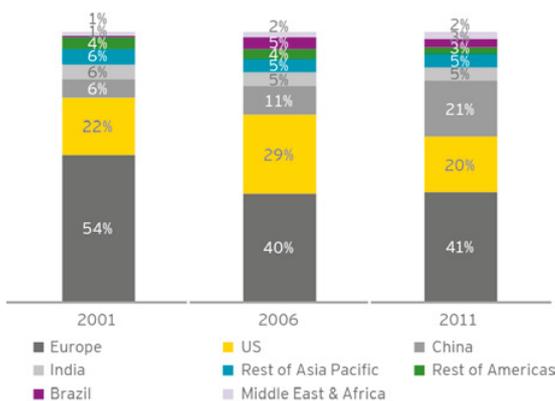
Similar to global energy consumption and renewable capacity trends, the global picture for clean energy investment also shows a clear shift toward China, which more than tripled its share of global clean energy investment from 6% of investment in 2004, to 20% in 2011. We anticipate that new investments in the sector over the next five years will broadly mirror the expected trends in total energy consumption and renewable capacity forecasts, with China remaining a significant contributor to global clean energy investment. However, the nature of financing solutions in emerging markets such as China is likely to be distinctly different from that of more developed markets over the past decade, with newer markets heeding the lessons learned by predecessors.

Total global renewable energy investment reached US\$237b (€183.08b) in 2011 (excluding large hydro). This marked a pivotal year for the sector, exceeding for the first time the level of investments in fossil fuel power generation of US\$223b (€172.27b). A more detailed look at 2011 reveals that the apparent peak in renewable investment was largely driven by asset financing for large renewable projects backed by US stimulus funds and a rush of investment in solar PV across Italy and Germany in response to impending subsidy reductions.

A shift in the global power base is under way (cont'd)

However, 2012 marks a turning point for global renewable energy investment, as developed markets start to close the door on generous subsidy programs and traditional access to capital in equity markets continues to be difficult in the face of ongoing economic uncertainty. The global recession and persisting fiscal barriers have clearly impacted developed markets more than emerging markets, but the situation has been even more challenging for publicly traded companies in these markets. Asset valuations and net income reductions are evidence of the challenges being posed by decreasing liquidity and increasing competition for financing, as well as post-recession fiscal austerity. Perhaps inevitably, therefore, new investment levels for the clean energy sector are forecast to decrease in 2012 compared with 2011. Third quarter 2012 investment figures were 20% lower than the same period in 2011, though this still amounted to more than US\$50b (€38.63b), broadly equivalent to total global investment in clean energy in the whole of 2004.

Figure 4: Clean energy investment (US\$b)



Sources: Bloomberg New Energy Finance & UNEP Global Trends in Renewable Energy Investment 2012; Ernst & Young analysis

New investment in all forms of energy – both fossil and renewable – continues to be faced by volatility in prices. Securing long-term power purchase agreements (PPAs) for new build assets or locking in contracts for silicon or other materials further down the supply chain are crucial strategic decisions that corporate, utility, infrastructure and manufacturing executives are grappling with. Valuation of companies and assets is becoming increasingly difficult during this time of ongoing uncertainty and constant change. Robert Seiter, Ernst & Young's EMEA Cleantech Leader sees contractual and long-term arrangements with vendors and purchasers becoming critical aspects of any cleantech CEO's strategy. "Having a strategy to manage these agreements is important for any cleantech firm working across countries where costs are lowering dramatically."

The valuation gap between buyers and sellers is also potentially deterring strategic partnerships and transaction opportunities, particularly in the M and A market. In Ernst & Young's biannual survey of corporate confidence among power and utility executives, 80% believe that the global economy shows no signs of improvement and 67% expect the downturn to persist for at least another year.

Opportunities for the global renewables sector

While the global investment landscape is generally beginning to show signs of a slowdown for renewable energy, partly driven by economic and political uncertainties, initial 2012 investment figures indicate that pockets of strategic investment by governments is being seen in some markets such as Brazil, Japan, Morocco and Eastern Europe. The largest financing in Q3 2012, for example, was the development of 22 small hydroelectric projects in Ukraine totaling 980MW, according to data collected by Bloomberg New Energy Finance (BNEF).

As financial flows start to shift to developing countries therefore, sources of finance are also likely to experience a shift in emphasis toward government financing, infrastructure funds or aid by the largest national development banks. New forms of guarantees, covenants, bilateral funding, long-term sovereign debt or other municipal bonds may also arise, although securitization of debt or equity will continue to be challenged by the underpinning fiscal uncertainty and concerns around governments' creditworthiness. The ability for emerging markets to expand their pool of financing or embed additional liquidity in equity markets for cleantech is also likely to be an ongoing challenge. That said, even in emerging markets, we continue to see examples of new methods of financing. In July, South Africa's Nedbank announced a capital raising target of US\$490m (€378.53m) from a retail green bond program to finance renewable energy in the country and in October, the Development Bank of South Africa approved loan facilities totaling US\$1.1b (€0.85b) for projects under the Round One bidding program.

By far the most strategic investors during this transition toward increased deployment of renewable energy have been large corporations whose preferred method is direct asset acquisition. With large cash flows that need to be diversified, corporate investors have dominated the buyer's market. These large corporations stem from both emerging markets (e.g., China's state-owned corporations) and developed markets (e.g., Google, Ikea and Total). The key industrial conglomerates within emerging markets themselves can drastically change the dynamic of each country's market growth potential. Moon Ho Choi, Ernst & Young's Cleantech Leader in South Korea said, "the cleantech market in South Korea is still in its early stages, but does not follow the financing pipeline like that of innovators in developed markets. Clean technologies are being closely developed in partnership with the larger conglomerates such as Hyundai, Samsung and LG."

Yet at the same time, investments have shifted in favor of risk-averse markets where renewable energy is sold at grid parity, or toward more mature technologies where cost levels are supporting commercialization (e.g., the Swedish onshore wind market). In such markets, a strong electricity market and regulatory regime can allow for the securitization of assets that deliver long-term dividend yields or payments.

Power offtake, connection and integration to the grid, as well as the viability to export power across borders and diversify across different customer bases, are all significant issues that emerging market governments are contending with as they build out their renewable projects. In markets such as Brazil, financing is still bespoke. “Each power plant, biofuel plant or wind energy project is wholly unique due to the local nature of the resource and the integration with existing infrastructure in Brazil. Within the cleantech landscape, there are many local opportunities – but each with a distinct set of challenges and different ways to scale up,” according to Daniel Maranhao, Ernst & Young’s Cleantech Leader in Brazil.

Having taken note of the lessons learnt across markets in Europe and the US, where high levels of subsidization for some renewable technologies have been the key driver of growth in the sector, governments in emerging markets are finding that success in their own markets depends on driving business models that work without direct subsidies or grants, and that renewable strategies must be able to compete head-on with conventional fossil fuel sources.

Hybrid projects, energy storage and integration, smart technologies, eco-efficiency and urban mobility systems are just some examples of the other types of platforms being developed in addition to the deployment of more traditional renewable technologies. Furthermore, with increasingly competitive pricing of renewable generation components, manufacturers in China and India are finding that global partnerships and distribution channels are critical. As Ernst & Young’s Cleantech Leader in India, Sanjay Chakrabarti has indicated, “establishing the right long-term policy framework to support renewable energy has been important given the manufacturing base in India, but just as important is the ability to establish joint ventures across the globe to find new markets and investment partners, especially in areas where solar and wind are cost-competitive.”

The changing global landscape and key success factors for renewable markets

The following are identified as some of the key challenges facing renewable energy sector growth in emerging markets:

- ▶ How emerging markets will contribute to securitization of assets is yet to be determined – underwriting of securities alone will be difficult given sovereign credit risk concerns and ongoing uncertainty across the financing environment.
- ▶ Emerging markets may also fail to facilitate liquidity in current publicly traded renewable energy markets, and financing for pipeline technologies may not occur at the high levels seen in previous years.

- ▶ Access to finance continues to be challenging and many smaller projects need a pooling of assets, coordination of financing or new financing mechanisms with low transaction costs.
- ▶ The viability of particular projects still rests on the ability to export or deploy the energy generated. Cross-border interconnection and integration of national grids across some emerging markets (such as North Africa) may be viable in the long term but expensive and politically challenging in the more immediate term.
- ▶ Each country needs to foster a supportive investment climate backed by governance and accountability frameworks. Access to legal frameworks that support contractual obligations are critical, as are guarantees and royalties that are favorable to foreign investment.

Therefore, while it is anticipated that pockets of strong growth will emerge across the emerging markets in the short term, the long-term success of individual projects and the rollout of national energy policies will depend on the ability of these emerging markets to address the challenges above as well as on the right timing and conditions. Until “grid parity” is reached, financing will still depend on the timing and nature of individual countries’ incentives and support regimes, a commitment to invest in grid infrastructure and connectivity, and the ability of projects to seek multiple partnerships and investors.

Current global macroeconomic drivers are reinforcing the role of emerging markets in the future global energy mix. These key drivers have changed significantly in the past few years, resulting in a renewable energy sector that is very different to that seen a decade ago. As renewable technologies become more cost-competitive, the importance of government subsidies to bridge the increasingly narrow cost gap has decreased. Rather, the sheer increase in the demand for energy and the availability of natural renewable resources have become the primary drivers that strongly influence both the quantity of renewable power required and the efficiency of generating that power. It is therefore these factors that will dictate a shift in global power base.

Back in February 2003, Ernst & Young’s renewable energy CAI was first launched. There were only 15 countries in the CAI: 14 Western European countries plus the US. Since then, 25 countries have been added, most of which have been emerging markets in Asia, Eastern Europe, and Latin America. More recently, countries have been added in North Africa (Morocco, Tunisia and Egypt) and this issue sees the arrival of Saudi Arabia and the United Arab Emirates into the top 40 CAI countries, reflecting the increased importance of the MENA region to the global renewables market.

Global trends in biofuel markets

Co-authored by Ernst & Young and Bloomberg New Energy Finance

The global biofuels market is at a crossroads. The policy frameworks supporting biofuels are under pressure in both the US and the EU, while the Brazilian ethanol markets have suffered almost two years of shrinking demand and low margins. This has led to a gradual consolidation of the global biofuel industry and a sharp slowing of first-generation biofuel investment. Furthermore, investors are not finding any immediate respite in the next-generation biofuel and biochemical arena. Most of the leading companies still face challenges in scaling these technologies and reducing production costs. The public markets likewise have not been a forgiving place for these firms.

However, the longer term outlook is not all doom and gloom. Those players that survive the current lean margins in the first-generation markets will emerge much stronger as the industry consolidates further. And provided the next-generation companies with technologies aimed at new forms of feedstock can overcome their challenges, they are also likely to reap dividends.

United States

In the US, the Renewable Fuel Standard (RFS) came under attack in Q3 2012. Corn prices climbed to historic highs of over US\$8 (€6) a bushel, pushing up global grain prices and putting the spotlight back on the US ethanol policy. While it is unlikely that mandates for corn ethanol blending will be repealed in 2012, the coming year may present an uncomfortable test of Washington's tolerance for its US corn ethanol program. As if policy uncertainty was not damaging enough, the market also turned for corn ethanol producers as margins were squeezed by high feedstock prices in the second half of 2012, forcing 1.6b liters of installed capacity temporarily offline. We do not expect any new capacity additions in the US in 2013, leaving total nameplate capacity at around 52b liters a year.

On the next-generation front, the first half of 2012 saw just over US\$657m (€508m) committed to the sector, with biochemical companies cornering the bulk of the money. Although this is significant, the installed capacity for producing next-generation biofuels is still considerably below what was originally expected from investors. Companies such as Amyris have been late in producing the volumes of end product promised to investors, as technology challenges have delayed the scaling up of output.

All recently listed next-generation biofuel and biochemical companies have badly underperformed benchmark indices since going public, with most trading well below their initial public offering (IPO) target prices. This situation is unlikely to change until technology teething problems are ironed out and commercial-scale production is reached. The public players, meanwhile, must hope their financial backers do not run out of patience before those hurdles are surmounted.

Figure 1: Biochemical next-generation VC/PE investment, 2004 to (Q2)2012, US\$m

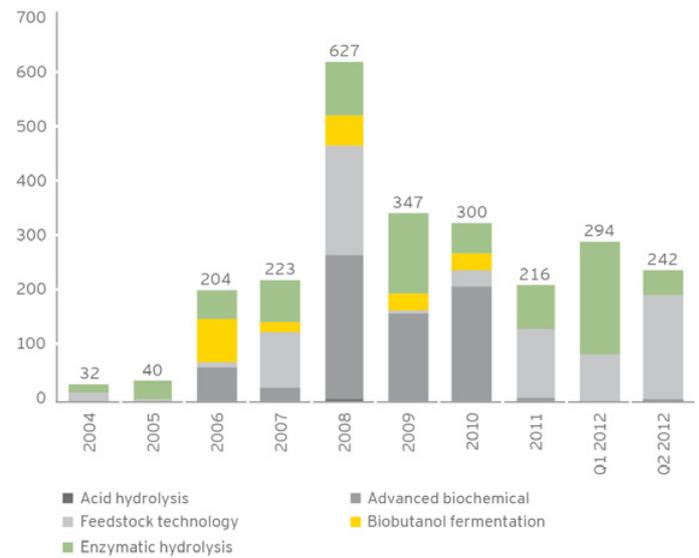
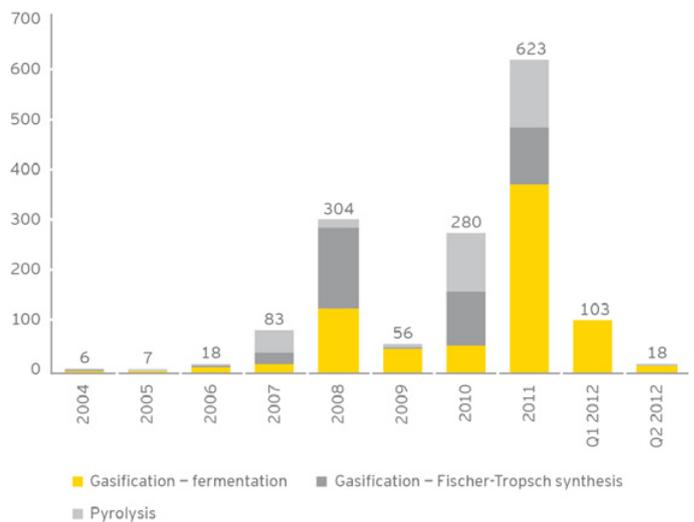


Figure 2: Thermochemical next-generation VC/PE investment, 2004 to Q2 2012, US\$m



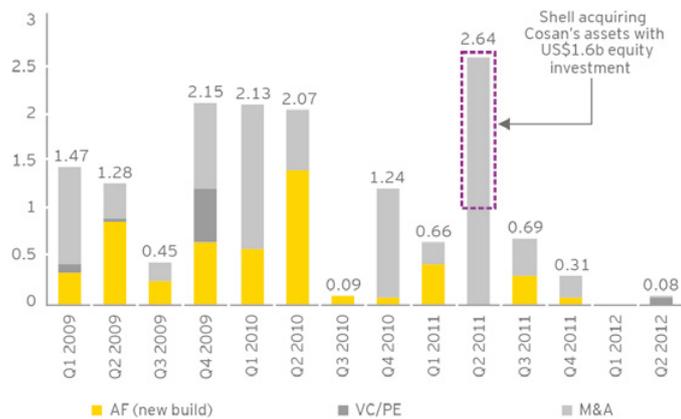
Brazil

The Brazilian market has been through a difficult two-year period with low to negative margins in the domestic hydrous and anhydrous markets. Since January 2012, mills in the center south have produced anhydrous ethanol at an average of US\$0.67 (€0.52) per liter while average supplier prices also stood at this price. Ethanol production costs have surged 60% since 2009, driven by higher feedstock and fixed costs, as well as inflation. Since the 2011-12 harvest, mills have been running at 85% of their sugarcane crush capacity, increasing the impact of fixed costs by around US\$0.04 (€0.03) per liter.

The result of rising ethanol production costs has been hydrous ethanol losing competitiveness with gasoline at the pump. In addition to negative margins in the 2012-13 harvest, domestic demand for hydrous ethanol has dropped as gasoline retail prices have been more competitive than ethanol. From January to June 2012, 4.6b liters of hydrous ethanol were sold in Brazil, down from 5.5b liters in 2011.

