

RECAI

Issue 38

Renewable energy country attractiveness index

August 2013

The price of biomass

Bio-energy is a critical part of the global energy mix, but where will the funding come from to keep expanding global deployment?

Elevating energy

Is now the time to elevate energy and resource management to a C-suite position with global perspective and remit?

Divide and profit: utility divestment

The recycling of capital by utilities via strategic divestment of renewable energy assets is driving significant M&A activity. But what about the risks and rewards?

Leading the way

As policy makers increasingly look to PPPs to create sustainable support mechanisms, does South Africa's renewable energy procurement program provide a template for success?

Index reshuffle

This issue sees significant movements across our top 10 countries, as Australia falls prey to political tensions and India's support schemes come under fire.



Building a better
working world



August 2013

Renewable energy country attractiveness index

Chief Editor's note



Ben Warren, RECAI Chief Editor

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Adapting to a new norm. Surging electricity demand has made energy security the top priority in some markets, while in others, economic tensions have created a trade-off between rising energy costs and a low-carbon agenda. Governments, corporations, investors and developers are all looking for ways to adapt to this new energy world. Innovation in funding solutions, business models and policy instruments is becoming the norm.

Capital must be found in new places. Increased IPO activity, the recycling of project sponsor funds via strategic divestments and the leveraging of capital markets illustrate that the sector is tapping into new pools of capital in response to constrained balance sheets and a tight project finance market. A 22% quarterly increase in new clean energy investment globally¹ suggests the demand for new capital will not subside.

Meanwhile, revisions to existing incentive schemes continue to cause instability as governments struggle to phase out support mechanisms. An EU energy summit in May highlighted an apparent shift from an environmental to an economic focus, exacerbated by a failing emissions trading scheme (ETS) and a dash for lower-cost (at least in the short term) energy sources, such as coal and gas. Policy makers must find ways to support renewables deployment, including transmission and distribution infrastructure, and encourage investment in fast-response balancing and storage capacity.

A series of recent global pacts and initiatives, many involving China, send strong signals that the energy agenda can transcend national borders, as well as overcome potentially harmful protectionist measures. The increasingly important role of emerging markets in driving renewable energy growth must also not be understated. A recent study revealed that clean energy investments totaled US\$112b and US\$132b in emerging and developed markets, respectively – this gap of just 18% compares with 250% in 2007.² Our "Country focus" section highlights the significant opportunities across a number of new and exciting markets.

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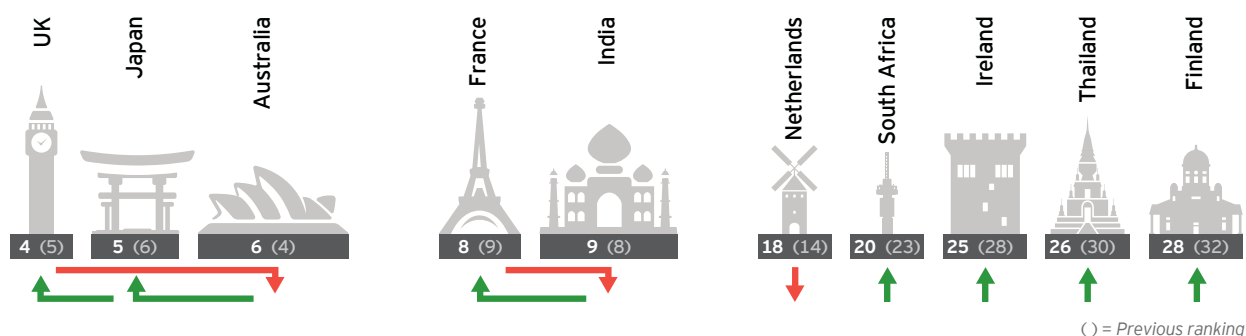
1. *Global Trends in Clean Energy Investment – Q2 2013 fact pack*, BNEF, July 2013.

2. *Global Trends in Renewable Energy Investment 2013*, United Nations Environment Programme and BNEF, June 2013.

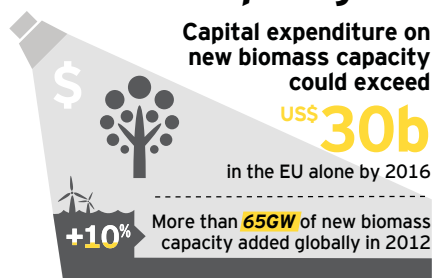
At a glance ...

Innovation in funding solutions, business models and policy instruments is helping the sector adjust to a new energy world.

Key index movements

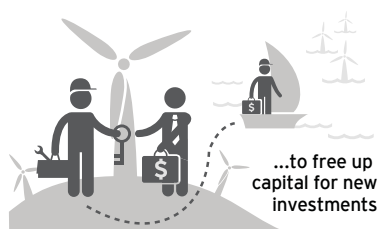


Bioenergy funding back in the **spotlight**



Utilities divest

US\$12b of renewable energy assets in 2012 ... **a third** of all M&A global activity



Quarterly developments:

Where's **"hot"** ...

China
Stands by solar

UK
Details disclosed

US
Green agenda

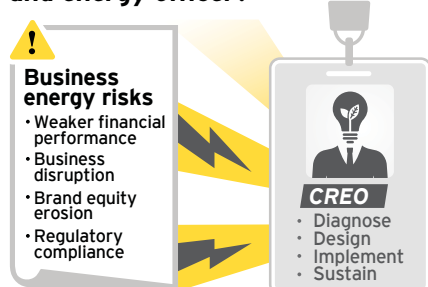
... and **"not"**?

Australia's
Carbon conundrum

Germany
Destabilizes itself

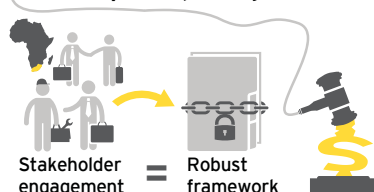
India's
REC wreck

Do you need a **chief resources and energy officer**?



The **public** and the **private**

PPP: creating power offtake certainty while pushing down costs



Summary

An overview of this issue

Do you need a “chief resources and energy officer”?

Resource and energy risks can no longer be ignored. In a world of increasing tension between constrained supply and rising global demand, resource management and energy security must be elevated to the highest levels of executive management through a C-suite position with a global perspective and remit.

Our feature article explores the risks and opportunities that are driving the need for such a role and the various forms this might take. We also look at the four pillars that are likely to define the role – diagnose, design, implement and sustain – and the boardroom questions that will need to be asked if businesses are to identify the opportunities that could emerge out of an energy imperative.



Utility transactions allocate risk and reward

The utility model is changing. Constrained balance sheets and the entry of new investor groups looking for long-term stable yields have galvanized a shift in utilities from asset owners to asset operators.