Investment in the Brazilian sugarcane ethanol industry has been historically low in 2012. Except for a small transaction between BP and Bunge, and a US\$129m (€99m) acquisition by Olam in the second quarter, the market has been quiet. Mills are focusing on their agricultural productivity, and we expect a substantially better harvest in 2013, which could fundamentally reboot the competitiveness of the sector.

Figure 3: Quarterly new investments in Brazilian ethanol assets, (Q1) 2009 to (Q2) 2012 (US\$b)



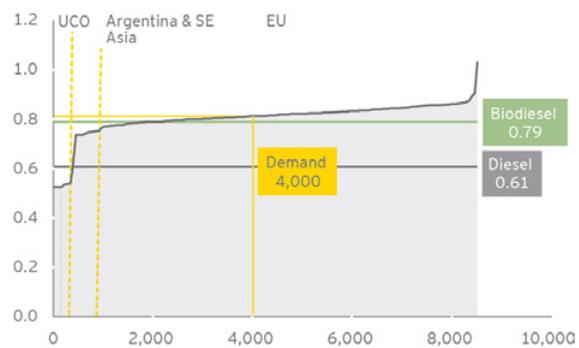
Note: Q2 2012 represented by Solazyme/Bunge investment in the Moema renewable oil facility. It has been assumed that Bunge's investment share is the same as that set out in Solazyme's SEC filing.

We believe Brazilian ethanol will turn a corner in 2013 with positive margins for producers and higher demand for ethanol. The drivers behind a better outlook for the market are better feedstock yields, lower logistics costs and more anhydrous ethanol demand as a result of a higher ethanol blending mandate with gasoline, which will stand at 25%. Cane crushing capacity in Brazil will not change in the coming year and stay at around 700m tonnes, with a production capacity of 38b liters. However, actual ethanol production is likely to increase from the projected 22b liters in 2012.

EU

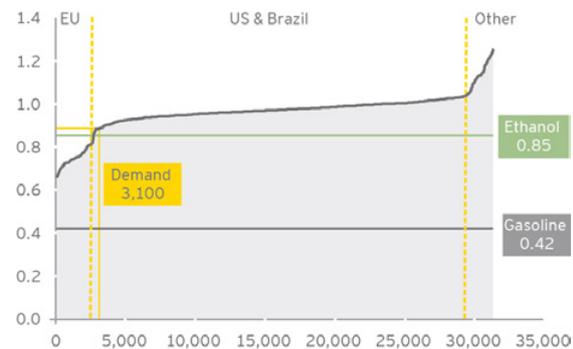
Like their US counterparts, European biofuel producers were mostly losing money in 2012. The biodiesel sector in particular was limping along, running at no more than 40% of its installed capacity and losing close to US\$0.05 (€0.04) per liter in the process. The EU-27 ethanol sector looked a bit better, with producers clearing positive margins for most of 2012 and operating at close to full capacity. Europe will continue importing ethanol in 2012 – to the tune of 1.3b liters – to comply with EU-wide mandated demand objectives.

Figure 4: European biodiesel supply costs, forecast Q3 2012 (€ per liter)



Note: Indonesian and Malaysian (SE Asia) biodiesel supply comes from 100% palm oil feedstock; European supply uses 40% palm oil and 60% rapeseed oil feedstock; and Argentine and US supply uses 100% soybean oil feedstock.

Figure 5: European ethanol supply costs, forecast Q3 2012 (€ per liter)



Note: It is assumed that only US supply above the mandated volume has potentially been consumed in Europe

Similar to the US, the policy framework supporting the production of biofuels in the EU-27 may weaken in 2013. Lobbying against the 10% renewables-in-road transport 2020 target of the EU Renewable Directive could result in these targets for first-generation biofuels being capped at just 5%. Uncertainty around these EU-27 transport targets means the market can expect little investment in expanding regional ethanol production and even less in the biodiesel sector. As such, we expect the installed ethanol and biodiesel production capacity of the EU-27 to remain at 7.5b and 24.7b liters respectively in 2013.

Sources: All charts and diagrams are based on BNEF data.

Anaerobic digestion – a step in the right direction?

Anaerobic digestion (AD), alongside small-scale solar, onshore wind and hydro power technologies, has benefited from the welcomed “U-turn” by the Department of Energy and Climate Change (DECC) in October on its proposal to prevent sub 5MW projects from being able to elect either Renewable Energy Certificates (ROCs) or FITs as a support mechanism up to 2017. The intention of the policy proposal, announced in July this year, was for small-scale generation to claim only the FIT. However, this was met with resentment from the industry who argued it would undermine investor confidence in a sector that is still in its relative infancy. Commenting on the turnaround in policy, Energy Minister, Greg Barker said that he is “fully committed to spurring on growth in clean green energy generation across the nation and want to provide long-term certainty for those who choose to invest.”

Fashionable technology?

Only recently has AD been making the headlines in the waste sector, although this technology has been used for over a hundred years in the treatment of sewerage sludge by the water industry. AD is the natural process of the breakdown of organic material in a sealed container, in the absence of oxygen, to produce a biogas and digestate. The biogas can be used for a variety of purposes, including the generation of heat and electricity, or conversion into biomethane to be injected into the grid or used as a transport fuel. The digestate, a by-product of the process, can be used by agriculture (both commercial and individuals) as a nutrient rich fertilizer.

The technology has already been embraced extensively across a number of countries in mainland Europe such as Germany, France and Denmark, therefore the UK has a bit of making up to do given that uptake has only increased in the last few years. Following the publication of the AD Strategy and Action Plan by the Department for Environment, Food and Rural Affairs (Defra) in June 2011, at which time there were only 54 non-sewerage sludge AD treatment facilities in operation, there are now 83 such facilities (with a further 140 sewerage sludge treatment facilities in operation), representing more than a 50% increase in uptake over the past 18 months alone.

One of the key advantages the technology has over other waste treatment technologies, beyond the ability to produce a biogas and digestate, is that it has the potential to provide energy consistently subject to a constant supply of feedstock. Furthermore, it is considered to have much less of an environmental impact and faces less public opposition compared with other energy from waste technologies, which enables a relatively smoother path through the planning system. This, added to the fact that the plants are smaller and comparably quick to build, means AD can be an attractive option for treating waste quickly and efficiently.

AD can use a number of different organic feedstocks, each with differing yield productions, but the key is providing a consistent supply. Feedstock includes farm manures and slurry, sewerage sludge, energy crops and food waste, some of which can be co-digested together. It is estimated that the UK produces 15m tonnes of food waste a year, half of which is from households with the balance from industrial and commercial sources, with the majority of this being landfilled. According to CentreForum, power output from the UK’s AD facilities currently has the potential to produce around 1.3TWh a year, sufficient to meet the energy needs of around 300,000 homes. However, by 2020, this could grow by over 800% to 11TWh of power, equivalent to meeting the energy demands of approximately 2,500,000 homes, or around 10% of UK households.

Government support for AD

Government policy supporting the increased uptake of AD differs across the UK as England, Wales, Scotland and Northern Ireland are each responsible for their own waste policies, while still working toward the same EU legislative framework. In England, Defra has set out a support plan in its AD Strategy and Action Plan published in July 2011 and subsequent update in July 2012 this year, which includes proposals to remove any “unnecessary obstacles” by “addressing the barriers ... [and its] ambition to avoid food waste going to landfill.” However, it is argued that it does not go far enough since no specific targets or measures are set, in contrast to what appears to be a more proactive approach in both Scotland and Wales.

In Scotland, the Waste (Scotland) Regulations 2012, which follow the announcement of the “Zero Waste Plan” in June 2010, include a number of provisions that seek to support the uptake of AD; for example, the requirement to collect food waste separately will be rolled out over the next few years, and a total ban on biodegradable municipal waste (including food waste) being sent to landfill will be in force by 2021. In Wales, which also has a Towards Zero Waste strategy, there is a target to achieve 70% recycling by 2025, which is being supported by the procurement of food waste infrastructure in “hub” areas, where financial support is being provided to local authorities to increase the deployment of AD technology.

In England, the imminently expected announcement confirming the availability of funding through the £250m (€311m) Weekly Collection Support Scheme will go some way toward helping local authorities that are suffering from austerity measures to roll out food waste collection schemes, although it should be noted that its priority will remain the promotion of a return of weekly bin collections. The £10m (€12.4m) loan fund administered by the Waste and Resources Action Programme (WRAP), established in July 2011, is intended to support AD infrastructure development, although to date there has not been a large uptake.

What more can be done to encourage AD uptake?

Ban all food waste to landfill

The announcement of a future ban on all municipal food waste going to landfill, as well as limiting certain types of material going to incineration – similar to that seen in Wales – would encourage local authorities to increase food waste prevention awareness. Further, considerations around the diversion of food waste away from landfill by means of separate collection would create a feedstock supply that could encourage development of specific infrastructure to deal with food waste. Not only would this support the UK's obligations under the 1995 EU Landfill Directive by helping it to reduce the biodegradable municipal waste sent to landfill to 35% of 1995 levels by 2020 and thereby help the Government to be the "greenest Government ever," it would also stimulate job creation in the local economy.

However, feedback from an Ernst & Young survey cited the cost of implementing a separate food waste collection scheme as one of the key barriers to such a strategy. While it was acknowledged to be a "good to have" service, the realities of austerity measures and budget cutting means it is not a "must have" in the immediate term. Therefore, without a binding target to aim for and corresponding financial assistance for local authorities, the urgency of diverting food waste away from landfill diminishes in the short term. This, combined with the extensive procurement by local authorities of large-scale residual waste solutions over the last 10 years, has meant that the value and potential of specific food treatment solutions has not yet been given much attention.

Stable support mechanism

As with other renewable technologies, providing a stable support mechanism is key to generating investor confidence in the market. Regular changes to tariffs and eligibility rules does not create a solid platform on which to plan investment. Since the period from inception through to the commissioning of an AD facility can take anything from three to five years, and given the current support mechanism in the UK only allows tariffs to be claimed once the plant is ready to operate, the business plan that was initially developed for a particular project may not reflect the reality once built. The recent U-turn on ROC eligibility has helped ease this issue slightly, however, investors will need to be confident that there will be no further changes to the support mechanism as a clear signal that the Government is encouraging AD development.

Higher tariffs for particular type and size of technology

Targeted increases in the tariffs for certain technologies would also increase activity, noting, however, the regime in place should not oversubsidize. For example increased support for the generation of biomethane through the Renewable Heat Incentive and the Renewable Transport Fuel Obligation, which is considered the most efficient use of biogas, would help the viability of future

"gas to grid" projects and create a sustainable transport fuel network. Higher tariffs targeted at smaller scale farm AD facilities would also promote micro-generation and increase demand for small-scale farm-based digestion, and will have the added benefit of reducing greenhouse gas emissions. AD growth in countries in Europe, particularly Germany, which has a network of more than 4000 AD plants, has been predicated on a subsidy high enough to encourage their development.

Develop digestate market

Developing the market for digestate would help make the financial business plan stack up. Currently there is a cost, incurred by developers, of spreading digestate on to agricultural land. However, increased support, including educating and promoting the safe use of the material (taking into account EU "end of waste" criteria), would help stimulate a commercial market and a reduced dependency on increasingly expensive oil-based synthetic fertilizers.

Availability of finance

Availability of finance for this relatively new technology has been difficult in recent years, with developers seemingly dependent on relatively expensive equity funding rather than typical project finance structures. The relatively high costs of due diligence compared to the capital requirement, and the time required to understand the inherent risks of AD technology, has been a key barrier in providing developers with financing solutions. Therefore, the availability of increased and varying sources of funding from organizations that understand the technology risks will be critical in helping to secure cheaper sources of finance. Encouraging investment via the £10m (€12.4m) WRAP-administered loan scheme, other various grant funding schemes and from the Green Investment Bank (GIB), which recently made its first investment in AD, will all help make projects more commercially viable.

Conclusions

AD has a number of technical advantages over comparable waste treatment solutions which, combined with its potential for growth as a relatively immature market, means that it should be an attractive sector for investors to deploy funds. However, the path for success is not yet sufficiently well-trodden given there are still a number of key barriers that need to be overcome before the technology can fully compete for attention in the medium to long term. Most of these barriers are starting to be addressed in the UK, but there is still some way to go. Watch this space.

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Regional focus – South America



Energy market overview

Comparatively higher levels of economic growth in South America through much of the past decade, and a swift recovery from the economic crisis, have led to greater attention being placed on the continent as an attractive target for investment. Forecasts suggest that the region will continue to outperform Europe and North America in the upcoming years, supported mainly by high internal consumption and ever-strengthening trading ties with China.

Demand for power in the region is forecast by Business Monitor International (BMI) to rise by 4% in 2013 due to continuous growth in GDP and socioeconomic migration. The latter is particularly positive for investors considering that, according to Brazil's International Labour Organization, approximately 30 million Brazilian citizens have migrated above the poverty line between 2003 and 2009 and there is expectation that this positive trend will continue.

Increased power demand, in turn, has caused governments to focus on expanding power capacity. Historically, energy production from large hydro plants has been predominant in the region's energy mix. However, due to unreliability of power supply caused by drought and unpredictable rainfall patterns, paired with greater scrutiny due to the perceived environmental impacts of these types of plants, South American countries have sought to diversify their power mix and increase their use of other forms of renewable energy.

Brazil in particular has identified its renewable energy strategy as an effective way to boost economic growth and reduce carbon emissions. The country's renewable strategy can also be considered a model for other countries due to its success in diminishing the requirements for public funding (i.e., subsidies) and successfully attracting investment from the private sector.

Conversely Chile, which imports a large portion of its energy requirements and has few hydrocarbon resources of its own, has identified renewable energy expansion as a way to decrease dependency on oil and gas imports, and to further diversify its domestic energy mix.

While the motives behind renewable expansion may vary across the region, an increased political will combined with growing demand and vast untapped resources mean the industry is set to grow significantly in coming years, offering a great number of opportunities to renewable investors.

Policy

The changing attitude toward renewable energy in South America has led most governments to introduce specific policies and support mechanisms aimed at encouraging investments in the renewable energy sector.

Many governments have introduced renewable energy targets and biofuel blending mandates, for example, Brazil and Chile, which have targets to generate around 45% of energy from renewable sources by 2021 and 10% by 2024 respectively.

FITs, a popular policy choice in Europe, have not been widely implemented in South America as governments have sought to develop mechanisms with a lower fiscal and administrative burden.

Reverse auctions, which provide a simpler and more cost-effective mechanism for developing renewable energy capacity, have proven to be a popular method of contracting energy. Auctions have also allowed central governments to contract sector-specific capacity and thereby maintain a high degree of control regarding the rollout of renewable energy technologies. This type of mechanism has been implemented in countries such as Brazil, Uruguay and Peru; in the case of the latter, auctions are set to add 588MW of clean energy capacity by 2014.

Policy change can be an ongoing concern to the renewable energy industry and there remains a risk that governments may reduce targets or remove current tariff levels or financial support. South America is no exception in this regard, as was observed in the recent announcement by the Chilean Government that their original target of 20% energy from renewable sources by 2024 was not a binding commitment and that the existing goal of 10% by 2024 will remain in place.

Political risk, in particular, is perceived to be a key deterrent for some considering investing in the region, due in part to nationalization policies in the power sectors of some countries. The nationalization in 2012 of the Bolivian grid operator Transportadora de Electricidad and YPF, an Argentinean oil company, are recent examples.

Infrastructure

Set to host the 2014 World Cup and 2016 Olympic Games, Brazil is in the process of implementing infrastructure investment projects worth billions of dollars, and is taking a lead role in the potential rollout of smart grid infrastructure in the region.

The need for grid investment is heightened as the Government continues to contract energy from projects located in previously untapped regions. This has resulted in the need for a massive expansion of the transmission network, which the Government is attempting to address through public transmission auctions.

While this approach can sometimes create mismatches in the timing of construction of both the plants and the transmission lines, it could also be effective as it allows planning authorities to contract wind power at the lowest-cost sites.

The situation is no different in other countries in the region. As power demand increases and projects are contracted by the governments, the need for investment in transmission infrastructure in the region increases. The Chilean Government recently cited transmission issues for the recent reduction in its renewable capacity targets, among other reasons, while Uruguay has admitted that its ambitious wind targets will pose difficulties for a grid capacity that is close to reaching its limit.

Supply chain

The renewable supply chain in South America is set to grow following proactive efforts by governments in the region. Brazil is seeking to establish itself as a regional hub for the manufacture and supply of renewable equipment across several industries, notably wind and biofuels.

The application of local-content rules set down by Brazil's national development bank, BNDES, whereby developers are required to use locally produced material in order to access more competitive funding, has helped to grow a local supply chain. Such policies are starting to see tangible benefits; Siemens announced this year its intention to invest up to US\$1b (€0.77b) in Brazil in the next five years to expand into various sectors, including Brazil's upcoming smart grid market.

Changing global market conditions for clean energy are likely to favor Latin America as technology costs decline and overcapacity in developed countries forces manufacturers to seek out new opportunities. Chile is a key country expected to benefit as its well-functioning capital markets and anticipated growth in the solar industry are beginning to attract participants to its solar supply chain.

Aside from hydro and biomass, the renewable energy industry is not particularly well developed in South America and challenges remain. The limited availability of supporting infrastructure such as cranes, specialized transportation equipment, and experienced balance of plant (BOP) contractors could challenge developers and original equipment manufacturers (OEMs) to bring projects online on time in many parts of the region. However, opportunities abound across the continent and supply chains are beginning to show signs of expansion.

Access to finance

Across the region, investors are rushing to finance renewable energy projects, as many countries now have attractive incentives and investment-grade ratings. International development agencies and both domestic and international banks have been active in providing finance for projects, and Latin American financial markets are becoming more sophisticated with regard to financing, including the use of mechanisms such as non-recourse debt, bridge financing and bonds.

According to the Climatescope 2012 report, Brazil was able to attract a cumulative total of US\$70b (€54b) in clean energy investment, representing 77% of all funds committed to the Latin American and Caribbean low-carbon economy in 2011.

BNDES has programs in place to provide competitive cost of finance for Brazilian renewable energy projects, with a current lending portfolio of over 100 wind farms at various stages of financing. Access to these competitive rates are essential to OEMs unable to provide financing solutions, although commitment to some level of localized production is required in order to access funds.

Furthermore, there are a number of institutions that have been active in the region in providing finance for local projects. In Peru, the Overseas Private Investment Corporation approved US\$185m (€142m) in financing to Conduit Capital Partners, a private equity (PE) firm, for the construction of two 20MW solar plants in the south of Peru.

As equipment costs stabilize at historically low levels and financial markets continue to evolve, opportunities for innovative private financiers arise and the range of investors active in the region will widen. Strategic investors and PE firms with a higher tolerance for risk are becoming more active, notably in Colombia and Peru: in June 2012, it was announced that the Carlyle Group had launched an investment fund targeting investments in Peru due to the country's high growth rate and low penetration of PE firms.

Hydro

Although still the predominant source of energy in the region, hydropower has significant untapped resources. A shift, however, has taken place and investors have become more attracted to small-scale hydro projects.

These projects tend not to undergo the environmental scrutiny attracted by larger scale projects, resulting in a reduction in planning and construction times. Bolivia is at the forefront of this source of energy in the region, with the highest proportion of its total installed capacity made up of small hydro projects, while in Chile, small hydro is the most prevalent renewable power source.

Solar

Historically, South America has not embraced solar technology to the same degree as other regions, such as Europe, due to a legacy of concerted efforts in previous decades to develop a large hydro industry and to a lack of FIT incentive mechanisms.

Grid parity for solar PV will remain a key determinant on the future of this sector in the region. Declining costs and large, untapped solar resources are opening opportunities across the region and there are signs that countries are seeking to expand the solar share of their energy mix.

Recent anti-dumping measures in the US have caused Chinese manufacturers to focus on this growing market, while a slowdown in the European market has led to an increased focus on the region by many global developers. German developer, SAG Solarstrom announced in November 2012 that it plans to build a 2MW pilot PV plant in Chile and that it will seek larger investments in the country in the future.

Regional focus – South America (cont'd)



The Atacama desert, widely believed to be one of the best solar resources in the world, is expected to be a key location for large-scale solar projects to power the burgeoning mining industry. A 300MW pipeline, funded in part by the Chinese Development Bank, has been announced by a mixture of Chinese and Chilean developers, notably Sky Solar. As at October 2012, Sky Solar had received planning permission to build an 18MW solar plant, which makes up part of this pipeline.

Other countries in the region are seeking to provide incentives to jump-start this industry, notably Brazil with the creation of a net-metering program that will allow solar producers to obtain credits for energy sold to the grid. The Government, however, does not foresee the inclusion of solar energy into the public energy auctions in the short term.

Wind

Like Brazil, other countries in the region have been focused on developing a wind market and attracting private investment. This effort, coupled with a degree of market stagnation in some of the traditional wind power markets, has led manufacturers and developers to look to the region for opportunities. MAKE Consulting has forecast a compound annual growth rate (CAGR) of 33% in Latin America between 2012 and 2016, including over 1.5GW forecasted in Chile and Argentina.

Many countries have built up considerable pipelines through the implementation of power auctions, resulting in an increase in competition. Heightened competition has led to power auction price levels below US\$70 (€54)/MWh in Brazil, Uruguay and Peru, even lower than some gas-powered generation bids.

This decline in prices, while signaling strong competition within the industry, has also raised concerns that projects could prove to be unprofitable. Once project tariffs are locked in at lower levels, returns will inevitably drop, creating less room for errors and delays.

A trend observed from the decline in prices is that developers dissatisfied with the low pricing offered at auctions are seeking opportunities in the open market. In Brazil, a number of major independent power producers (IPPs) and utilities have announced intentions to explore opportunities outside of the auction process, for example, supplying power directly to large corporate consumers.

Uruguay has been particularly proactive in seeking to develop its wind industry and has a target to add 1GW of wind capacity by 2015 according to World Bank reports, financed in part through the sale of carbon credits to the World Bank's Spanish Carbon Fund.

Summary

A combination of strong economic growth and abundant natural resources leave South America well placed to attract renewable energy investment.

Continuous growth in demand for power and incentives implemented by different countries, such as targets and support mechanisms, provide energy developers with various opportunities and allow the region to boost their renewable energy capacity.

While opportunities are not the same across this large and diverse continent, and in some countries the political environment may not be conducive to capital investment, there have been substantial concerted efforts by the different countries to ensure that political risk is minimized and attractiveness for investments is maximized.

Finally, as developers seek out opportunities away from traditional markets such as Europe and the US, driven by declining growth rates and political uncertainty, South America is well poised to take advantage.

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Ernst & Young's MENA cleantech survey

As one of the world's most energy-rich regions, MENA has always caught the eye of investors, developers and governments from around the world. Over the last decade, however, attention has started to shift toward the region's abundant – and broadly untapped – renewable resource, in addition to its continuing status as a major oil and gas producer. The region's strikingly high solar intensity and impressive wind speeds in particular neatly position it as the next rising star in the world of renewables.

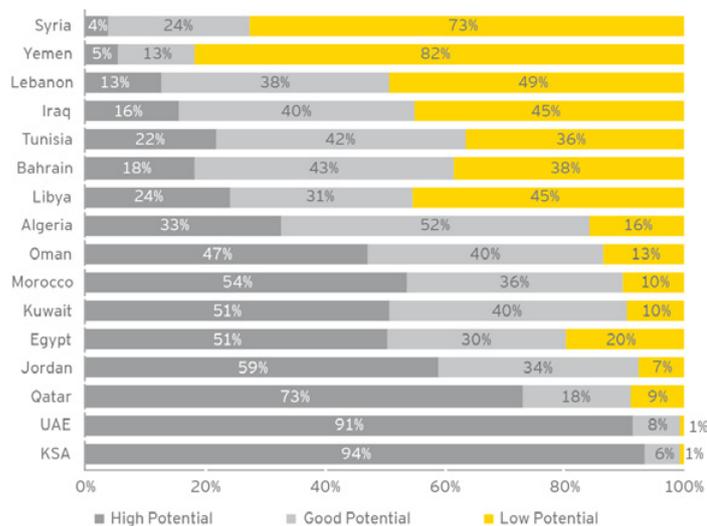
Exploiting this newfound fame is not without its challenges, however. Political turbulence, relatively cheap oil resources and a lack of clarity around governments' renewable energy agendas are some of the issues that could undermine the region's growth potential in this burgeoning sector.

In order to gauge stakeholder views on current and future trends in the development of MENA's cleantech sector, Ernst & Young conducted a survey of 190 experts in the region across various disciplines including investors, bankers, technology experts and government representatives. This article provides a summary of the key findings from the survey.

Country attractiveness

The survey identified Saudi Arabia, the UAE, Qatar, Jordan and Egypt as the most attractive MENA markets based on a five-year horizon, though for different reasons. Whereas Saudi Arabia, the UAE and Qatar were selected due to the availability of financial resources through major initiatives such as KACARE, Masdar and the "green" FIFA World Cup 2022, Jordan and Egypt were identified as attractive markets on account of their increasing populations driving strong energy demand growth and also the need to secure more jobs through the local economic activity generated by clean technology expansion.

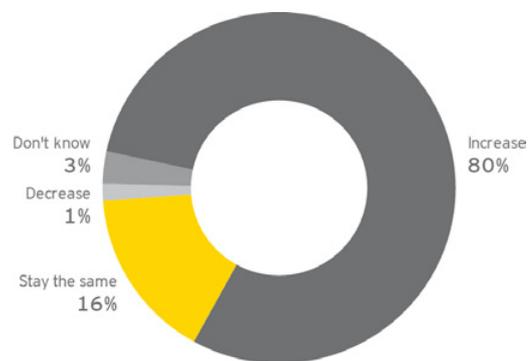
Figure 1: Country attractiveness in MENA region



Investment

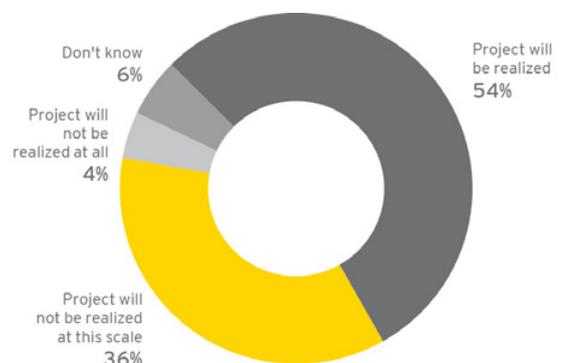
The announcement of renewable energy targets by several MENA countries such as the UAE, Saudi Arabia and Morocco, although not backed by clear policy frameworks, has had an encouraging impact on participants' attitude toward the market. Respondents were generally optimistic about investment trends in MENA over the next five years, with 80% confident that cleantech investment will increase in the short to medium term. The majority of respondents expect that this investment in cleantech will be inside MENA, through projects, funds or investments driven mainly by government expenditure.

Figure 2: MENA cleantech investment in five years



This optimism is not only driven by government commitment within the region, but also by the noticeable support from EU countries and multilateral institutions. With the financing currently in place for Morocco's Ourzazate solar project – Desertec's reference project – an EU-MENA market based on an integrated electricity network no longer seems impossible. It is hoped that such a market will support sustained global interest and investment in MENA's renewable sector and potentially generate strong economic benefits for both parties. The majority (54%) of respondents believe that projects such as Desertec will be realized, while those who answered less positively cited financing and the cost of renewable energy as the key challenges for the project.

Figure 3: Realization of the Desertec project (EU-MENA grid)



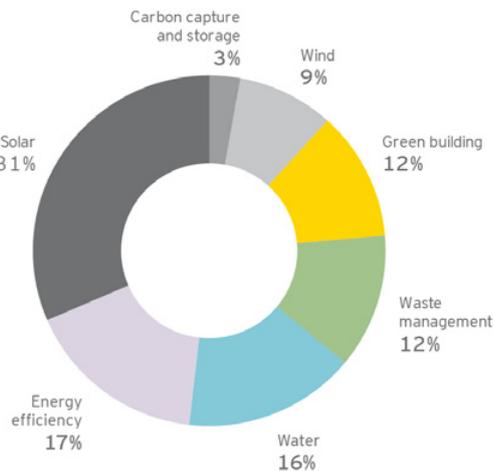
Note: All charts in this article based on the results of the Ernst & Young MENA cleantech survey

Ernst & Young's MENA cleantech survey (cont'd)

Technology

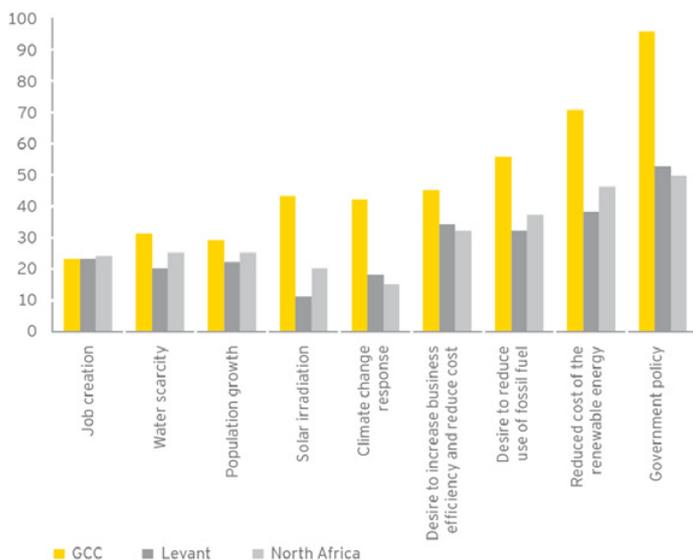
In general, respondents feel that there is good potential across most renewable energy and clean technologies, with only minor variations between the Gulf Cooperation Council (GCC), Levant and North Africa participants on the exact split.

Figure 4: Technology growth potential



As expected, abundant untapped resource means the majority of respondents believe that solar technologies have the highest potential, mainly driven by PV but with a healthy 17% believing CSP to be the most appropriate technology for the region. In stark contrast to last year, energy efficiency has emerged as the technology with the second-highest potential.

Figure 5: Drivers of cleantech growth



There is significant potential for energy efficiency in the region in terms of grid improvements as well as demand management measures. These are primarily driven by the relatively high transmission and distribution losses – which currently averages 14% across MENA – and the increasingly high per capita consumption of electricity, which reaches up to 18,000kWh in GCC countries. Existing energy subsidies are seen as a potential barrier to the adoption of demand management measures.

However, the debate around reform of subsidy policies is now being more openly discussed in several MENA countries, including Egypt and the UAE. In fact, the Government of Abu Dhabi, which subsidizes nearly 86% of power expenses for nationals and 50% for expatriates, has started notifying residents of the real cost of the power they use as the Gulf emirate seeks to curb energy wastage.

Wind came sixth in the poll, with only 9% of votes. However, we believe that the attractiveness of wind will be heavily concentrated in specific countries such as Saudi Arabia and Egypt, which have one of the world's most attractive wind sites, specifically the Gulf of Suez.

Drivers of cleantech growth

Government policy, cost of renewable energy, desire to reduce use of fossil fuels and increased business efficiency appear to be the main drivers of cleantech growth across MENA, according to our survey.

It should be noted, however, that country-specific agendas will also influence these drivers, government policy in particular. Saudi Arabia, for example, hopes that, in addition to using renewable energy to help meet rising electricity demand, it will also reduce its domestic use of crude oil and hence release additional oil capacity for exports. The kingdom risks becoming an oil importer in the next 20 years if oil consumption grows in line with peak power demand, which gains about 8% annually.

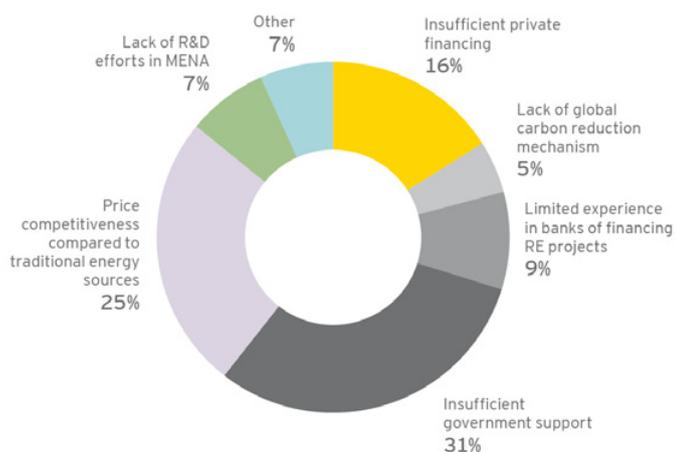
On the other hand, North African countries view renewable energy exploitation as critical to establishing energy security. In Egypt for example, BMI forecasts the 2012-21 average annual growth rate for electricity at 4.50%. The ability of Egypt to satisfy this demand increase through gas-fired generation is questionable, with gas exports further reducing the availability of fuel for domestic consumption.