Utilities pursuing emerging markets and new technologies need to recycle capital, and non-core renewable energy projects with little or no commodity risk are proving to be the most suitable assets to sell for this purpose.

This shift has triggered a wave of divestment activity. In 2012 alone, major utilities worldwide sold around US\$12.5b worth of renewable energy assets.

But this changing model requires a re-examination of the risks and rewards associated with such assets, and where these risks and rewards should sit. Maximizing income certainty and minimizing generation risks have therefore become critical strands of these divestment transactions.

Biomass funding back in the spotlight

With wind and solar accounting for more than 90% of the US\$244b of new renewable energy investment in 2012, it's perhaps not surprising that biomass has been out of the limelight.

But biomass still has a significant role to play in the global energy mix, accounting for more than a tenth of the 650GW of new renewables capacity installed globally last year. So where will the capital come from to continue supporting the deployment of bioenergy?

We look at the challenges faced by the biomass sector and how this is impacting the funding options for both large- and small-scale projects.

The public and the private

Austerity measures combined with the increasing importance of energy security on the political agenda are forcing policy makers to seek more sustainable mechanisms for stimulating capacity deployment.

The result has been increased interest in the auctioning of power-generating capacity through competitive bidding, the ultimate public private partnership (PPP).

South Africa has arguably become the flagship case study for this model, having procured more than 2GW to date, with further rounds under way.

Both the challenges and the successes of the South Africa procurement program should help other policy makers carve out similar mechanisms that are tailored to their needs. We expose some of the key risks and opportunities of the PPP model and consider whether it is a viable model for the future.

Summary

continued

Index top 10 gets shuffled around

Australia has fallen two places in the index, to sixth place. This is partly driven by stronger performances from Japan and the UK but also reflects the impact of political infighting on Australia's decarbonization agenda.

Meanwhile, the UK jumps to fourth place thanks to revised electricity consumption growth projections and an increase in the number of new build asset finance deals. It also reflects greater power offtake certainty following the release of contract for difference (CfD) strike prices in late June.

Japan's renewable energy sector is continuing to grow rapidly as the country climbs to fifth place in the rankings. Solar PV capacity forecasts are up, and a growing number of asset finance deals indicate liquidity in the market. However, grid constraints are starting to hinder deployment of solar capacity in particular.

France took eighth place from India this issue, thanks to a slightly improved macroeconomic outlook and higher electricity demand forecasts. A final decision is also on the horizon regarding the eligibility of France's wind feed-in tariff (FIT), uncertainty over which has significantly hindered the sector's progress in recent years.

Meanwhile, India's various incentive regimes are coming under fire, as a lack of enforcement and oversupply bring the country's renewable energy certificate (REC) market to the brink of collapse. A request for retroactive cuts to solar subsidies by India's biggest solar power-producing state (Gujarat) has sparked unrest, while a court filing is now stalling the country's first wind auction.

Mixed fortunes for our top three markets

In Germany, energy increasingly looks to be one of the key battlegrounds in the upcoming September election. Most political parties favor a reduction in support for renewables in a bid to reduce consumer electricity prices, but the lack of clear policy statements and vague rhetoric about affordability are destabilizing the sector.

Meanwhile, it seems China is looking to create amicable relations with its largest renewable energy rival after signing a climate change pact with the US in June, setting out five clear actions for reducing emissions. Late July also saw China formalize an agreement with the EU that will see anti-dumping duties on Chinese solar panel imports replaced with minimum pricing and an annual capacity quota.



In the US, late May saw the unveiling of President Obama's Climate Action Plan, which set out a variety of clean energy and emissions reduction measures, such as an additional 10GW of renewable energy projects on public lands by 2020. The offshore sector also received a boost, as dates for the first two leasing auctions were set.

Emerging markets continue to generate significant opportunities

Brazil is also experiencing auction fever, with four planned this year. However, wind has been excluded from the A-5 energy auctions amid fears that low prices will crowd out other sources, and given the country's desperate need to increase fossil fuel base-load capacity as hydropower becomes less reliable.

Peru features in our "Country focus" section this issue, having made its debut in the index back in May. A favorable macroeconomic and investment environment, combined with significant untapped potential and a clearly structured auction mechanism, make it an increasingly attractive market within South America.

In the first of our "markets to watch" series, highlighting attractive markets that do not yet feature in the RECAI, we look at the significant energy opportunities in East Africa and the challenges that may be hindering progress in the short term.

Do you need a “chief resources and energy officer”?

The case for elevating the management of energy, water and other critical natural resources to the C-suite

Commodities and natural resources drive roughly 10% of global GDP and underpin the performance of nearly every industry. The world's resources are finite; easily accessible energy sources and commodities are giving way to harder-to-access and more costly alternatives.

The tension between constrained supply and rising global demand – driven by population growth, urbanization and increasing wealth in emerging markets – will continue to rise.

Energy security concerns, rising and volatile energy prices, growing food challenges and water scarcity are creating new risks and opportunities that no business can afford to ignore.

In this context, we believe that there is a compelling case for elevating corporate resource management to the highest levels of executive management through a C-suite position with the global perspective and remit to manage resource risk strategically – call it a chief resources and energy officer (CREO).

Why a CREO: growing risks and value-creation opportunities

Corporations face a set of resource and energy risks that are becoming more acute:

- Weaker financial performance from commodity price exposure
- Business disruption
- Brand equity erosion
- Regulatory compliance

Naturally, companies in different market segments are at varying stages of reckoning with these challenges. Those in resource- and energy-intensive industries, such as mining and transportation, have been among the first to recognize and respond proactively to these risks. Companies in other sectors have been slower to recognize them because the risks derive primarily from their supply chains or from their customer bases.

How best to orient a company's executive leadership to minimize these risks and exploit related opportunities is a complex question. Managing resources and energy on a global scale – dealing with often complex regulatory and tax regimes in multiple jurisdictions, addressing the different resource contexts of each facility, understanding the most cost-effective and reliable local energy sources – is not simple.

As energy and resource anxieties rise, the strongest argument for dedicating an executive to focus on these issues goes beyond simply avoiding these risks, to the challenge of transforming them into opportunities. Left untended, resource and energy constraints pose great risk to business operations. Conversely, companies that are well prepared for shortages and price volatility can leap ahead of less well-prepared rivals.

The full version of EY's white paper, *Do you need a chief resources and energy officer?* will be available on ey.com/cleantech from 5 September 2013.



CREO: a new position or just a new role?