Our survey identified job creation as another cleantech driver, particularly for countries that are net importers of energy. Proactive supply chain management initiatives, such as Morocco’s minimum local content requirement legislation, are likely to help boost green economy job creation.

Challenges to renewable energy development

When asked to identify the single most important barrier to the development of renewable energy in the region, insufficient government support appears to remain the key challenge, highlighting the importance of, and potentially current skepticism about, the extent to which government ambitions are being translated into tangible and deliverable projects or initiatives.

Figure 6: Challenges to renewable energy development



Price competitiveness with traditional energy sources was identified as a key obstacle for oil producing countries in particular, while net importers of energy saw the lack of experience and funding as the main challenges given their limited financial resources.

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Transactions and finance

Transactions market overview

The global power and utilities sector saw a decline in deal activity in Q3, largely attributed to continued global economic uncertainty, delays in privatizations and divestment programs in Europe, and a resurgence of the valuation gap between buyers and sellers leading to a number of aborted deals.

Political or regulatory uncertainty is playing a more significant role in delays or stifling new investment in a number of markets than it has done for more than a decade, resulting in a drop in big-ticket deals in Q3. Indeed, figure 1 indicates that while the total number of clean energy deals remained broadly stable, these deals were typically lower in value, i.e., sub US\$250m (€193.13m), contributing to the overall drop in deal value. This has inevitably also been caused by the sharp fall in the cost of wind and solar technologies, with the same capacity now costing less.

Ernst & Young's fifth Global Capital Confidence Barometer: Power and Utilities report, released in October, attempts to capture industry sentiment on what is driving capital flows and transactions in the global market. This survey of corporate confidence among power and utility executives reveals that; 80% of power and utility executives think the global economy shows no signs of improvement; 67% expect the downturn to last for more than one year; 66% believe the valuation gap between buyers and sellers is more than 10%; and 79% of executives expect their acquisitions to remain below US\$500m (€386.25m).

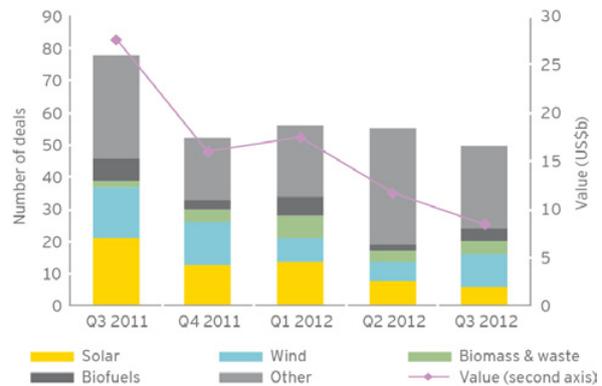
In the clean energy sector specifically, national consolidation efforts and a renewed focus on corporate restructuring is likely to contribute substantially toward transaction activity in the short term. China's intention to limit support to only a small number of large solar firms, for example, is likely to lead to further consolidation both domestically and internationally.

Meanwhile, large corporates are starting to rationalize their portfolios in an attempt to restructure balance sheets. Siemens, for example, is looking to sell its loss-making solar energy business, instead concentrating on its wind and hydro investments. Iberdrola has also announced that it will sell assets not central to its strategy and outside its main geographies. This could result in the sale of up to US\$6.5b (€5.02b) in total, and around US\$2b (€1.55b) by the end of 2014.

Wind and solar

The trend of balance sheet rationalization by major utilities boosts onshore wind deals in particular, with sellers looking to free up capital for future investment in other technologies and geographies. The emergence of secondary market financiers and a buildup in confidence in the renewables markets as a safe haven for institutional investors will be critical in determining capital liquidity across the whole sector. Some wind developers in traditional markets such as France and the UK are shifting their focus to offshore projects. Both DONG Energy and Iberdrola are seeking buyers for onshore wind farms in Poland as a result of energy reforms increasing the attractiveness of offshore wind and solar over onshore wind.

Figure 1: Global clean energy sector M&A Q3 2012 – value and volume of completed deals



Source: BNEF

Major wind deals in Q3 included the acquisition by DONG Energy of three offshore wind development projects off the German coast totaling 900MW. In the same period, German offshore wind developer, Windreich AG, agreed to sell a 210MW North Sea project, which requires a €1b investment, to an unspecified PE firm.

In October, Danish pension fund, PensionDanmark boosted its infrastructure investments by acquiring a 50% stake in three US wind farms from E.ON. The deal highlights the interest of insurance and pension funds in reasonable low-risk wind assets with stable returns. In the UK, insurance company, Munich RE, bought an operating wind farm portfolio totaling 102MW from HG Capital for around US\$234m.

In the solar sector, Korean business conglomerate, Hanwah Group officially positioned itself as the third-largest solar manufacturer in the world after purchasing bankrupt Q-Cells for US\$323m (€249.52m).

Outlook

We expect increased sector reorganization to drive a stable number of smaller deals through Q4. Renewable transactions in Europe have maintained momentum as utilities struggle to balance capital allocation and portfolio management, while still complying with EU mandates. Despite subsidy cuts and slow economic growth, these types of assets nevertheless appear to attract new investors.

Asian investors will continue to expand their geographical presence by participating in European divestment programs and general opportunistic acquisitions. Japanese trading houses, in particular, have become increasingly active in international energy markets – Sumitomo Corp plans to acquire a 25% stake in a 550MW solar power project in California, giving the trading house a foothold in the growing US solar industry.

Deal activity in the emerging economies of Latin America is also expected to rise, driven by significant infrastructure requirements, particularly as the renewable portfolio build-out in the region continues, particularly in Brazil.

IPO activity

The global IPO market has shown some signs of improvement, with a number of high profile companies such as Direct Line, Talanx and Megafon signaling their intention to float.

While the clean energy market remains relatively sluggish, there was some activity in Q3. Chinese solar developer, Sky Solar Holdings announced plans to raise US\$300m (€231.75m) via an IPO, even as share prices of other renewable energy companies slump. SolarCity also made headlines when it filed to raise US\$201m (€155.27m) via an IPO on the Nasdaq. However, CPFL Energias Renováveis, Brazil's largest renewable energy producer, canceled plans for an IPO citing "current market conditions." More generally, the biggest public market deals of Q3 were secondary issues rather than IPOs.

Debt markets and asset finance overview

Total clean energy investment fell 5% in Q3 to US\$56.6b (€43.72b), with investor enthusiasm continuing to be dampened by skepticism over policy-makers' renewable energy commitments and the ongoing atmosphere of fiscal austerity. However, it should also be noted that the continued decrease in solar and wind technology costs inevitably reduces total investment values given the same MW capacity requires less dollar power.

Activity also remains buoyant in some developing markets, with four of the top five project financings in Q3 occurring in Morocco, Brazil and China. However, depressed global clean energy share prices are continuing to hold back the sector overall, and it is unlikely that increased investment in emerging markets will fully offset the downturn in developed countries.

Figure 2: Clean energy new build asset finance raised globally Q3 2012 – value and volume of completed deals



Source: BNEF

In fact, total new investment in clean energy across the different regions saw a mix of trends. Total investment in Europe, the Middle East and Africa rose 7% to \$21bn in Q3, mainly driven by solar thermal and wind project financings in Morocco. In the same period, Brazil attracted US\$1.9b (€1.47b), an increase of 94% on the previous quarter.

Investment in the Americas and Asia Pacific slipped, however, by 25% and 3% to US\$10.4b (€8.03b) and US\$25.2b (€19.47b) respectively. This included new investment of US\$14.8b (€11.43b) and US\$1.5b (€1.16b) in China and India representing a drop of 17% and 60% on Q2 respectively.

Other finance market trends

Q3 saw a number of PE firms announce plans to create clean energy funds. Terra Firma is reported to be establishing a US\$5b (€3.86b) fund with the China Development Bank, while Blackstone plans to start investing in energy projects in Africa worth US\$3b (€2.32b). With the majority of corporations intending to invest in smaller M&A deals and the IPO market remaining volatile, PE firms continue to look for every opportunity to optimize their portfolio companies. In the latest Ernst & Young Private Equity Capital Confidence Barometer report, 86% of PE respondents indicated they would increase sector-focused operating partners, while 49% also expect to pursue bolt-on acquisitions in the next 12 months.

Private sector corporates also seem to be getting in on the clean energy act. IKEA announced it will invest €1.5b in solar and wind power to ensure it is totally self-sufficient by 2020, while electronics giants Sharp and Hitachi have unveiled an innovative finance deal to provide UK homeowners and businesses with loans to boost the uptake of solar PV.

New build asset finance deals fell slightly in terms of both value (US\$32.2b (€24.87b)) and volume (247) of deals, with solar activity overtaking investment in wind projects. Major solar funding deals announced in Q3 include US\$500m (€386.25m) raised by LS Power for its 170MW Centinela Solar PV Project in California and US\$227m (€175.36m) raised by Northland Power for the six Ontario projects totaling 60 MW in Canada.

Top funding deals in the wind sector in Q3 included US\$350m raised by Nareva Renouvelables and Kharabel FZE for the 300MW Tarfaya Wind Project in Morocco and US\$165m (€127.46m) raised by Alto Holding for its 120MW Karaburun Wind Farm in Turkey.

“Political and regulatory uncertainty, working in tandem with constrained capital markets, continue to put the brakes on investment and deal volumes. Inevitable market restructuring and the emerging secondary market for infrastructure financing provide the drivers for short-term deal making.”

Ben Warren, Energy and Environment Partner, Ernst & Young LLP

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All renewables index (ARI) at November 2012

Rank ¹		Country	All renewables	Wind index	Onshore wind	Offshore wind	Solar index	Solar PV	Solar CSP	Biomass/ other	Geo-thermal	Infra-structure ²
1	(1)	China	69.6	76	77	69	64	66	46	59	50	72
2	(2)	Germany	65.6	68	65	79	61	70	0	68	58	73
3	(2)	US ³	64.5	62	64	55	70	69	73	61	67	59
4	(4)	India	63.5	63	69	40	66	68	53	60	44	63
5	(6)	France	55.8	58	59	54	53	57	29	57	34	56
6	(5)	UK	54.6	62	59	78	41	47	0	57	35	64
7	(8)	Canada	53.6	63	66	46	40	46	0	50	36	66
8	(9)	Japan	52.6	50	52	43	60	65	29	42	49	58
9	(6)	Italy	52.4	53	54	45	53	56	37	49	57	44
10	(10)	Brazil	50.5	52	55	40	48	50	33	54	24	51
11	(11)	Australia	50.1	49	52	38	53	53	55	43	57	48
12	(12)	Sweden	49.2	55	55	53	37	43	0	58	35	56
13	(13)	Romania	48.2	54	57	39	40	46	0	45	42	47
14	(15)	Poland	47.8	55	57	44	39	44	0	44	23	49
15	(16)	South Korea	47.5	48	47	54	49	52	30	41	37	47
16	(14)	Spain	47.0	45	48	35	52	52	56	43	26	37
17	(17)	South Africa	46.5	50	54	37	44	43	51	37	35	51
18	(19)	Belgium	45.0	51	50	58	37	43	0	39	28	52
19	(20)	Portugal	44.6	46	48	35	46	47	36	38	26	39
20	(18)	Greece	44.1	45	48	33	47	49	33	34	25	32
21	(21)	Mexico	44.0	45	46	40	44	44	40	39	55	41
22	(22)	Denmark	43.1	48	45	58	35	40	0	46	33	53
23	(24)	Ireland	42.7	52	53	51	27	31	0	43	24	49
24	(23)	Netherlands	42.6	48	49	47	36	41	0	37	21	41
25	(25)	Morocco	42.4	40	43	26	49	48	56	38	21	43
26	(26)	Turkey	41.6	43	45	33	41	43	29	36	42	39
27	(28)	Norway	40.4	48	49	46	26	30	0	45	31	52
28	(27)	Taiwan	40.3	43	44	38	37	42	0	37	38	43
29	(30)	Egypt	39.8	42	44	32	39	38	45	35	24	33
29	(29)	Ukraine	39.8	39	41	27	40	46	0	46	32	41
29	(31)	Finland	39.8	46	48	39	25	28	0	54	26	47
32	(32)	New Zealand	39.5	47	50	37	27	31	0	34	51	47
33	(33)	Austria	38.8	33	40	0	45	51	0	51	34	52
34	(34)	Tunisia	36.6	36	38	27	44	43	47	20	27	40
35	na	UAE	36.5	34	37	22	48	47	50	18	18	44
36	(35)	Israel	36.4	33	38	14	45	46	39	27	29	39
37	na	Saudi Arabia	35.9	38	40	27	47	47	49	0	0	49
38	(37)	Chile	35.4	36	39	24	36	37	31	29	38	42
39	(36)	Bulgaria	35.0	35	38	23	35	40	0	34	34	39
40	(38)	Argentina	34.7	37	40	22	33	35	17	32	27	33

Source: Ernst & Young analysis

Notes:

1. Previous ranking in issue 34 is shown in brackets.
2. Combines with each set of technology factors to produce the individual technology indices.
3. This indicates US states with renewable portfolio standard (RPS) and favorable renewable energy regimes.

This issue of the CAI sees two entrants to the index, the **UAE** and **Saudi Arabia**, exemplifying the growing clean energy potential of the MENA region, with policy-makers already announcing ambitious renewable energy targets.

The UAE is ranked 35th in the index, two places above Saudi Arabia. While both countries have significant potential and a proven track record in energy infrastructure projects, Saudi Arabia currently has very little by way of a credible project pipeline, while the UAE's progress is more tangible.

The rollout of solar initiatives in particular has resulted in the UAE taking the lead over Saudi Arabia in the solar index, while the reverse is true in the wind index based on natural resource. Both countries, however, will need to attract more private investment, and in the long run, the sheer size of Saudi Arabia relative to the UAE may offer additional growth opportunities.

ARI November 2012 (cont'd)

To accommodate these new entrants, the lowest performing countries in the previous issue – **Czech Republic** and **Hungary** – have been dropped out of the index. The clean energy market in the Czech Republic has experienced a series of severe cuts in government support in the past 18 months, culminating in the announcement earlier this year that generous renewable subsidies will be abandoned altogether from 2014. There has also been little by way of activity in the market this past year.

The same can be said for Hungary. Despite a comprehensive FIT policy, an EU binding target of 13% renewable energy by 2020, and relatively strong solar resource, the country has made little progress over the past year and there are few signs of this changing. Both Hungary and the Czech Republic may also be disadvantaged in the long-term by their lack of offshore wind potential as a result of being landlocked countries.

Q3 ARI results

China has fallen a point in the ARI in Q3. While consolidation in the solar sector as part of efforts to boost domestic installations and rationalize government support for supply chain firms may restabilize growth in the long term, the renewables sector is still undergoing a transformation that could slow growth in the more immediate term. Inadequate grid infrastructure is still hindering the connection of wind projects, while consolidation and trade wars with the US and EU are likely to obliterate a large portion of the solar market. Further, recent months have seen a large outflow of Chinese investment in favor of emerging markets such as Africa and South America.

Germany has overtaken the US to take second place in the ARI, despite also experiencing a modest half point score decrease. While the Government has recently increased the country's renewables target from 35% of electricity to 40% by 2020, and is being proactive in implementing policy measures to create sustainable growth, more immediate changes are likely to put a strain on the clean energy market. There are increasing tensions between support for renewables and energy price hikes for consumers, and with 2013 being an election year, there are concerns that clean energy support may be reined in to reduce the cost to consumers.

The **US** has fallen to third place following a one and a half-point score decrease. While Obama's victory is good news for the country's clean energy sector, the election campaign has highlighted polarized views – both political and public – on the future of US energy policy and reinforces the challenge posed by political divisions in generating a consolidated energy strategy. Cheap gas and concerns over the extension of key renewables incentives continue to cast uncertainty over energy policy and are likely to dramatically slow growth in the sector in the short to medium term, particularly in the wind sector.