This risk environment argues for a heightened focus on resources and energy at the C-suite level. Yet a number of factors work against strategic resource and energy management:

- Operational complexity multiplying faster than a manager's capacity to keep pace
- Gaps in knowledge and responsibility leading to fractured understanding of a company's resource footprint

- Lack of high-level focus on these cross-functional issues leading to missed efficiency and savings opportunities

Hence the question: do companies need a new C-level executive whose sole focus is to tend to the strategy and operations related to energy, water and other critical resources? In most cases, the answer is likely to be no, at least in the near term. But even then the role must be assumed by one or more of the existing C-suite executives.

Resource and energy risks	Value-creation opportunity
Weaker financial performance ▸ Increased financial costs, lost sales due to rising input prices and resource shortages ▸ Impact on second-order derivatives, such as logistics, capital equipment and supply chain costs	▸ Reduced long-term costs from fixing against current prices and improved ability to plan ▸ Advantage over less resource-efficient competitors during shortages or spiking prices
Business disruption ▸ Lack of resource and energy security ▸ Supplies of raw materials and energy constrained for political, market or natural disaster reasons	▸ Enhanced energy security through energy mix optimization and on-site or adjacent-site solutions ▸ Uninterrupted operations, enabling uninterrupted sales
Brand equity erosion ▸ Failure to meet stakeholder expectations related to the use of energy and resources ▸ Failure to meet customers' business continuity or sustainability expectations	▸ Brand equity enhanced from resilient operations and robust sustainability initiatives ▸ New business opportunities from companies that prioritize the same issues and mandate sustainable suppliers
Regulatory compliance costs and potential penalties ▸ Regulatory exposure from CO₂ emissions, waste streams and water use ▸ License to operate at risk	▸ Potentially lower carbon allowance costs and reduced landfill/sewage charges from emissions reduction initiatives ▸ Improved efficiency resulting from the discipline of measuring, managing and reporting on key resource performance indicators



CREO models

A variety of CREO models are emerging with the common theme of empowering cross-functional resource management – from raw materials in the supply chain, to green building technology, to enterprise data management and stakeholder reporting. Models for the CREO role include more empowered versions of the existing C-suite positions:

- ▶ **Chief sustainability officer** with authority beyond moral influence to make operational decisions
- ▶ **Chief operations officer** with a broad view of resource risk and understanding of resource reporting requirements
- ▶ **Chief financial officer** extending financial risk management and reporting competencies to resources and energy (especially in light of growing movement toward integrated reporting)
- ▶ **Chief information officer** bringing a focus on productivity and data management to the enterprise-wide resource data collection and analysis
- ▶ **Executive management board** focusing on resource and energy strategy, taking a cross-functional approach backed by the authority of the CEO

The key commonality among these models is that the CREO has the authority to implement change across the enterprise.

Defining the CREO role

Capital markets' expectations often incentivize companies to prioritize revenue growth before operational savings. Corporations typically subject improvements in energy costs to the same hurdle rate as top-line revenue growth. As a result, upgrades to energy and resource efficiency are often passed over, despite delivering virtually guaranteed, recurring returns.

Cultivating an effective CREO requires support from a CEO and board of directors who are advocates for the long-term benefits of resource efficiency and willing to give equal weight to cost saving and revenue growth in corporate planning.

It follows that this role is best filled by a seasoned veteran fluent in data-intensive analysis and able to delve into widely varying operational areas – from raw materials in the supply chain, to green building technology and data center design.

The duties of a would-be CREO will naturally vary from business to business. However, based on our work with large companies, the agenda of the CREO can be framed as follows.

Diagnose

While companies usually have a good understanding of their first-order resource and energy risks, most do not have good visibility into such risks farther down into their global supply chains. A CREO must diagnose the company's current and anticipated resource and energy use and related risks, engaging with business units, suppliers, customers and stakeholders as well as benchmarking against peers.

Design

With a clear assessment of a company's resource and energy profile, the next step is to design an improvement agenda. Risks are location-specific. Energy, water and resource prices tend to vary by region. A CREO's challenge is to optimize resource and energy procurement and consumption market-by-market, mapping alternatives and designing integrated improvement initiatives.

Implement

To optimize a company's capital stock and increase shareholder value, the CREO's team must comb through the portfolio of equipment, real estate and energy services

agreements to identify specific improvement opportunities and implement savings where possible.

Sustain

Sustaining the benefits of resource and energy optimization requires continuous measurement and improvement. It also requires cultural change in the organization and its supply chain. Evangelizing the adoption or modification of these goals by colleagues and partners may prove the greatest challenge.

A CREO's job, in this respect, is aided by the fact that many of these changes reduce costs and will therefore benefit the bottom line. Also, corporate sustainability programs show that workers have a strong emotional connection to efforts that improve the environment. While CREO initiatives can be complex to roll out, organizational support is often high.

Developing the CREO role

The CREO role requires a diverse – and currently rare – set of skills. The precise blend of qualifications for the role will vary by company, but it is safe to say that qualities of a successful CREO include being:

- ▶ Data savvy
- ▶ Knowledgeable about energy resource markets and options
- ▶ Aware of the different resource contexts in which the company operates globally
- ▶ Experienced in corporate project development
- ▶ Adept at innovating new corporate processes and approaches
- ▶ Familiar with emerging resource and energy technologies
- ▶ A big thinker who can not only find savings but also new opportunities

The next several years are likely to see a formalization of this role as it becomes more widely recognized as boosting competitiveness and as grounded in a particular skill set. While a pool of professionals with varying combinations of these skills is developing in diverse companies across the economy, the CREO is most likely to come from within for the near term due to the specialized company knowledge required.

Now is the time, therefore, for boards and C-level leaders to become more sophisticated in their understanding of the potential contribution of a CREO.

Resource and energy imperative

There is little debate that most companies face rising risks from less predictable, costlier and scarcer resource and energy supplies. Depending on the sector, companies are responding to that challenge with varying degrees of in-house expertise. Yet in all cases, an evaluation of the need for, and potential role of, a CREO will prove a revelatory exercise, regardless of the outcome.

After all, if a company pays close attention to energy and resource issues, it's good for the bottom line. It's not either efficiency or profits, it's both.

Given rising resource and energy risks, business leaders should no longer be wondering whether they ought to prioritize these issues. Rather, they should begin to answer the questions, **Who** will lead this effort? **How** will they lead it? and **When** do we start?

Boardroom questions

- ▶ Do we have defined resource and energy targets? Are we on track to meet them?
- ▶ What would be the financial and operational impact of an abrupt change in the price or availability of resources and/or energy?
- ▶ What would be the impact on our operations of disruptions of materials and basic inputs to our second- and third-tier suppliers?
- ▶ Do we have sufficient skills to assess global energy and resource trends, risks and potential solutions?
- ▶ Given existing resource demands and anticipated intensification of resource scarcity, does a current executive have the capacity to extend his or her mandate?