India has fallen a point in the ARI given the sector is continuing to battle a policy vacuum – while individual states have developed detailed clean energy packages, there is still a lack of coherent policy at a national level. Further, July's blackouts and serious issues impacting the country's overarching power grid could temporarily shift focus away from clean energy in the immediate term.

France has increased a point in the ARI as a result of Q3 announcements of government plans to launch solar and the second offshore wind tenders before the year end, and increase the FIT awarded to small-scale solar installations.

The **UK** has fallen a place in the ARI following a number of political miscommunications and an apparent lack of consistency over key energy reforms continuing to undermine confidence in the UK's energy policy. The wind sector was particularly hard hit by conflicting messages about the level of government support. Meanwhile, more positive news that the GIB has received approval from the European Commission (EC) was somewhat weakened by the revelation that funds would support operating offshore installations as opposed to underwriting the riskier construction phase.

While **Japan** has stopped short of committing to a complete exit from nuclear, its new energy plan does envisage investment of JPY38t (€0.38t) in renewable energy over the next two decades in order to generate 30% of the country's energy from clean sources. An additional JPY84t (€0.82t) of investment in energy-efficient technology is anticipated to cut consumption by at least 10% by 2030. Q3 also saw proposed reforms to the country's power market, including retail market liberalization and electric power grid unbundling.

Q3 saw **Italy** enact legislation to replace its Green Certificate (GC) scheme with reverse auctions for projects commissioned post 2012. However, the extent to which this will revive the country's stagnating renewables sector is unclear. The lack of activity in the market in recent months, combined with an unstable regulatory environment and prolonged period of slow economic growth is likely to hinder the clean energy sector in the short to medium term, resulting in a dramatic fall from seventh to ninth place in the ARI.

Spain's renewables sector received a blow in Q3 following the Government's approval of a draft energy bill setting out a series of tax measures, including a flat tax of 6% on both traditional and low-carbon energy generation. The tax, likely to be effective from January 2013, is part of government measures to raise around €2.7b a year to address the €24b tariff deficit that built up as a result of strong renewables growth.

Greece is attempting to stave off a fresh energy crisis by imposing a temporary tax on renewable energy producers. The move damages further the long-term growth outlook for the sector, resulting in a one-point fall in the ARI.

In **South Africa**, it was announced that the US Export-Import Bank has signed an agreement to lend the Industrial Development Corporation of South Africa US\$2b (€1.55b) to fund clean energy projects in the country that use US equipment. This improved access to finance has increased South Africa's score in the ARI.

In October, **South Korea** published a new emissions target equivalent to a 3% reduction in 2013. A nationwide emissions trading scheme affecting 377 companies will be established in 2015 as part of a long-term energy and climate change plan, which may also include linking energy taxation to emissions and establishing a nationwide smart grid by 2016.

Bulgaria's renewables sector was hit in September by the announcement that temporary taxes will be imposed on existing plants, ranging from 1% to 39% for solar power, 10% for wind energy, 5% for hydro and 1% for biomass. The tax is designed to pay for the "difficulties" of integrating variable energy supply into the grid. The news followed an already devastating blow to the solar sector when it was announced FITs will be reduced a further 28%-39% for projects completed after 1 September, after FITs were already halved on 1 July.

Argentina has increased a point in the biomass/other index after the Government launched a new biomass incentive program called "Probiomasa," which aims to add 400MW in capacity during its first phase and boost the biomass share of the total generation system from 2.5% to 10%.



Meet our Corporate Finance team at EWEA

Ernst & Young will be hosting a VIP seminar as a side event to the EWEA conference on Wednesday, 6 February 2013 in Vienna.

Topics for discussion will include topical market trends (e.g., regulatory, financing) as well as perspectives on new market opportunities.

To register your interest in attending, suggest topics of interest or arrange a bilateral meeting with our team at the event, please contact Will Gaskell (wgaskell@uk.ey.com).

Wind indices at November 2012

Rank ¹		Country	Wind index	Onshore wind	Offshore wind
1	(1)	China	76	77	69
2	(2)	Germany	68	65	78
3	(3)	India	63	69	40
3	(6)	Canada	63	66	46
5	(3)	UK	62	59	78
5	(3)	US ²	62	64	55
7	(7)	France	58	59	54
8	(9)	Sweden	55	55	53
8	(10)	Poland	55	57	44
10	(11)	Romania	54	57	39
11	(8)	Italy	53	54	45
12	(12)	Ireland	52	53	51
12	(12)	Brazil	52	55	40
14	(14)	Belgium	51	50	58
15	(15)	South Africa	50	54	37
15	(16)	Japan	50	52	43
17	(16)	Australia	49	52	38
18	(18)	Netherlands	48	49	47
18	(20)	South Korea	48	47	54
18	(18)	Norway	48	49	46
18	(20)	Denmark	48	45	58
22	(20)	New Zealand	47	50	37
23	(23)	Finland	46	48	39
23	(23)	Portugal	46	48	35
25	(23)	Spain	45	48	35
25	(26)	Greece	45	48	33
25	(26)	Mexico	45	46	40
28	(28)	Taiwan	43	44	38
28	(28)	Turkey	43	45	33
30	(30)	Egypt	42	44	32
31	(31)	Morocco	40	43	26
32	(32)	Ukraine	39	41	27
33	na	Saudi Arabia	38	40	27
34	(33)	Argentina	37	40	22
35	(33)	Chile	36	39	24
35	(33)	Tunisia	36	38	27
37	(33)	Bulgaria	35	38	23
38	na	UAE	34	37	22
39	(37)	Israel	33	38	14
39	(37)	Austria	33	40	0

Source: Ernst & Young analysis

Notes:

1. Previous ranking in issue 34 is shown in brackets.
2. This indicates US states with RPS and favorable renewable energy regimes.

The **US** has fallen two points in the wind index as a result of ongoing political wrangling and the less than favorable election timeframe continuing to cast doubts on the extension of the critical PTC beyond the December 2012 expiry date. The country is already starting to see significant job losses in the sector with more predicted, and there are concerns that even if a last minute extension materializes, it may not be possible to undo the short-to medium-term damage already created by the uncertainty and the divisive policy views that have emerged throughout the election campaign.

Q3 saw **Germany** fall a point in the wind index, recognizing the likelihood that some kind of support rationalization will be implemented to ease electricity price tensions in the immediate term. In offshore news, while policy-makers have been proactive in approving grid connection liability legislation that splits the cost between operators and consumers, this in itself will not resolve the ongoing challenges faced by the sector arising from insufficient grid availability and the postponement of various projects means some damage has already been done.

India has fallen a point in the wind index. While a recommendation has been made to renew financial support for wind projects following the expiry of the accelerated depreciation and generation based incentives (GBI) earlier in the year, there is no guarantee this will be approved. Therefore, while growth in the sector is likely to continue at a moderate pace, the lack of regulatory framework or support mechanism at a national level is likely to hinder medium-term growth.

In the **UK**, the lower than expected reduction in the number of ROCs for onshore wind, announced in July, has been somewhat undermined by further consultations into the benefits of wind farms and the rather alarming statement by a junior energy minister that “enough is enough” as far as wind turbines are concerned. This, combined with wider policy uncertainty over the future of renewables in the UK, has resulted in a two-point drop in the wind index.

In September, the **French** Government announced that it will kick off a limited offshore wind tender by the end of the year to move ahead with bidding for zones already identified off Treport and Noirmoutier, totaling 1.3GW. The round – which is more of a “round 1, part 2” than an official round 2 – will build on the 1.9GW of capacity already licensed as part of the initial tender effort. A full second round is still scheduled for 2013. As a result, France has increased a point in the wind index.

Japan's attractive FIT scheme, introduced in July, has already had a tangible impact on the country's wind energy pipeline, with telecommunications company Softbank, announcing in Q3 a 500 turbine 1GW wind farm on the island of Hokkaido. In the same period, operations began for Japan's first floating wind turbine; the 100kW turbine will be replaced with a 2MW turbine mid-2013 once data regarding performance and maintenance has been collected.

Solar indices at November 2012

Rank ¹		Country	Solar Index	PV	CSP
1	(1)	US ²	70	69	73
2	(2)	India	66	68	53
3	(3)	China	64	66	46
4	(4)	Germany	61	70	0
5	(5)	Japan	60	65	29
6	(7)	Australia	53	53	55
6	(9)	France	53	57	29
6	(6)	Italy	53	56	37
9	(7)	Spain	52	52	56
10	(10)	Morocco	49	48	56
10	(10)	South Korea	49	52	30
12	(13)	Brazil	48	50	33
12	na	UAE	48	47	50
14	na	Saudi Arabia	47	47	49
14	(10)	Greece	47	49	33
16	(14)	Portugal	46	47	36
17	(14)	Israel	45	46	39
17	(16)	Austria	45	51	0
19	(18)	South Africa	44	43	51
19	(17)	Tunisia	44	43	47
19	(18)	Mexico	44	44	40
22	(20)	UK	41	47	0
22	(21)	Turkey	41	43	29
24	(21)	Canada	40	46	0
24	(21)	Ukraine	40	46	0
24	(21)	Romania	40	46	0
27	(26)	Poland	39	44	0
27	(25)	Egypt	39	38	45
29	(28)	Belgium	37	43	0
29	(28)	Sweden	37	43	0
29	(26)	Taiwan	37	42	0
32	(32)	Chile	36	37	31
32	(30)	Netherlands	36	41	0
34	(30)	Bulgaria	35	40	0
34	(32)	Denmark	35	40	0
36	(34)	Argentina	33	35	17
37	(37)	New Zealand	27	31	0
37	(38)	Ireland	27	31	0
39	(38)	Norway	26	30	0
40	(40)	Finland	25	28	0

Source: Ernst & Young analysis

Notes:

1. Previous ranking in issue 34 is shown in brackets.
2. This indicates US states with RPS and favorable renewable energy regimes.

India's score in the index remains unchanged in Q3, with wider power concerns and a weak regulatory environment offsetting what would otherwise be positive news for the sector, specifically the introduction of a comprehensive solar package in Andhra Pradesh and the prospect of Bank of India funding homes and business to encourage rooftop installations.

China's position in the solar index is also unchanged – while the Government is being proactive in expanding domestic capacity and addressing oversupply issues through consolidation, these long-term measures are likely to clash with more difficult conditions for the sector in the short term as a result of a potential outflow of investment to other emerging solar markets as a result of this consolidation, exacerbated by solar trade wars with the US and EU.

Japan's attractive solar FIT is starting to yield dividends, with Q3 revealing plans for a 250MW solar project backed by the Goldman Sachs Group, IBM, and Toyo Engineering, among others. BNEF has estimated that about 900MW of utility-scale solar projects (>1MW) have already been announced this year, of which 350MW are under construction.

France's Ministry of Energy, Environment and Sustainable Development has launched a request for proposals for large-scale PV plants by the end of 2012 as part of a second round of bidding following a July auction in which 520MW of capacity was awarded. The Government has also increased FITs for installations <100kW to €0.184/kWh from €0.175/kWh.

Spain's draft energy reform bill, released in September, appears to include a provision to scrap the existing premiums for thermal solar plants that use gas as well as the sun to generate energy. In addition to the flat rate tax across all renewable technologies, this is likely to hit Spain's CSP sector hard, resulting in a one-point fall in the solar index.

Greece has fallen a point in the solar index after its Energy Ministry temporarily suspended the issuing of licenses for new PV projects in September as part of measures to restore liquidity to the Greek power market. A statement by the Ministry indicated it will also reduce the guaranteed prices.

Israel has initiated a consultation that proposes to review solar FITs every quarter and cut the premium rate for large-scale projects (>12MW) by 34%. The proposals signal the Government's intentions to control capacity growth, though arguably the sector is not showing signs of over heating.

The **UK's** solar score remains unchanged pending the results of a consultation launched by DECC, which proposes cutting support for solar projects from the current 2ROCs/MWh to 1.5ROC/MWh from April 2013, with further cuts thereafter.

On 1 October, **Taiwan's** Bureau of Energy, Ministry of Economic Affairs held a hearing that determined that the solar FIT in the first 2013 period will fall between 9.23% and 12.63%, where as the second period will be between 1.9% and 5.62%.

Chile has risen a point in the solar index to reflect the continuing high levels of solar market activity through Q3. Sun Edison submitted plans in August for two PV plants totaling 72MW, while Mainstream Renewable Power received the green light for its ambitious 162MW solar park in the Atacama region.



Government finds new ways to support solar

Ranking	Issue 35	Issue 34
All renewables index	1	1
Wind index	1	1
Solar index	3	3

Source: Ernst & Young analysis

Solar sector changes direction

Despite battling excess supply and the knock-on impact of the global economic downturn on international markets, Q3 saw significant activity across China's solar sector. However, this is not the supply chain-driven growth of the last five years, but a new dawn for the world's largest solar manufacturing economy. That the country is seeking to expand its domestic solar demand to deal with oversupply and falling prices has become well-known, but Q3 has shown that the Government is willing to practise what it preaches in terms of implementing policy.

Q3 saw the National Energy Administration rubberstamp the country's new and ambitious solar capacity targets of 21GW by 2015 and 50GW by 2050, although some market commentators are speculating this could rise further to 30GW and 100GW respectively based on the current rate of growth alone.

The quarter also saw explicit signs that market consolidation is the Government's primary strategy for dealing with oversupply and boosting domestic projects. The China Development Bank (CDA) renewed a pledge to support 12 solar companies but said that lending to other companies, especially those seeking to expand manufacturing capacity, would be strictly controlled. Indeed, a number of the top ten manufacturers were not included in the initial list of those eligible for priority funding, although the full list has not yet been disclosed. As part of this consolidation, the CDA will also support the acquisition of smaller companies by larger ones.

A report published in October by GTM research estimated that around 180 solar module manufacturers globally would fall victim to the industry's consolidation efforts by 2015, around 54 of which would be Chinese. This is based on an assessment of the market's "solar zombies," defined as those companies manufacturing less than 300MW of capacity per annum and that have relied on generous subsidies from China's Government.

Perhaps the starkest evidence of the Government's intention to shift support toward developers and away from solar panel manufacturers, has been the extension by the CDA of a US\$1.6b (€1.2b) credit line to Sky Solar Holdings – a Shanghai-based PV power developer. The credit facility, which could cover equity, debts, loans, leasing, bonds, and securities, is further evidence that the bank will prioritize financing to project development, construction and asset management.

However, while this period of consolidation aims to stabilize the country's solar sector and therefore has the potential to create a medium-to long-term growth platform, it is also forcing Chinese manufacturers and investors to look elsewhere. This year has already seen significant activity by Chinese companies in Africa and South America.

Distributed solar PV gets a boost

There was a plethora of good news for the country's distributed solar sector in Q3. The National Energy Administration intends to raise targets for distributed PV (also known as "off-grid" or "self-generation") and has already announced a decree requiring each province to build 500MW of capacity. This is expected to increase overall PV installations in the country by more than 15GW.

In October, the State Grid Corporation of China announced that it would provide free grid connection for distributed PV projects less than 6MW from November 2012 onward. The Government is also planning to introduce subsidies for distributed solar projects of up to CYN0.6 (€0.07)/MWh.

Trade wars continue

China's Ministry of Commerce announced in early November that it has launched an investigation into whether EU companies have been selling polysilicon at unfairly low prices and receiving illegal subsidies. The action follows a series of complaints by EU solar manufacturers against Chinese rivals earlier in Q3, which has led to official anti-dumping and anti-subsidy investigations being undertaken by the EC. The EC now has nine months to decide on whether to impose provisional anti-dumping duties for half a year and governments have 15 months to decide whether to apply "definitive" levies for five years.

Q3 also saw interesting developments in the ongoing trade war between China and the US. The World Trade Organization has agreed to launch an investigation by an international panel following complaints by China that anti-dumping tariffs imposed by the US on Chinese solar panels contravened trade rules.

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Electricity surcharge hike causes reform dilemma

Ranking	Issue 35	Issue 34
All renewables index	2	2
Wind index	2	2
Solar Index	4	4

Source: Ernst & Young analysis

Policy tensions as electricity prices rise

Grid operators announced on 15 October that the surcharge on retail electricity prices, which funds renewable energy subsidies, will increase by 47% to just over €0.053/kWh in 2013. Given politicians' earlier claims that the surcharge would remain at €0.036/kWh, this announcement is likely to spark both a public and political backlash.

The dilemma for Chancellor Merkel is how to balance the need for additional renewable capacity in response to the Government bringing forward the planned phase-out of nuclear power from 2036 to 2022, with a desire to keep consumer costs as low as possible in the run-up to next year's election. The Government intends to raise its renewable electricity target from 35% to 40% by 2020, however, it seems almost inevitable that it will also need to rein in support for renewables in some way to cushion the blow to consumers.

Indeed, less than a week before the surcharge announcement, the new Environment Minister, Peter Altmeier, announced that he is considering a reform to the renewables system that would cap subsidies for wind and biomass power once government targets are reached. This could supplement the plan announced in June to cap solar payments at 52GW.

However, this is just one of a range of options that the Government is looking at while it seeks to revise the German support scheme. Industry has called for a reduction in the number of surcharge exemptions for energy-intensive companies, while others are proposing a quota system as an alternative to the FIT. Merkel has already announced a review of exemptions, as well as a plan to prevent utilities from closing unprofitable gas plants to ensure security of supply.

It's unlikely any of the proposed reforms will be completed before the Federal election next year, therefore energy reform proposals will be a hot topic for the 2013 election. However, it should also be noted that Article 14 Para 3 of the German Constitution stipulates that existing rights can only be withdrawn for an important reason and not without compensation. The Environment Minister has emphasized that existing FIT-qualified renewable energy installations will not face any retroactive changes in the renewable support scheme.

Notwithstanding the likely period of energy reform ahead, Ernst & Young's German Energy Transition Index (DEX), jointly published with German grid agency, DENA, indicates sentiment over the German renewables sector has improved for most stakeholders since Q2. The index, which seeks to reflect the industry's opinions on the progress of the transition from traditional to renewable energy, increased to 102.8 out of 200 from 100.8 earlier in the year, although grid operators and consumers in the country remain concerned security of supply.

Wind still key but grid issues remain

Wind power is expected to remain the backbone of Germany's energy switchover – in the first half of the year, an additional 1GW of wind power was installed, taking total installations past the 30GW mark. This is in the context of 2020 targets of 35GW onshore capacity and 10GW offshore capacity.

The pace of offshore developments, however, remains slower than expected, with only 200MW installed as of June 2012. While some projects are under construction, a string of high-profile postponements due to grid connection issues highlights the importance of a quick implementation of new liability regulations agreed by the Government on 15 August (due to be ratified in December).

This energy law amendment aims to raise investments and increase clarity over grid connection liability compensation, after utilities threatened to halt projects and grid operators struggled to raise financing and complete projects on time. In the meantime, DONG announced in late October that it will continue to postpone any further works on its Riffgrund 2 wind park until grid operator, TenneT provides a connection date, while TenneT has called for a moratorium on new connections until it has a clearer view on government plans.

The draft bill would make power consumers pay up to €0.25/kWh if turbine connection delays result in operators being unable to sell their electricity, while grid operators will have to pay up to 20% of damages subject to a cap of €100m per claim. This cap limits the compensation to approximately four months of delay; in context, RWE's Nordsee Ost wind project is currently experiencing delays of one to two years, therefore, it is unlikely this legislative amendment alone will completely solve the grid-related woes of the offshore industry.

Solar growth exceeds target

According to data release by DENA, installed solar PV capacity increased by 4.9GWpeak in the first half of 2012, well above the Government's target of 3.0GW for the whole year. It is likely this was primarily driven by developers rushing to beat the deadline for 20%–40% FIT cuts that took effect on 1 July.

Initial data for Q3 already indicates a dramatic slowdown in installations as consumers respond to the new monthly routine of FIT cuts, which aims to avoid demand peaks. Nevertheless, total installed solar capacity now exceeds 30GW and despite the FIT cuts, the solar sector is still expected to see healthy growth as a result of module prices continuing to fall dramatically.

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Election victory strong signal but barriers remain

Ranking	Issue 35	Issue 34
All renewables index	3	2
Wind index	5	3
Solar Index	1	1

Source: Ernst & Young analysis

Election polarizes energy debate

The results of the presidential election were always going to play a significant role in shaping the future of the renewables sector in the US. The issue of energy – hotly debated throughout the election campaign and catalyzed by Hurricane Sandy-emerged as a highly divisive topic. President Barack Obama favored an “all of the above” approach in which clean technologies play a starring role. Mitt Romney, meanwhile, relegated renewables to the bench in favor of more traditional fuels, making clear his intention to remove subsidies on clean energy and help the oil and gas industry make the US energy independent by 2020.

The re-election of Obama on 6 November is inevitably, therefore, a huge relief for the country’s clean energy sector. Electricity generated from renewables has increased by almost three-quarters since Obama took office, and in the nine months to September, renewable installations represented 43.8% of all new generating capacity in the country.

However, Obama’s victory does not hide the fact that energy policy remained a polarizing issue throughout the campaign, perhaps reinforced by the 50:50 split in the popular vote. There is therefore no reason to expect a dramatic turnaround in the Administration’s ability to pass energy legislation.

Notwithstanding the pivotal role of the election, however, it may be public opinion itself, and not just in the polls, which turns out to be the real driver of the country’s energy sector.

Nationwide polls have increasingly suggested that Americans are in favor of a reduced dependence on oil and the development of a sector with the potential to generate new jobs. In the face of the most widespread drought since 1956, there have been calls to increase focus on clean energy sources such as wind and solar that require less water than conventional power. The recent devastation caused by Hurricane Sandy is also likely to bring the issue of climate change to the forefront of public opinion; while rebuilding the infrastructure across the worst hit areas will inevitably be the focus in the short term, the medium-to long-term implications of the disaster may empower US citizens in re-shaping the country’s energy policy.

However, there is still some way to go. In August, the Obama Administration and the Environment Protection Agency suffered a significant defeat when the US appeals court overturned a ruling forcing coal power plants to reduce harmful emissions. In September, the Republican-led House of Representatives passed the “No More Solyndras Act,” which blocks federal loan guarantees for clean energy projects, and the “Stop the War on Coal Act” which seeks to remove regulations on the coal industry. While neither bill is likely to pass through the Democrat-led Senate or escape a White House veto with Obama at the helm, it has undoubtedly given a boost to those factions backing traditional energy sources.

Mixed renewables news elsewhere

The Office of Management and Budget has announced it will expedite the approval of seven solar and wind energy projects across four western states, totaling almost 5GW. Projects such as the 3GW Chokey/Sierra Madre wind farm in Wyoming and the 750MW McCoy solar park in California will benefit from “a government-wide effort to make the permitting and review process ... more efficient and effective.”

Q3 also saw the US army issue a Request for Proposals for its initial procurement of US\$7b (€5.4b) worth of renewable energy capacity via a series of 30-year contracts.

However, international relations this quarter looked less rosy. In late August, the Chinese Ministry of Commerce concluded that six renewable energy projects in the US are in breach of World Trade Organization rules as a result of illegal subsidies, and has threatened to take legal action if these are not removed.

Uncertainty over wind tax credit remains

The election debates have revealed very different views on the extension of the PTC, a wind-specific tax credit that has played a key role in driving growth in the sector. Obama sees wind energy as a key economic driver and is openly backing the extension of the PTC beyond 2012, while Romney opposes the credit and believes the wind sector is mature enough to survive.

The American Wind Energy Association (AWEA) has forecast that the US wind industry could lose up to 37,000 jobs if the PTC is not extended, and claims 10,000 posts have already disappeared as a result of the uncertainty. Indeed, Vestas has already cut a fifth of its US jobs this year.

In August, the US Senate Finance Committee passed a bill extending both the PTC and the investment tax credit (ITC) by a year, the latter supporting offshore wind projects. However, a full Senate vote will not take place before the election and passage through the House will be more tricky.

The bill also amended the eligibility criteria for the ITC, with projects qualifying from the start of construction rather than service commencement. This is expected to be a big boost to the offshore sector if passed. In other offshore news, Q3 saw the country’s first offshore wind farm, the 468MW Cape Wind project in Nantucket Sound, receive crucial planning approval that should enable construction to begin next year.

Early October saw the US entangled in yet another legal dispute with China, this time over the President’s decision to block the acquisition and development of a wind farm by Chinese-owned Ralls Corp. due to the site being near a US naval facility. The decision, which is being challenged by Ralls, is the first foreign investment to be blocked on national security grounds in 22 years.

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Power deficit and ailing grid shift energy focus

Ranking	Issue 35	Issue 34
All renewables index	4	4
Wind index	3	3
Solar Index	2	2

Source: Ernst & Young analysis

Off-grid power may ease deficit

India is expected to experience a 10% peak power shortage this fiscal year according to a report by the country's Central Electricity Agency, equivalent to around 15GW. The gap between energy supply and demand is partly responsible for the massive grid collapse and the world's largest blackout in July.

The huge power deficit represents a significant opportunity for renewable sources to step in to meet this growing demand for energy, while also increasing the country's energy security by reducing dependence on coal imports. However, the country's poor power infrastructure remains one of the largest threats to the ability of alternative energy to fulfil its potential.

India lacks the transmission and distribution infrastructure to fully integrate renewables and many projects are already struggling to get connected to the national grid. FIT disputes, grid frailties, and connection delays are among the problems, exacerbated by high transmission and distribution losses.

As such, the country will need to focus on overhauling its power infrastructure in the short to medium term if it is to restabilize its energy market and facilitate the connection of additional capacity required to meet the continuously increasing demand for energy in this growing economy. This shift in focus for policy-makers and the energy sector as a whole may mean that renewable energy investment will have to wait its turn.

However, it has also become clear that renewable plants operating through local community grid systems were broadly unaffected by July's blackout. More than a third of India's population have no connection to the central grid, but there are now suggestions that a rapid expansion of distributed generation installations (i.e., off-grid) may be a way to meet increasing demand and ease grid pressures. To date, the Government has given little attention to distributed generation from renewable sources, however, this may be a potential avenue as it re-examines its power infrastructure, although the scale of off-grid projects is inevitably more limited.

Trading on India's renewable energy certificate (REC) market continues to fare well, however, there are some concerns that it may not be trading optimally. Demand for RECs had been relatively low in recent months due to a supply glut and a concern that regulators may not be able to enforce the renewables targets properly. Cash-strapped state-run distribution companies, the main intended buyers, are failing to meet the targets and appear to be relying on government leniency. While REC trading levels are expected to remain relatively robust, failure to enforce non-compliance could undermine the credibility of the mechanism in the long run.

National support for wind is critical

India's wind sector has been relatively subdued over the past six months since the expiry of two key government incentives. The Ministry of New and Renewable Energy has recommended that the Government reinstate the "accelerated depreciation" tax benefit and "generation-based incentive" subsidy, on terms that are potentially even better than those that were in place until March 2012. However, there remains no certainty on whether the measures will be restored, and while 18 of the 25 State Electricity Regulatory Commissions offer FITs, the lack of coherent policy at a national level could continue to hinder future growth of the sector as a whole.

The number of turbine suppliers in India last year almost doubled from two years earlier as a result of surging installations. However, these suppliers may now be forced to consolidate amid increasing competition given the 39% plunge in installations in the first half of the financial year.

However, not all activity has ceased; listed company, Mytrah Energy has announced plans to invest INR300b (€4.32b) to install 5GW of wind power capacity in India by 2018, and the company has already signed wind turbine supply deals with Suzlon and Gamesa worth US\$2b (€1.54b).

Solar packages continue to be rolled out

Q3 saw the state of Andhra Pradesh introduce its first solar energy policy, offering projects completed by June 2014 benefits such as refunds on site registration charges and VAT on equipment. It will also waive transmission fees for using state-owned infrastructure and speed up the approvals process. The rollout of such a comprehensive solar package at a state level is extremely encouraging, although the solar resources here are not as high as in other states.

The Bank of India plans to offer loans to homes and businesses for solar power systems as part of the post-blackout energy reforms. The state-owned bank signed a memorandum of understanding (MOU) with Gautam Polymer's Solar unit to finance lanterns and rooftop panels.

Q3 saw Areva Solar recently commence construction of Asia's largest CSP installation in Rajasthan, a 250MW project on behalf of Indian power company Reliance Power. Meanwhile, First Solar, the world's biggest maker of thin-film panels, is looking to shift its focus toward project development, in particular plants for industrial and commercial consumers.

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Politics continue to cause investor uncertainty

Ranking	Issue 35	Issue 34
All renewables index	6	5
Wind index	5	3
Solar Index	22	20

Source: Ernst & Young analysis

Mixed signals from policy-makers

The biggest challenge faced by the UK's energy sector still appears to be apparently inconsistent policy messages. The recent Cabinet reshuffle has also caused some concerns for the renewables sector, in particular the appointment of an Energy Minister and Environment Minister who, at times, have both been openly critical of certain clean energy technologies.

That energy remains a major battleground was recently highlighted in a particularly embarrassing display. Prime Minister, David Cameron announced that new legislation would force energy companies to give customers the lowest tariffs. However, the Government backed away from this pledge within days, claiming the legislation would simply force companies to inform consumers of lower tariffs.

Q3 also saw the Government acknowledge the lack of detail around its power market reforms. Energy Secretary, Ed Davey stated that the Government will seek powers in the Energy Bill, due a second reading in November, to give the market greater clarity on the Electricity Market Reform (EMR). While this will inevitably be welcomed by the sector, for many the biggest concern remains the lack of connection between UK support for renewable energy and legally binding carbon targets.

More than 50 companies wrote to Chancellor George Osborne in early October to make clear that the absence of a clear decarbonization goal undermines Britain's low-carbon plans. This may have gone some way to spurring the Energy Secretary in early November to call on the Government to agree a 2030 emissions reduction target. However, some policy-makers, including the Chancellor, still see the expansion of gas plants as more critical to the country's energy plans, leaving the prospect of a decarbonization target as uncertain as ever.

Funding receives a boost

More positively, Q3 saw the GIB receive critical approval from the EC after concluding that the £3b (€3.74b) fund did not constitute state aid. However, the revelation that the funds for offshore wind projects would be focused on operating assets as opposed to those under construction surprised many, as the original remit of the GIB was perceived by many to be funding for more risky phases of development.

Further, the inability of the GIB to use its capitalization to leverage private funds means its purpose has again, to some extent, been undermined. As such, the GIB is no longer expected to change the market fundamentally, but it is hoped it will go some way toward minimizing risk to private capital.

Scotland revealed in Q3 that increased subsidies for offshore wind projects will be funded by a 10% cut in tariffs for onshore wind farms and the removal of ROCs for non-CHP biomass projects. Meanwhile, hydropower will continue to receive 1ROC/MWh. The Scottish Government also intends to introduce a ROC banding for deepwater offshore projects.

Future of onshore wind uncertain

Q3 proved to be a trying time for the UK's onshore wind sector, with the Energy Secretary launching a call for evidence on the benefits of the technology to local communities and the appropriateness of subsidy levels from 2014. This coincided with the announcement that Siemens' proposed £210m (€261.60m) turbine factory in Hull has been further delayed until 2013.

However, perhaps the greatest blow was the claim by a junior energy minister that there would be no further expansion of onshore wind, stating that the machines had been "peppered" across the countryside and that "enough is enough." While this sentiment was quickly denied by the Government, the incident has highlighted yet further tensions between policy-makers.

Offshore wind, however, fared better in Q3. EDP Renovaveis has sought permission for a 1.5GW wind farm under round three of the UK's offshore licensing process. The £4.5b project would be the world's largest. In the same period, the Crown Estate awarded licenses for sites off Northern Ireland, including a 600MW wind project to be developed by DONG Energy.

Solar consultation on support levels

The Government has launched a consultation on reduced subsidies for solar projects that are currently eligible for FITs, and are particularly interested in the cost of installations over 5MW. Under the proposals, the rate would fall from the current 2ROCs/MWh to 1.5ROCs from April 2013, eventually reaching 0.9ROCs/MWh by 2016-17. The cuts are a response to higher than expected demand for large solar projects and signal the Government's determination to prevent the solar boom seen in the small-scale solar market.