Key developments

Country-specific highlights

Hot



China stands by solar. The Government stepped up efforts to support its flagging solar sector by urging lenders to ease financing constraints and awarding tax breaks to companies using M&A to reorganize their operations. It has also increased its 2015 domestic solar target by 67% to 35GW and is promoting market competition through consolidation and overseas investment. June saw the launch of an ETS in Shenzhen, the first of seven pilot schemes in anticipation of a national rollout in 2015.

UK details disclosed. The UK Government ended months of speculation by releasing the proposed strike prices for its new CfD mechanism. It also received 18GW of applications under its "final investment decision" program, which will qualify some large-scale projects for CfDs ahead of the electricity market reform (EMR) becoming law, in order to avoid a major project gap. Late June also saw the Green Investment Bank (GIB) receive an additional £800m (US\$766m) and increased borrowing powers. (See article on page 22.)

US green agenda. Measures set out in Obama's Climate Action Plan include an additional 10GW of renewable energy projects on public lands by 2020 and increasing the renewables share of federal power procurement to 20% by 2020 from 7.5% now. It also reaffirmed the need to increase the FY14 budget for clean energy R&D by 30% to US\$7.9b. In other news, the first two offshore lease auctions representing 5.5GW of capacity have been scheduled for 31 July and 4 September.



Not

Australia's carbon conundrum. New Prime Minister Kevin Rudd wants to scrap the fixed carbon price a year early to lower energy prices. But the move would cost A\$3.8b (US\$3.5b) and take the price of carbon from A\$25 (US\$23) to just A\$6 (US\$5), potentially delaying investments. Bloomberg New Energy Finance (BNEF) predicts oversupply could result in carbon units being sold 40% below the EU price. May's budget saw A\$370m (US\$339m) set aside for renewables deferred until after 2020 and the loss of A\$260m (US\$239m) of funding for energy efficiency and large solar programs.

Germany destabilizes itself. Despite strong public support for a green economy, rising political tensions prior to September's election are paralyzing investment in the sector. Calls to reform the FIT scheme ignore the relatively small impact of new renewable plants on the consumer surcharge, while rhetoric about the "affordability" of Germany's energy supply has not translated into policy statements. In related news, the European Commission is examining whether the exemption of energy-intensive industries from the renewables surcharge constitutes state aid.

India's REC wreck. India's REC market is facing collapse due to insufficient enforcement and falling renewable costs, leaving developers with 2.1 million RECs and no buyers, and funders shunning projects heavily reliant on REC revenues. Meanwhile, Gujarat's electricity regulator is seeking permission to cut its solar tariff retroactively by 28% to avoid windfall gains for developers, potentially impacting 970MW of solar capacity. In Rajasthan, a court filing has stalled the country's first wind power auction, which would have added 1.2GW of capacity.

Key developments

Deal, investment and policy highlights

Trade war stalemate lifted. Late July finally saw an “amicable solution” that will see the EU replace anti-dumping tariffs on Chinese solar imports with minimum price and quantity limits. The accord will fix a minimum price of €0.56/watt (US\$0.74) and establish an import quota of 7GW per annum. The move comes after the EU announced provisional duties of 37.3%-67.9% in early June but imposed a lower rate of 11.8% through July and August to expedite talks with Beijing.

US and China join forces. In early July, a five-point action plan to reduce greenhouse emissions was signed by China and the US, the world’s largest polluters. The agreement is due to be implemented in October and will cover the promotion of energy-efficient buildings, reduced emissions from heavy-duty and other vehicles, developed carbon capture and storage technology, improved climate change data and the rollout of smart grids.

IPOs go deep. As conventional exit routes remain stifled by constrained balance sheets, developers and infrastructure funds are looking to deeper pools of capital in the public markets. Late July saw Renewables Infrastructure Group Ltd. raise £300m (US\$460m) to become the UK’s biggest clean energy IPO, while in Brazil, CPFL Renovaveis, the region’s largest wind farm owner, raised BRL900m (US\$404m) to fund new wind and solar projects. In the US, a unit of NRG Energy, the country’s largest independent power producer, raised around US\$430m in an IPO, after pricing its shares above the targeted range.

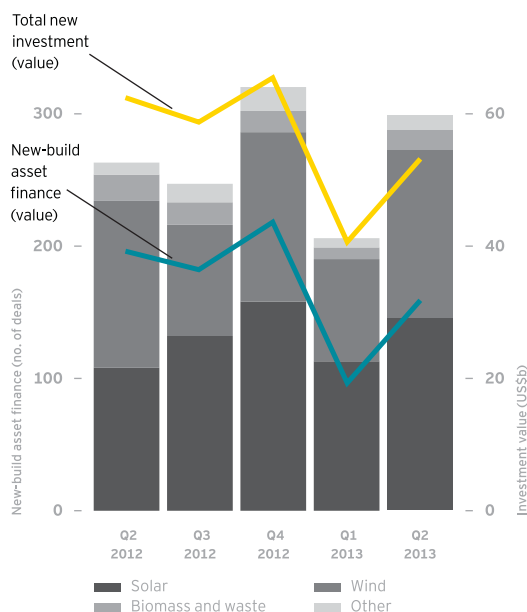
Buffett goes big. In late June, Solar Star Funding LLC, part of Warren Buffet’s MidAmerican Energy Holdings Co. group, completed a US\$1b notes offering to fund the ongoing construction of 579MW of solar capacity in California. The 5.375% notes offering is claimed to be the largest-ever single project bond financing for solar. Meanwhile, the group’s power unit, Berkshire Hathaway Inc., is to buy NV Energy for US\$5.6b, taking advantage of Nevada’s significant natural resources and helping the utility transition away from coal.

Tough times for German solar. After filing for insolvency on 5 June due to severe liquidity constraints and the inability of lenders to agree on a short-term implementation plan, Conergy AG – once Germany’s biggest solar company – has been acquired by Miami-based private equity firm Kawa Capital Management for an undisclosed sum. Meanwhile, Siemens announced in late June that it would close its solar power unit after struggling to find a buyer following losses of at least €784m (US\$1b) since 2011.

New clean energy investment worldwide, Q2 2013

Quarterly investment of US\$53.1b is up 22% on Q1, but cumulative investment in 2013 is still running below the comparable period in 2012.

The quarter-on-quarter increase was driven largely by the US, where investment jumped 155% to US\$9.5b after a weak Q1, and also China, where Q2 investment was up 63% at US\$13.8b. Meanwhile, South Africa generated US\$2.8b of investment in Q2, up from almost nothing in Q1.



Source: Global trends in clean energy investment – Q2 2013 fact pack, BNEF, July 2013.

Global view

Emerging markets step up large-scale deployment while Europe struggles to find its feet.

North America

- ▶ In Canada, **Ontario's** large-scale FIT is to be replaced with a competitive bidding process that will increase the involvement of communities and municipalities.
- ▶ Meanwhile, **Quebec** has finally launched a fourth round of wind tenders, seeking 800MW of capacity, and the controversial US\$5.3b Keystone XL oil pipeline is prompting officials in **Alberta** to accelerate renewable energy efforts. (See article, page 24.)
- ▶ In the **US**, the flagship US\$2.6b Cape Wind offshore project is edging closer to construction after securing a further US\$200m in mezzanine debt from PensionDanmak. For the broader US green agenda, see our "Key developments" section (page 10).
- ▶ In early June, **Mexico** unveiled a National Climate Change Strategy that set out targets for the next 40 years, including the somewhat ambitious goal of slashing carbon emissions 50% from 2000 levels by 2025. The plan sets out eight action points, including accelerating Mexico's transition toward cleaner energy sources.

South America

- ▶ **Brazil** has set the stage for four capacity auctions this year, although wind projects will be excluded from some amid fears low prices will crowd out other sources. Solar will make its auction debut but is unlikely to flourish. Meanwhile, wind developers are facing rising costs and strict domestic content rules are forcing manufacturers to reassess the market. (See article, page 28.)
- ▶ In **Chile**, private equity firm Actis and Mainstream Renewable Power have established a JV to develop 600MW of wind and solar projects with an estimated US\$1.4b. The Government has also approved five solar plants totaling 300MW, to be developed by China's Sky Solar at a cost of US\$1.1b.

Europe

- ▶ Late July saw the **Czech Republic's** Ministry of Industry and Trade approve legislation that will effectively axe support for new renewable projects from 2014. Meanwhile, the energy regulator will bring charges against two solar producers it claims benefited illegally from subsidies, and it plans to investigate as many as 180 energy providers.
- ▶ An opinion by the Advocate General of the European Court of Justice that **France's** wind FIT breaches EU laws on state aid brings the sector one step closer to getting a final decision that will force the Government to implement a new legally sound incentive scheme and end years of uncertainty.
- ▶ In mid-May, **Greece** approved solar subsidy cuts of around 44% in a bid to curb record installations in Q1. The reductions took effect on 1 June but apply retroactively to all plants installed after 1 February 2013. The rates are now €95-€125/MWh (US\$125-US\$165/MWh) depending on project size.
- ▶ **Italy** will no longer grant FITs for new solar PV projects after reaching its subsidy limit of €6.7b (US\$8.9b) on 6 June. Meanwhile, grid operator Terna signed a

Europe (continued)

€570m (US\$753m) loan agreement with the EIB in July to partially fund its €1b (US\$1.3b) transmission project that will bolster the integration of renewable energy projects.

- There's more bad news for **Spain** as the Government's latest energy reform package replaces renewable FITs with a scheme that will only guarantee a "reasonable profitability," capped retroactively at 7.5% before tax. There are fears the latest cuts will drive many project developers to bankruptcy.

- In **Poland**, the renewables sector continues to express impatience and disappointment that the Government has not yet established a comprehensive system of support. This is even more critical in light of a recent report by EY on behalf of the Polish Wind Energy Association, which found that Poland could generate more than US\$20b for its economy through the build-out of 6GW of offshore capacity.

- Political unrest in **Turkey** does not appear to be slowing progress in the solar sector, as June saw

developers submit applications totaling almost 9GW for the 600MW of permits on offer in the first round of bidding for solar-energy licenses. Turkey's biggest wind farm began operations in mid-May. The 142.5MW project was financed via a €135m (US\$175m) syndicated loan arranged by the EBRD.

- For **Germany** and the **UK**, see our "Key developments" section (page 10).

Asia Pacific

- In **Japan**, grid constraints are threatening to severely slow the pace of solar deployment. A decision by Hokkaido Electric Power to limit solar capacity connections to 400MW means more than 1GW of applications already received will likely be refused. In more positive news, Goldman Sachs Group Inc. intends to invest JPY50b (US\$487m) in clean energy projects over the next five years, and up to JPY250b (US\$2.4b) in project finance loans.

- Late July saw **Thailand** announce plans to increase the proportion of electricity generated from renewable sources to 25% over the next 10 years, and the country's 2021 target renewable capacity will increase 51% to 13.9GW.

- In **New Zealand**, Genesis Energy has received consent to take forward its ambitious 860MW Castle Hill wind project, the country's largest proposed wind farm to date. However, oversupply of energy in the country means the utility has no immediate plans to start construction.

- For **China**, **India** and **Australia**, see our "Key developments" section (page 10).

- For **South Korea**, see the article on page 26.

Middle East and Africa

- **Morocco** has shortlisted bidder groups for its two CSP tenders, comprising a 200MW facility using parabolic trough technology and a 100MW tower technology plant. The sector also received a boost as Germany's environment ministry announced plans to support solar projects in the country with a further €650m (US\$842m) of funding over the coming years.

- **South Africa's** public procurement program continues to see more projects reach financial close. A JV comprising Tata Power Co. and Exxaro Resources Ltd. completed US\$700m of funding for two wind farms totaling 229MW in June. Meanwhile, Investec plc confirmed in late July that it will provide US\$813m in debt funding for wind and solar projects for round three of the procurement, which is currently under way and expected to be oversubscribed.

- **Saudi Arabia** has initiated a program to measure renewable power generation potential across the country. It will install at least 70 stations testing a variety of natural resources, and it aims to publish a resource map later this year to guide investors and developers on suitable sites.

Our index

RECAI scores and rankings at August 2013

(See page 34 for individual technology indices.)