Biomass capacity cap dropped

Consultation results released in July 2012 confirm the Government's preference for particular types of biomass, causing many developers, including Centrica and Drax, to ditch plans to build or expand dedicated biomass plants in favor of biomass conversion. In the same period, the Government dropped plans that would have capped the number of power plants converting to biomass or using a mixture of feedstock and other fuels should too many companies apply for funding.

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Further legislative amendments to support RE

Ranking	Issue 35	Issue 34
All renewables index	13	13
Wind index	10	11
Solar Index	24	21

Source: Ernst & Young analysis

Eastern Europe's renewables haven

Romania, already the shining star of renewables in Eastern Europe, may benefit further from a slow exodus of institutional investors from Bulgaria following dramatic subsidy cuts in the country. A favorable regulatory environment, combined with a lack of investment outlets in other sectors, has already led to a rapid increase in RE capacity in Romania, although policy-makers should also be alert to the perils of overgenerous incentive schemes in the face of stringent austerity measures.

Further amendments to energy legislation

Since Romania's introduction to the CAI two years ago, the country's legislative framework covering renewable energy has undergone significant development. The amendments to Law 220/2008, which were approved in late 2011 and became applicable earlier this year, have provided strong indications that the renewables market in Romania seeks to mirror the interest of investors in the region, as well as supporting a very attractive GC incentive scheme.

In July, yet further amendments were made to this legislation, including the following key revisions:

- ▶ The introduction of a methodology to identify the benchmark IRR for specific technologies as part of the "overcompensation" assessment principle
- ▶ The creation of a "last resort" guarantee fund mechanism to buy unsold GCs from producers at a price no lower than the minimum legal value (currently €28.17/GC), funded by equivalent payments from those entities that fail to fulfill their quarterly mandatory quota
- ▶ The number of GCs allocated for each technology cannot be decreased before 1 January 2014 for solar projects and 1 January 2015 for other technologies, after which the allocation may be reduced in the case of overcompensation
As an exception to this, power plants with a commercial operations date falling before 1 January 2013 will receive the initially approved number of GCs
- ▶ The obligation on energy supplier to report quarterly the fulfilment of mandatory GC acquisition quotas
- ▶ Power plants less than 10MW will benefit from simplified procedures for authorization

Q3 also saw the introduction of a new energy law (Law 123/2012) as a further step toward the liberalization of the energy market and alignment with EU efforts to harmonize electricity and gas markets across the EU-27.

The new law seeks to ensure that transactions are performed on the competitive market in a "transparent, public, centralized and non-discriminatory manner." However, the obligation of power producers to trade on centralized electricity operator (OPCOM) platforms has caused some concern for clean energy producers, as this limits the possibility of selling power directly through bilateral agreements. An inability to close PPAs may result in some projects becoming unbankable.

The Minister of Economy has, however, admitted that the law is far from perfect. A recent public statement indicates that an amendment to Law 123/2012 was being prepared by the authorities, expected to provide greater clarity and speed up the financing of renewables projects.

Wind market remains active

Wind energy has experienced significant growth since the start of the GC scheme, from just 12MW in 2009 to 1,440MW in September 2012. A further 600MW is currently under construction and expected to come online by the end of 2013.

Q3 saw the Fantanele-Cogealac wind farm become the largest in Europe, with 540MW of the total 600MW now connected to the grid. Project developer, CEZ, is looking to install as much as 1.5GW of wind power in the country by 2016, while France's Filasa International announced in August its intention to invest around €1.4b across 10 wind farms.

Other utilities such as Enel, Steag GmbH, and EDP have also become active in the wind sector, while turbine manufacturer, Vestas, has located its new Eastern European hub in Bucharest.

Solar still playing catch-up

Uptake of solar projects in the country is still relatively slow, with only 5MW of installed capacity. However, the sector is expected to experience significant growth in the medium term due to the attractive incentive scheme (6GCs/MW), shorter construction schedule and smoother development process.

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Climate change law sets Mexico apart but challenges remain

Ranking	Issue 35	Issue 34
All renewables index	21	21
Wind index	25	26
Solar Index	19	18

Source: Ernst & Young analysis

Climate change law implemented

October saw the official implementation of *Ley General de Cambio Climático*, or the “General Law on Climate Change.” The legislation, passed in June this year, is one of the strongest national climate change laws to date and represents a robust foundation for Mexico’s transition to a low-carbon economy.

The law establishes a goal of cutting greenhouse gas emissions by 30% below business-as-usual levels by 2020, and 50% by 2050. It also calls for a major increase in the use of clean energy sources to generate up to 35% of electricity. Other measures include the establishment of a carbon trading market and mandatory emissions reporting by all major economic sectors.

The Government has created a public body to oversee the implementation of the bill – the National Institute of Ecology and Climate Change will involve both the Energy and Finance Ministries, and will help design a decentralized governance model that provides support by coordinating, analyzing and evaluating compliance with the new Climate Change Law.

The law also encourages both government and private sector entities to jointly invest in education, R&D and technical innovation to reduce emissions, as well as setting up tax breaks to increase the financial attractiveness of clean energy.

Barriers

While few doubt that the new climate change law represents a turning point in Mexico’s energy agenda, there are some concerns that the country still lacks a clear regulatory framework for attracting the substantial private investment required to fulfil these ambitious renewable energy and emissions targets. The Government may find that some sort of financial subsidy is still required to make renewables projects cost-competitive with more conventional sources such as gas.

Further, there are some concerns around whether Mexico’s incoming Government is likely to implement much of the climate change reform passed by current President, Felipe Calderon.

President-elect, Pena Nieto, who takes office this December, has publicly affirmed his commitment to fighting climate change, but some believe his Administration is more likely to focus on conventional fuels given increasing shale gas production in the US and the prospect of large recoverable reserves in Mexico. One of Nieto’s main campaign promises had been to reinvigorate oil and gas production by reforming state-owned giant Pemex to allow more private investment.

This, combined with pressure to deliver GDP growth, may take focus away from the renewables sector in the short term. However, it is perhaps too premature to dismiss the potential of the recent energy reforms – the incoming Government has a unique opportunity to establish Mexico as a leading 21st-century low-carbon economy, and only time will tell the extent to which this opportunity is realized.

As of October 2012, Mexico has 74 renewable energy projects in the pipeline, representing around US\$8.60b (€6.66b) of investment, which Mexican authorities believe will encourage significant foreign investment.

Bond market rises from the ashes

July saw a re-ignition of Mexico’s first-time bond issuer market following a two-year drought, due in part to the European debt crisis eroding demand for higher-yielding securities. Spanish construction company, Acciona SA is seeking to issue US\$332m (€256.27m) of debt due in 2013 to finance two wind projects in the country. Established borrowers have increased offerings to take advantage of record-low yields caused by near zero interest rates in other markets. However, Acciona is expected to be successful as a debut issuer due to the fact its wind projects have the backing of the Mexican Government.

Technology news

In July, Gamesa Corp. Tecnologica SA, Spain’s biggest turbine maker, completed a 74MW wind power farm in Oaxaca for Italy’s Enel Green Power SpA at an estimated cost of US\$160m. Meanwhile in late October, three new wind farms (La Venta III, Oaxaca I and Piedra Larga) with a combined capacity of 390MW became operational. The Energy Ministry anticipates the country’s wind power capacity will surpass 1GW by the end of the year and will reach 5GW in two years.

In September, Martifer SGPS SA, a Portuguese construction and energy company, agreed to build a 20MW solar park in northern Mexico, while South Korea’s LG Corp announced that it is considering building a 100MW solar PV plant in Sonora, a state that has an estimated 2GW of solar potential.

In September, Mitsubishi Heavy Industries Ltd. and Mitsubishi Corp. agreed to build a 50MW geothermal power plant for Mexico’s state-owned power company Comision Federal de Electricidad.

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Government measures try to curb tariff deficit

Ranking	Issue 35	Issue 34
All renewables index	16	14
Wind index	25	23
Solar Index	9	7

Source: Ernst & Young analysis

Energy tax hits renewables

2012 has witnessed a series of regulatory changes that have had a serious impact on Spain's renewable energy sector. These changes have one key goal – to control the country's growing electricity tariff deficit, caused by an increase in regulated payments to address the mismatch in power revenues relative to generation and distribution costs. The tariff deficit reached €24b at the end of 2011 and is expected to increase by around €5b if left unchecked.

The first measure taken by the Government in 2012 was the imposition in January of a moratorium on premiums for new renewable projects that have not been registered on the ministry's pre-allocation registry. Plants installed or under construction remain unaffected, as the decree targets new wind, solar, cogeneration or waste incineration facilities.

In March, Royal Decree-Laws 13/2012 and 20/2012 put new measures into law to cut energy costs, while in September, the much anticipated energy reform bill was presented to Parliament after receiving government approval. The reform package includes seven tax measures, the most high profile of which is a 6% flat tax on all electricity generation, including renewable energy. Other measures include a "green cent" tax on carbon-based fuels, ranging from €0.0279/m³ of natural gas to €14.97/tonne of coal, taxes on nuclear plants and a 22% levy on the use of water for electricity production.

While the measures must be debated in Parliament before being implemented, the reform package is expected to generate €2.94b for the Spanish Treasury, and ends six months of regulatory uncertainty around how Spain would address the tariff deficit. It also removes concern that renewables would incur higher tax rates than traditional power; initial drafts had indicated an 11% tax on wind and a 13% and 18% tax on solar thermal and solar PV respectively, compared with an average of just 4% on conventional energy sources.

However, there are still concerns that the renewables sector will have to take a hit from the 6% tax rate (because its retribution is set by law), while the major energy companies using traditional fuels will be able to pass the extra cost onto customers.

Notwithstanding the potential immediate adverse impact on clean energy companies, the latest reform bill at least provides the sector with some sense of certainty in the short to medium term, and indicates the Government is being proactive in seeking to address the financial imbalance in its energy sector. Only time will tell the extent to which these measures successfully deal with Spain's tariff deficit.

Despite this, Spain's renewables sector undoubtedly continues to feel the force of attempts to bring growth under control. Solaria Energia Medio Ambiente SA, Spain's only publicly traded solar company, has said it will begin talks to cut jobs at its factory in Puertollano, in order to "bring resources and labor costs in line with activity in the PV sector." Similarly, Gamesa Corp. Tecnologica SA, Spain's biggest maker of wind turbines, said it will cut 2,600 jobs as part of a business plan that will reduce its size through 2015 and return it to profit next year.

CSP support cut but hope for PV

While the proposed energy bill as a whole does not discriminate against renewables, a specific provision could severely impact CSP projects, which have thus far remained relatively unscathed by subsidy cuts. An apparently inconspicuous clause in the bill indicates the removal of subsidies for CSP plants that use gas as a backup fuel, a measure that is likely to affect most plants in Spain as almost all combine solar energy with natural gas. If approved, it is potentially a significant blow to the development of new CSP plants in the country.

However, it is not all doom and gloom for the solar sector. An increasing number of projects are being planned that do not rely on FITs and seek to compete with wholesale power prices. German renewable energy developer, SAG Solarstrom announced in October its plans to build four solar projects totaling 440MW in Spain's Extremadura region, with the output to be sold through PPAs with utilities. Earlier in the year, Wuerth Solar announced plans to develop a 278MW subsidy-free plant in the Murcia area for €277m, while Gehrlicher Solar intends to develop a €250m solar park in the Extremadura region with 250MW capacity.

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Signs of progress toward ambitious targets

Ranking	Issue 35	Issue 34
All renewables index	35	na
Wind index	38	na
Solar Index	12	na

Source: Ernst & Young analysis

Energy market overview

Being one of the few federal state structures in the region, the UAE enjoys a healthy competitive tension among its seven emirates. This has certainly left its mark on the power sector, with both Dubai and Abu Dhabi, for example, pursuing a slightly different approach to market structuring and regulation.

The Abu Dhabi Water and Electricity Authority (ADWEA) and Dubai Electricity and Water Authority (DEWA) oversee the power sectors in Abu Dhabi and Dubai respectively. Both have experience of attracting private investments in conventional power generation through the use of long-term PPAs. ADWEA has developed four IPPs via joint venture arrangements with international companies, while DEWA has embarked on a program consisting of six IPPs, the first of which was the recently closed US\$1.3b (€1.01b) Hassyan 1 IPP.

In an approach that is fundamentally different from many other MENA countries, the UAE tends to shape its markets not just through independent regulation, but also through the creation of privately structured, government-backed entities such as TAQA and MASDAR. These are able to channel government funds into infrastructure projects through effective partnering with the private sector at a global level, to deliver market-making projects and transactions.

Both local and international banks seem to have an appetite to fund renewable energy projects in the UAE. Giants such as BNP Paribas, Société Générale and the National Bank of Abu Dhabi have recently financed the Shams 1 solar project.

The UAE, however, currently lacks a comprehensive policy agenda and a renewable energy-specific incentive scheme. The UAE is reported to be contemplating the introduction of green tariffs that give companies generating energy from renewable resources the right to feed electricity into public grids, and obtain fixed rates for each kWh produced. If implemented, this policy will undoubtedly improve the UAE's overall attractiveness to cleantech investors.

Renewable energy potential

Realizing the risks of being largely exposed to fuel prices, the Government has effectively sought diversification of its energy mix away from gas and toward clean energy such as renewables and nuclear. The UAE enjoys reasonable renewable energy resources, with an average vertical solar irradiance of 2120kWh/m²/year and an average monthly wind speed of 4.2-5.3 m/s in coastal areas. The UAE is also recognized for its commitment to the global carbon agenda and has planned to reduce its CO₂ emissions by 30% by 2030.

With the above drivers in mind, the announcement of the country's aims to attract AED367b (€77.45b) of investment in alternative and sustainable energy projects by 2020 was no surprise. Both Abu Dhabi and Dubai are targeting the generation of 7% and 5% respectively of total power demand from renewable sources by 2030.

Project and market activity

Unlike many of the GCC countries, the UAE presents strong evidence of its commitment to delivering the renewable energy and carbon reduction targets. The creation of Masdar, the UAE's multi billion dollar investment company signals the Emirate's strong determination to lead in the clean-technology market.

Masdar is to commence commercial operations of its flagship 100MW Shams 1 CSP plant in Abu Dhabi by the end of 2012. The company is also waiting for approval from the executive council of Abu Dhabi for the construction of the 100MW Noor 1 PV plant.

In another strong reaffirmation of the Emirate commitment not only to energy mix diversification, but to the wider carbon and sustainable living agenda, Abu Dhabi launched its Masdar Sustainable City initiative, which will house 50,000 people and will be completely reliant on renewable sources for its power needs, paving the way for carbon-free cities in the region. Dubai has also launched the Mohammed bin Rashid Al Maktoum Solar Park, with a view to establishing 10MW of installed capacity by 2013, and eventually 1GW by 2030. Bids for the first 10MW unit are to be issued in 2012, with the first unit scheduled to become operational in 2013.

Wind has not been left out of the mix either. Sir Baniyas Island wind project, with a capacity to produce 30MW, is expected to be completed in 2013. Plans for a 100MW wind farm near the Saudi border are also being considered by Masdar.

Outlook

The UAE's track record of delivering against plans and growing evidence of a project pipeline is gradually contributing to an increased trust by the international community in the Emirate's renewables program. However, the program still remains highly dependent on government investments in large utility-scale projects, which presents a clear sustainability risk.

Unless the Government translates its ambitions into well-designed market-driven policies and incentive mechanisms that encourage private uptake of renewable generation capacity, this risk could remain a barrier to more long-term growth.

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Power project track record gives strong foundation

Ranking	Issue 35	Issue 34
All renewables index	37	na
Wind index	33	na
Solar Index	14	na

Source: Ernst & Young analysis

Energy market overview

The creation of the Saudi Electricity Company (SEC) has played a cardinal role in the consolidation of a previously highly fragmented power sector. While being partly private, SEC also benefits from a monopoly in transmission and distribution and a quasi-monopoly in generation.

Although Saudi's energy generation mix is almost wholly dominated by fossil fuels, with oil representing around 60% of energy sources and natural gas making up the rest, the Saudi market is still seen as having the potential to attract investments in clean energy. The country hosts several major IPPs and IWPPs, delivered under long-term PPS that are proven to be bankable and have already attracted billions of dollars of domestic and international investment. There is no doubt that previous transactions, albeit limited to conventional energy, represent important precedents and lay the foundation for the deployment of a renewable energy market in the country.