Rank	Previous ranking	Market	RECAI score	Macro drivers			Energy market drivers			Technology-specific drivers		
				Macro stability	Ease of doing business	Total	Prioritization of renewables	Bankability of renewables	Total	Wind	Solar	Other technologies
1	(1)	US	75.4	64.8	71.1	68.6	57.6	76.0	68.7	68.8	78.0	52.9
2	(2)	China	71.9	67.5	46.3	54.7	60.6	63.4	62.3	76.7	79.6	58.4
3	(3)	Germany	69.6	75.6	61.5	67.1	70.1	74.0	72.4	58.4	59.6	45.9
4	(5)	UK	62.1	79.2	76.4	77.6	59.5	69.8	65.7	58.8	38.9	36.0
5	(6)	Japan	61.8	73.0	61.0	65.8	61.4	69.1	66.0	43.7	56.8	49.4
6	(4)	Australia	61.3	83.7	73.2	77.4	57.3	65.1	62.0	46.2	57.2	35.0
7	(7)	Canada	59.3	80.8	74.3	76.9	52.1	63.1	58.7	52.5	46.1	46.1
8	(9)	France	56.9	71.5	60.9	65.1	53.5	63.1	59.3	47.3	48.3	39.0
9	(8)	India	56.2	54.1	37.2	44.0	61.6	52.6	56.2	50.5	60.6	46.0
10	(11)	Italy	54.4	46.6	45.2	45.8	63.4	65.7	64.8	37.3	50.3	44.4
11	(10)	Belgium	53.0	68.2	77.7	73.9	64.5	58.0	60.6	42.5	35.7	29.3
12	(12)	South Korea	52.2	67.7	61.2	63.8	64.9	53.3	57.9	39.9	41.7	38.9
13	(13)	Spain	51.7	53.6	57.5	55.9	54.4	65.8	61.2	36.0	45.5	27.8
14	(16)	Denmark	51.3	79.5	73.9	76.2	60.6	61.2	60.9	46.0	24.9	28.5
15	(15)	Brazil	50.9	53.6	38.2	44.3	50.6	51.8	51.3	47.4	46.9	60.8
16	(18)	Chile	50.8	77.2	73.6	75.0	65.0	55.0	59.0	32.8	40.1	33.0
17	(19)	Portugal	50.6	46.4	65.6	57.9	57.0	59.5	58.5	37.6	41.0	35.1
18	(14)	Netherlands	50.5	74.8	63.0	67.7	63.7	56.7	59.5	43.7	29.3	29.7
19	(17)	Sweden	50.4	83.6	73.5	77.6	61.1	59.5	60.2	45.0	20.9	39.5
20	(23)	South Africa	48.5	63.0	61.6	62.1	49.6	48.4	48.9	37.9	49.6	26.2
21	(20)	Austria	48.1	72.5	68.5	70.1	65.3	56.0	59.7	31.9	31.9	35.9
22	(22)	Taiwan	47.8	70.5	63.2	66.1	47.5	58.5	54.1	32.5	40.9	31.2
23	(21)	Poland	47.6	67.2	56.3	60.7	61.9	56.7	58.8	39.0	28.0	31.8
24	(24)	Turkey	47.3	54.0	52.2	53.0	53.0	50.2	51.3	41.6	37.4	39.4
25	(28)	Ireland	46.5	67.5	69.7	68.8	65.3	60.5	62.4	42.2	15.5	24.2
26	(30)	Thailand	46.4	58.3	69.8	65.2	52.7	52.2	52.4	25.9	46.7	29.4
27	(26)	Peru	46.2	60.7	67.1	64.5	46.7	54.8	51.6	27.7	42.0	44.3
28	(25)	Norway	45.9	79.1	76.0	77.2	53.7	59.0	56.9	42.8	13.8	37.4
28	(32)	Finland	45.9	80.4	71.1	74.8	59.3	62.0	60.9	41.3	12.8	31.2
30	(29)	Mexico	45.2	57.6	58.1	57.9	50.7	48.6	49.4	37.9	36.5	29.8
30	(27)	Israel	45.2	71.4	69.4	70.2	58.1	53.0	55.0	20.4	45.7	18.2
32	(31)	Morocco	44.9	53.4	45.7	48.8	56.5	49.7	52.4	36.1	40.8	12.9
33	(33)	Romania	43.5	50.6	50.1	50.3	57.3	50.3	53.1	36.3	31.2	22.2
34	(36)	Bulgaria	41.2	55.5	56.1	55.9	56.0	43.1	48.2	29.7	34.6	24.0
35	(34)	Czech	41.1	62.8	56.1	58.8	57.8	46.7	51.2	26.9	31.2	28.3
36	(37)	Slovenia	40.6	56.4	56.2	56.3	66.1	48.3	55.4	18.9	33.2	31.7
37	(40)	Greece	39.7	31.6	37.9	35.4	52.3	33.7	41.1	33.9	47.6	27.2
38	(38)	Saudi Arabia	39.6	64.6	72.0	69.0	43.4	43.8	43.6	16.6	51.0	3.7
39	(35)	New Zealand	39.3	85.8	78.5	81.5	55.1	50.8	52.5	32.7	14.0	17.6
40	(39)	Ukraine	39.0	37.8	33.9	35.5	47.0	38.5	41.9	35.7	39.8	28.4

Index highlights

The release of updated forecasts for a number of our key scoring indicators, most notably macroeconomic variables and electricity demand projections, has enabled us to shift forward our outlook horizon, as well as confirm actual 2012 performance.

Despite a slightly improved score, **Australia** has dropped from fourth to sixth place, due to bigger score increases for the UK and Japan. Australia's higher electricity consumption score has been offset by the impact of political infighting on the country's decarbonization agenda.

The **UK** achieved moderate score uplifts across most categories, notably electricity consumption growth and an increase in the number of new build asset finance deals.¹ The release of additional EMR details reduces uncertainty and boosts power offtake attractiveness.

Japan's uptick to fifth place mainly reflects a shift from negative to positive electricity demand growth, increased solar PV capacity forecasts and greater liquidity in the asset finance market. However, Japan's infrastructure score has been marked down to reflect grid restraints that could hamper medium-term solar deployment.

France and India have switched places this issue. France's eighth-place position reflects a much improved energy demand growth outlook, lower inflation and higher capacity forecasts for offshore wind. The near-final ruling on the country's FIT program should also provide more power offtake certainty in the long run.

India's macroeconomic outlook remains strong, and capacity forecasts for onshore wind and solar PV have increased for our four-year outlook period. However, the threat of retroactive subsidy cuts for solar, a stalled wind tender and a REC market close to collapse have negatively impacted the country's power offtake attractiveness.

Italy has replaced Belgium in 10th place. While Italy officially ended subsidy support for solar from 6 July, our scoring already accounted for various downward revisions to support over the past 12 months, thereby

reducing the impact. More positively, projected long-term bond yield rates and short-term interest rate volatility have both decreased, while electricity demand growth has increased slightly.

Denmark has risen two places in the index thanks to a score reduction for the Netherlands and a relatively modest uplift for Brazil. Denmark also saw inflation projections fall, and a large M&A deal increased average project size from just US\$2m to US\$319m.¹

The **Netherlands'** fall to 18th position was primarily driven by the rise of Chile and Portugal, although it also experienced a dramatic fall in financing and M&A activity.¹ Meanwhile, an increased sovereign credit rating to AA+ and an ever-increasing wind and solar project pipeline sees **Chile** continue its ascent up the index to 16th place.

Portugal now sits in 17th position thanks to lower inflation and long-term bond rate projections, and reduced short-term interest rate volatility. Total new build asset finance deal values have surged, increasing to around US\$1.8b from US\$200m.¹

South Africa has jumped three places to 20th, after a sovereign credit rating upgrade to A- from BBB and a fall in projected long-term government bond yields. The number of new build asset finance deals has also increased, taking total deal value to US\$7.5b from US\$5.4b.¹

An improved macro outlook takes **Ireland** up three places to 25th, while lower interest rate projections and an increase in foreign direct investment as a proportion of GDP signals a stronger finance and investment climate.

Thailand's jump to 26th place mainly reflects sovereign credit rating uplift from BBB+ to A-, and a significant increase in onshore wind and solar PV projections for the outlook period. **Finland** also benefited from higher onshore wind projections and higher electricity demand growth in the revised forecast period.

Greece has managed to escape the bottom spot this issue, jumping to 37th position thanks to higher GDP and electricity demand projections, lower average credit default swap prices and an increase in the proportion of total electricity generated by renewables.

1. In the 12 months to 30 June, compared with the 12 months to 31 March.

1

Finance market



The future of biomass funding

Biomass has an increasingly important role to play in the globe's future energy mix. It is a reasonably affordable and, in most circumstances, proven technology. Unlike any other renewable technologies, biomass provides baseload decarbonized energy and can contribute to renewable heat and fuel for transport (both of which contribute significantly to total energy consumption).

Consequently, we are witnessing an explosion in the number and variety of bio-energy projects being developed worldwide. Based on project pipelines, BNEF estimates 3.6GW-6.8GW of new generating capacity could be commissioned in the EU-27 alone between 2012 and 2016. This is likely to equate to up to €25b (US\$33b) of capital expenditure.

The case for biomass

Feedstock and heat recovery are of paramount importance to the majority of projects. As a result, there is often a strong investment case for very site-specific projects, such as industrial processes using waste products (e.g., biomass power stations embedded into whiskey distilling processes in Scotland) or embedded heat and power generation (district-heating-led CHP and embedded generation in hospitals and schools).

In other cases, the technical and financial feasibility of converting heritage coal infrastructure to partially or fully biomass-fed can provide longevity to existing stand-alone centralized power generation assets at an affordable cost.

So, in these times of capital scarcity, where is the €25b (US\$33b) going to come from?

Funding large-scale bio-energy projects

Unlike renewable technologies such as solar and wind where the "natural resource" is free (albeit intermittent), bio-energy's need for feedstock results in a higher risk and potentially more volatile generating margin. To add to the complexity, bio-energy projects also tend to be characterized by higher levels of technical and operating risk than other formats of renewables, resulting in a considerable financing challenge.

Funding has typically been provided by integrated utilities or major independent power producers at the corporate level, or through a combination of specialist equity investors and vanilla project finance structures. However, the current lack of liquidity and competition in the project finance market has resulted in shortened tenors, higher margins, forced refinancings, limits on distributions and conservative contracting requirements, often leading to overly restricted returns to equity and unbankable projects.

Given this breakdown in the traditional funding model for bio-energy projects, what is needed to provide more liquidity to the sector?

The rise of government and multilaterals

There is a clear leadership role that needs to be provided centrally, either at the multinational or national level. The UK has been at the forefront of structured funding innovation over recent years, driven initially through local authority procurement of waste management services via private finance initiative solutions. Government bodies, such as the Treasury Infrastructure Finance Unit and the GIB, have provided much-needed liquidity directly into projects.

More recently, initiatives such as the HMT Guarantee Scheme have been established, designed to provide a monoline insurance product to bridge the credit spread between the project and the state in order to attract institutional capital. This monoline insurance product was used successfully by Drax in April 2013 when £75m (US\$114m) of debt was secured under guarantee from pensions group Friends Life to fund the conversion of some of its heritage coal boilers.

Capital plant procurement becomes strategic to fundraising

Export credit agencies are beginning to play an increasingly important role in the funding of renewables, providing either debt funds or a similar monoline insurance guarantee to the HMT product. Appropriate credit enhancement could facilitate securing non-traditional infrastructure funding for bio-energy projects.

Legislators must strive for consistent global policies in areas such as sustainability to enable market forces to work appropriately.



Institutional capital

To date, there has been limited traction with the institutional funding market for bio-energy projects. Long-term yield-based capital from institutional investors has started to find its way into homegrown asset classes of wind and solar PV, but to date remains wary of the apparent increased risks of bio-energy.

The capital markets

The deep pools of capital that exist in the public debt and equity markets have yet to be really tested, and public equity markets have struggled to fully understand and price the levels of business risk in bio-energy projects, particularly those with imported feedstock strategies.

We expect institutional investors and the capital markets to play a more significant role going forward, but only where the margin risk of power generation is effectively managed. In the absence of a fully liquid and tradable long-term wood market, the only viable way of achieving this risk/return balance is through the emerging toll contracting structure, where one counterparty takes all market and volume risk in the gross margin, in return for rewarding project equity with an availability-based level of return.

Corporate energy users

As corporations seek energy price and supply security for their facilities globally, as well as brand enhancement through achieving publicly stated renewable energy or decarbonization targets, we expect them to take an increasingly active role around the bio-energy sector globally.

Smaller-scale funding solutions

Asset-based financing has been used extensively around the globe for the funding of vehicles, IT equipment, manufacturing machinery, catering equipment and a long list of other assets. For providers of asset financing, confidence in the residual value of the asset following the end of the leasing or hire purchase period is key.

These very common forms of funding have an important role to play in small-scale bio-energy plant financing as more experience of the asset class is gained. To accelerate the deployment of asset financing into the bio-energy sector, the original equipment manufacturers themselves have a real opportunity to create their own funding solutions in partnership with asset financiers, enabling them to sell fully financed assets to their customer bases.

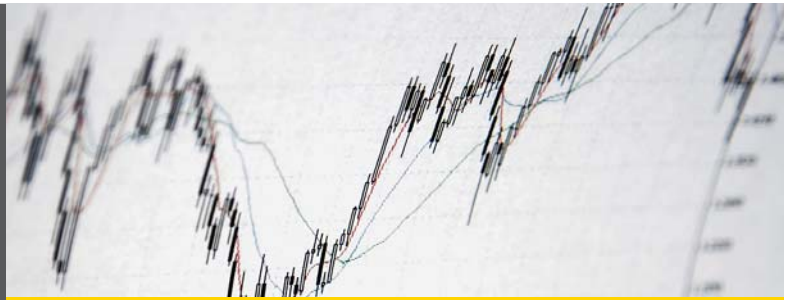
Predicting the future

It is clear that bio-energy has a crucial part to play in the global energy mix for years to come. Capital innovation in this sector will continue to evolve, closely following innovations in contracting models, the development of a liquid trading market for feedstock and the commoditization of some parts of the bio-energy project spectrum. To achieve this, central support and commitment to the sector is vital. Legislators must ensure a clear, coherent and consistent approach to how bio-energy projects are supported through both direct and indirect subsidy measures.