The financing environment is also accommodating, with local banks being fairly liquid based on an average loans-to-deposit ratio of 80%. Further, the pegging of the Saudi Riyals to US Dollars and the low exposure to the Eurozone makes Saudi an attractive market for international lenders. The country has a wealth of project finance experience and has hosted several landmark deals in the energy sector.

Moreover, thanks to the Government's investment in the grid over the last decade, it is believed that Saudi Arabia could provide up to 10% of its total electricity capacity through renewable energy, without significant impact on power quality, according to the PV Group.

Renewable energy resources

The strikingly high solar radiation of around 2,550kWh/m²/year (almost double the average radiation in Germany) and the availability of large stretches of empty desert that can host solar arrays, in addition to the vast deposits of clear sand that can be used in the manufacture of silicon PV cells, makes Saudi Arabia an ideal location for both CSP and PV power generation. While harsh desert conditions, heat and dust can reduce system efficiency, long periods of intense sunshine should help compensate for this.

Unlike many other GCC countries, Saudi Arabia has good wind energy potential, with some 4.9 hours of full-load wind per day on average, one of the highest in the MENA region. Two windy regions exist in Saudi Arabia along the Arabian Gulf and the Red Sea coastal areas.

Policies and plans

Saudi has quickly made it onto the list of focus markets for investors and technology providers, with the Government announcing its ambitious US\$109b (€84.42b) plan to install 41GW of solar and 9GW of wind capacity by 2032, and is consistent with the Government's desire to free up some of its locally consumed oil resources in order to increase exports.

Other strong signals to the market include the King Abdullah City for Atomic and Renewable Energy (KA-Care), the Government's alternative energy arm, announcing its plans to launch a major renewable energy auction, similar to that being undertaken in South Africa.

KA-Care is preparing to invite bids for the first phase of its procurement in the first quarter of 2013. The first round will include 1.1GW of solar PV capacity, 900MW of CSP, 650MW in wind capacity and 200MW from other sources, including geothermal and waste-to-energy.

Developers will be asked to submit proposals for projects >5MW in capacity and will also be responsible for site selection. All of the projects will be developed to be independent power projects with 20-year PPAs, each signed with an IPP.

While the planned auction could potentially revolutionize the shape of the power sector in the region, the lack of previous experience in renewable energy deployment should not be overlooked.

With current installed renewable energy capacity being almost negligible, Saudi still needs to go a long way in building its track record and credibility in the sector.

Further, the success of the procurement program will be largely determined by the attractiveness of the tariffs set by the Government and the robustness of the procurement process, all of which will need to be assessed once more clarity on the program is provided by KA-Care.

Outlook

A strong track record in the development of power projects bodes well for clean energy expansion, especially since the Saudi Government has long demonstrated a substantial commitment to social and economic infrastructure, as well as its desire to free up hydrocarbon fuels for export. Previous successes with IPPs, the established bankability of Saudi PPAs and the relatively liquid financing market are all strong evidence for the country's potential.

The next few months will be crucial for the future of the country's clean energy sector. The extent to which the Government is able to translate its ambitions into a credible project pipeline will largely determine Saudi's position in the CAI going forward.

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Commentary – guidance notes

As stated on page two, the individual technology indices, which combine to generate the ARI, are made up as follows:

- ▶ Renewables infrastructure index – 35%
- ▶ Technology factors – 65%

These guidance notes provide further details on the renewables infrastructure index and the technology factors.

Renewables infrastructure index

The renewables infrastructure index is an assessment by country of the general regulatory infrastructure for renewable energy.

On a weighted basis, the index considers:

- ▶ Electricity market regulatory and political risk (29%) – considers the extent to which markets are fully deregulated and the legislation underpinning the energy sector. This parameter also considers the relative level and consistency of political support for renewable energy, including national targets and financial incentive schemes.
- ▶ Planning and grid connection issues (42%) – favorable planning environments (low failure rates and strong adherence to national targets) score highly. Grid connection scoring is based on the ease of obtaining a grid connection in a cost-effective manner. The score also takes account of the degree of grid saturation for intermittent technologies.
- ▶ Access to finance (29%) – a market with a mature renewable energy financing environment, characterized by cheap access to equity and good lending terms, will score higher. The access to finance parameter incorporates sovereign credit ratings and sovereign credit default swaps in conjunction with qualitative analysis.

This generic renewables infrastructure index is combined with each set of technology factors to provide the individual technology indices.

Technology factors

These comprise six indices providing resource-specific assessments for each country, namely:

1. Onshore wind index
2. Offshore wind index
3. Solar PV index
4. Solar CSP index
5. Geothermal index
6. Biomass and other resources index

Other renewable energy resources include small hydro, landfill gas and wave and tidal technologies. Energy from waste is not considered. Each of the indices consider, on a weighted basis, the following:

1. Power offtake attractiveness (19%) – this includes the price received, including any technology-specific incentives or obligations, the potential price variation and length of PPAs granted. Higher scores are also achievable if a government guarantees the power offtake.
2. Tax climate (11%) – favorable, high-scoring tax climates that stimulate renewable energy generation can exist in a variety of forms and structures. The most successful incentives and structures have been direct renewable energy tax breaks or brown energy penalties, accelerated tax depreciation on renewable energy assets and tax-efficient equity investment vehicles for individuals.
3. Grant or soft loan availability (9%) – grants can be available at local, regional, national and international levels, and may depend on the maturity of a technology as well as the geographical location of the generating capacity. Soft loans have historically been used in pioneering countries of renewable energy technologies to kick-start the industry. High scores are achieved through an array of grants and soft loans.
4. Market growth potential (18.5%) – this considers current capacity compared with published targets, and other qualitative factors based on quarterly developments that provide strong indications around the growth potential of the technology in that country. In conjunction with the qualitative analysis, the score also incorporates forecast capacity levels over a four-year rolling period, based on data from various market sources.

It should be noted that the market growth potential score is based on a view taken of a range of business analysts' forecasts and Ernst & Young's own market knowledge. There is significant variation between analysts' views on each market and the forecasts used are a market view only – the scores in no way guarantee that the forecast capacity will be built.
5. Current installed base (8%) – high installed bases demonstrate that the country has an established infrastructure and supply chain in place, which will facilitate continued growth and, in particular, encourage the repowering of older projects.
6. Resource quality (19%) – for example, wind speeds and solar intensity.
7. Project size (15.5%) – large projects provide economies of scale and a generally favorable planning environment, which facilitates project development financing.

Glossary

Abbreviation	Definition
AD	Anaerobic digestion
ADWEA	Abu Dhabi Water and Electricity Authority
AWEA	American Wind Energy Association
b	Billion
BMI	Business Monitor International
BMW	Biodegradable municipal waste
BNDES	Banco Nacional de Desenvolvimento Econômico e Social (Brazilian development bank)
BNEF	Bloomberg new energy finance
BOP	Balance of plant
CAGR	Compound annual growth rate
CAI	Country attractiveness indices
CEO	Chief executive officer
CHP	Combined heat and power
CSP	Concentrated solar power
DBSA	Development Bank of Southern Africa
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DEWA	Dubai Electricity and Water Authority
EC	European Commission
EMR	Electricity Market Reform
EPIA	European Photovoltaic Industry Association
EU	European Union
FIFA	International Federation of Association Football
FIT	Feed-in tariff
GBI	Generation-based incentives
GC	Green certificate
GCC	Gulf Cooperation Council
GDP	Gross domestic product
GIB	Green Investment Bank
GIB	Green Investment Bank
GW	Gigawatt

Abbreviation	Definition
IPO	Initial public offering
IPP	Independent power producer
ITC	Investment tax credit
IWPP	Integrated water and power plant
m	Million
M&A	Mergers and acquisitions
MENA	Middle East and North Africa
Mtoe	Million tonnes of oil equivalent
MW/MWh	Megawatt or megawatt hour
OEM	Original equipment manufacturers
OPIC	Overseas Private Investment Corporation
PE	Private equity
PPA	Power purchase agreement
PTC	Production tax credit
PV	Photovoltaic
R&D	Research and development
RE	Renewable energy
REC	Renewable energy certificate
RFS	Renewable fuel standard
ROC	Renewable obligation certificate
SEC	Saudi Electricity Company
T	Trillion
TWh	Terawatt hour
UAE	United Arab Emirates
UCO	Used cooking oil
VC	Venture capital
WRAP	Waste and Resources Action Program

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Ernst & Young services for renewable energy projects

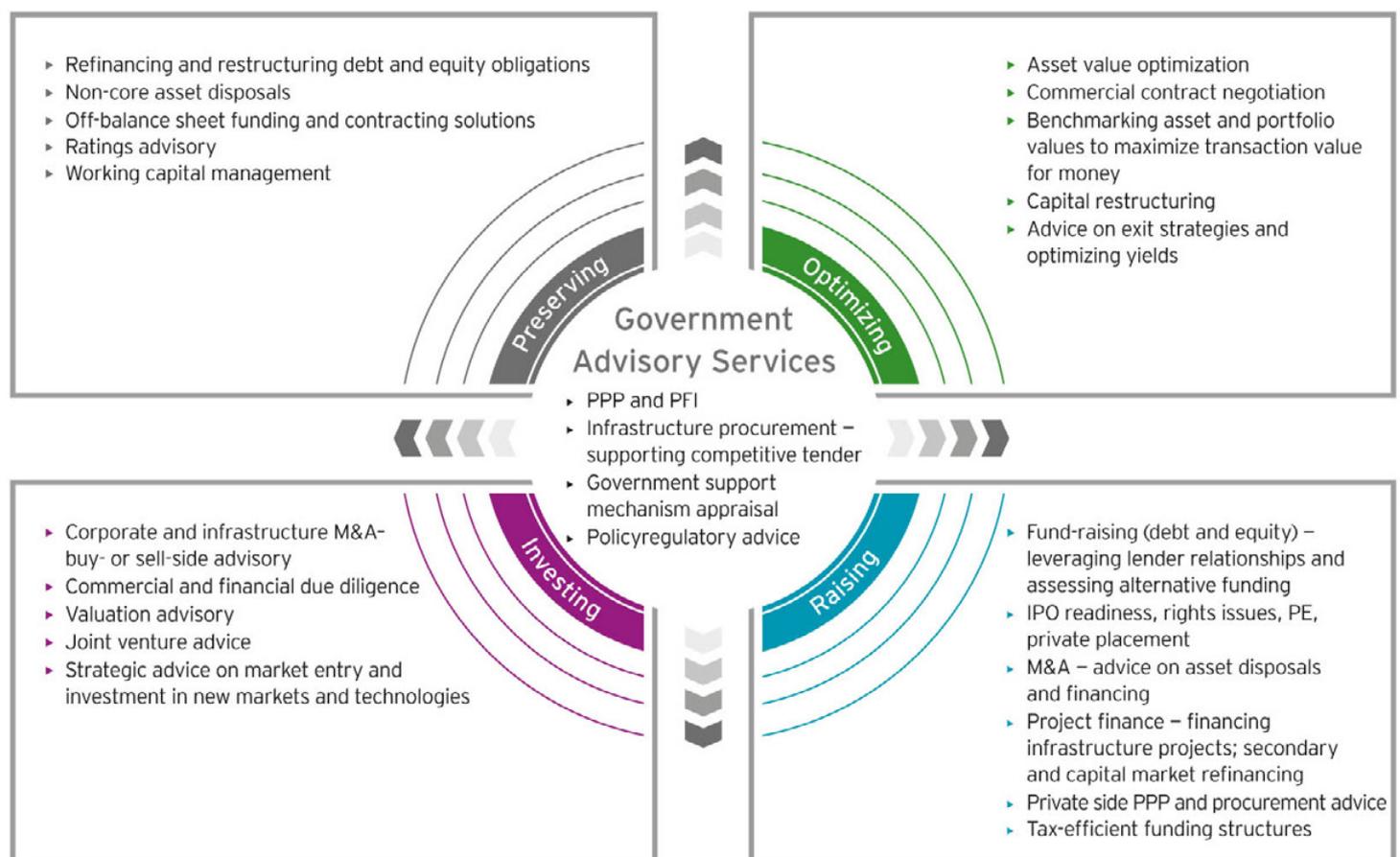
Ernst & Young provides in-depth knowledge and proven expertise for a range of services related to renewable and clean energy technologies. Our offerings can be broadly categorized under four services:

- ▶ Government advisory
- ▶ Project finance
- ▶ Infrastructure M&A
- ▶ Corporate M&A

We work with many businesses and governments worldwide to address the renewable energy issues of today and anticipate those of tomorrow. Our experience spans over more than 20 years, covering every renewable energy technology, energy from waste and decentralized energy generation and energy efficiency.

Our unique expertise and unparalleled track record of delivering successful transactions, enables us to connect buyers and sellers, funders and sponsors, and lenders and borrowers across all corners of the globe.

The diagram below summarizes the key cross-border service offerings provided by Ernst & Young for renewable energy projects.



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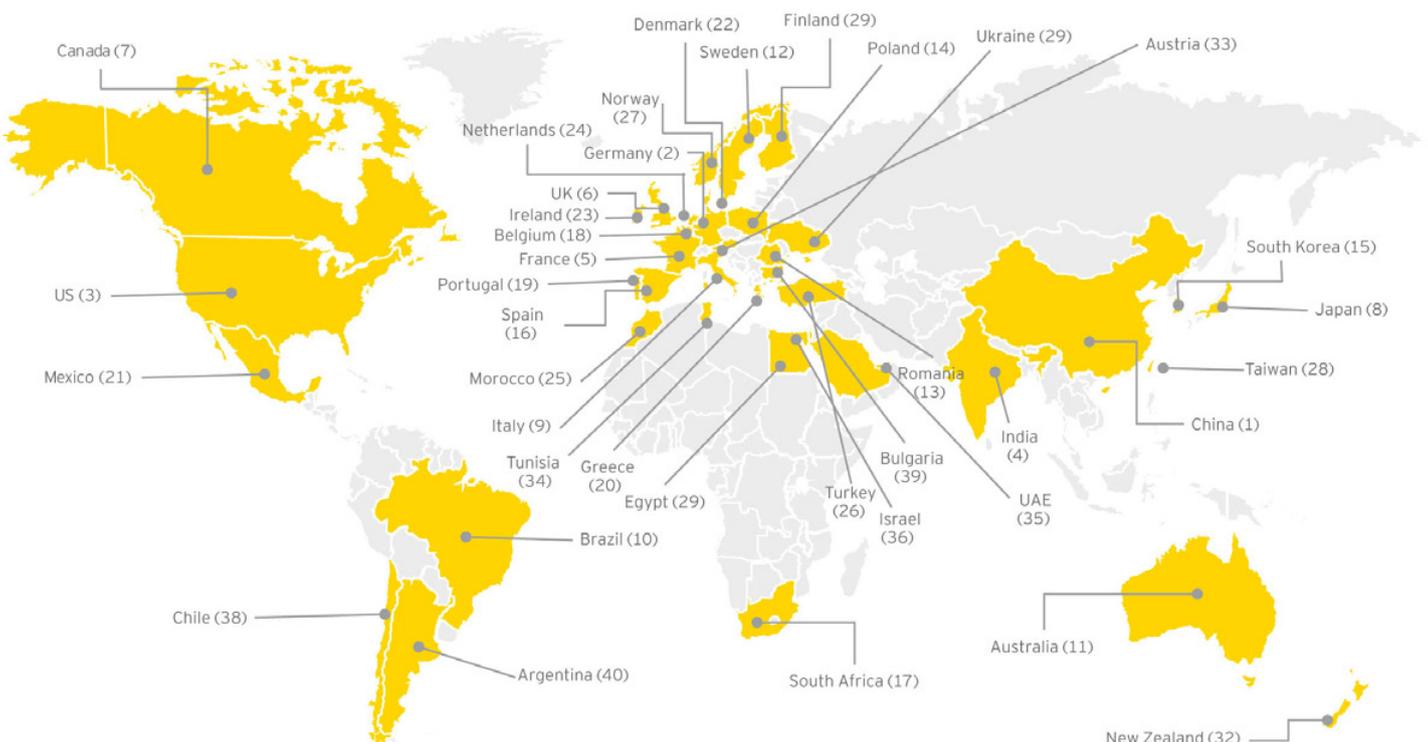
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Map highlighting CAI countries and their respective Issue 35 rankings



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