As if the challenge were not significant enough at a national level, legislators must also strive for consistent global policies in areas such as sustainability to enable market forces to work appropriately and avoid some of the well-documented pitfalls in the first-generation biofuels sector.

2

Transactions market



Divide and profit: divestment by utilities

Last year, €9.6b (US\$12.5b) of renewable energy assets were sold by major utilities, representing a third of total M&A activity globally in 2012, according to Clean Energy Pipeline. European utilities accounted for 87% (US\$10.9b) of this divestment value.

In Q1 2013 alone, a further €1.5b (US\$2b) has already been divested, and this trend is expected to continue.

Sustainable energy, sustainable capital

Utilities are increasingly looking to divestment, particularly of renewable assets, as a way of creating sustainable capital flows for reinvestment. This is driven by a need to keep debt under control in order to protect credit ratings and fund capital expenditure programs in emerging markets and technologies.

Enel plans to invest €4b (US\$5.3b) in emerging economies up to 2017 through its subsidiary, Enel Green Power. Meanwhile, the sale of 111MW of Polish onshore wind assets by Danish utility Dong Energy will allow the company to develop its offshore capacity.

Institutional interest

The sale of renewable assets by utilities has, in part, been enabled and facilitated by increased interest from non-traditional funding sources, such as pension and life insurance funds. These institutional investors see renewable energy projects as a way to manage their long-term liabilities, given the relatively low-risk, stable and long-term cash flows such assets yield.

E.ON, for example, sold half its stake in three US wind farms totaling 433MW to PensionDanmark in October 2012, in order to free up funds to realize more of its renewable energy project pipeline.

For this market to be sustainable, however, utilities need a change of mind-set – moving from asset owner to asset operator – and need to address fundamental issues, such as the appropriate apportionment of risk and reward between the utility as asset operator, and the investor as asset owner.

Equitable deals

With an increasing need from utilities to divest and recycle capital, and an increasing awareness of the renewable energy asset class and appetite to invest, there is an excellent opportunity right now for asset owners, sponsors and long-term finance providers to create lasting strategic partnerships founded on an equitable share of risk and reward.

However, fundamental risks such as those stemming from technology, revenue, resource and volume need to be managed. “To make buy-own-transfer contracts work, frank – and often time-consuming – discussions are needed about which risks to put in which party’s pocket,” says Dr. Cord Landsmann, CFO for E.ON Climate & Renewables.¹

This, in turn, has led to trends toward longer-term stability through extending power purchase agreements (PPAs), minimizing warranty exposure, avoiding areas of subsidy uncertainty and innovating with new technology.

Overview of risks

The ongoing divestment of renewable energy assets by utilities involves a frank and ongoing discussion of the risks involved, which party should be responsible and the best way to minimize them.

Here are the four main considerations for utilities and potential divestment counterparties:

1. **Revenue** – PPAs are increasing in length. However, not all offtake counterparties will continue to give the long-term security that investors are looking for.
2. **Technology** – Renewable energy project sponsors have always faced a choice between proven older technologies with more established track records and newer innovations that have yet to be proven.

Typically, distinctions are made based on project-specific suitability. Investors are faced with a choice between not only all renewable energy asset classes but also other forms of infrastructure investments.

3. **Resource** – In technologies such as wind and solar, resource risk is well understood, even if overoptimistic forecasting and poor wind years have left some pain. Feedstock for thermal plants such as biomass is totally different.
4. **Volume** – Transaction sizes are critical in attracting institutional capital. Typically, utilities have portfolios of operational assets, facilitating big-ticket divestments at appropriate costs of capital.

A change in mind-set is required for utilities to move their business models to one of a manager rather than an owner.



Maximizing income certainty

According to Raquel Perez Martinez, M&A manager for Europe at EDP Renováveis,² revenue risks are the biggest concern in the renewable energy sector, with firms looking for 20+ year PPAs with investment-grade counterparts.

By securing a PPA for the expected life of the green energy project, investors gain a certain amount of security on revenue streams. However, developments that could influence future energy prices – such as shale gas – mean certainty may change.

Changing levels of government support for renewable energy projects are also increasing uncertainty across many markets, including Eastern Europe, India, Germany and the UK. Retroactive cuts and policy u-turns, especially relating to financial incentives that impact revenue streams directly, will make these areas less appealing for investors.

Write-offs and oversaturation

In markets where improving conditions are unlikely in a financially sensible time frame, divestments may take the form of write-offs, with utilities looking to minimize losses. This could be the case in other areas, where the electricity market is oversaturated and energy demand imperatives do not exist.

“We do not expect growth in Spain,” says Perez Martinez, “since current installed capacity will be sufficient to cover electricity demand in the coming years.”

Minimizing generation risks

At the same time, technology risks are being pushed back onto equipment providers through warranties, guarantees and extensive liquidated damages packages. Manufacturers of renewable energy components are now willing to offer longer-term coverage due to increased pressure to generate new sales. Many existing technologies have now also been proven over a longer time frame.

Lesser-proven technologies will be unappealing to investors, and utilities will have to ensure technological risk is with the equipment manufacturer or engineering, procurement and construction (EPC) firm, providing a sufficient risk management wrap.

Independent technical reports from third-party organizations and other sources of further information will be required as institutional investors new to the renewable energy market do due diligence on projects with new technology. Data, and flexible collection processes, are essential for risk allocation as well as revenue forecasting.

Innovating forward

However, these newer forms of technology are often better able to deal with resource risk. For example, EDP Renováveis has improved sites that would get a limited 2,000 net-equivalent hours to 2,500, a 25% increase, as a result of new technology.

New technology could also help offset future volume risk by lowering the cost of new construction. For example, currently, foundations are custom-built to suit locations of offshore wind farms. In the future, it may be that a standard foundation is mass-produced and locations with suitable water depth and seabed conditions will be found.

Changing minds

Renewable energy assets are likely to be the first class of assets a utility CFO considers when contemplating capital recycling and divestments, driven by debate around core and non-core assets, and valuations. A change in mind-set is required for utilities to strategically divest such assets and move their business models to those of a manager rather than an owner. A key argument for not making an increasingly obvious shift is often the requirements and investor appetite of current utility shareholders.

There is therefore a choice: a change in business model and funding model, or an open and frank discussion with shareholders around the need for frequent and substantial rights issues.

1. Dr. Cord Landsmann, interviewed by EY, *Utilities Unbundled Issue 14*, June 2013.

2. Raquel Perez Martinez, interviewed by EY, *RECAI Issue 38*, July 2013.

3

Policy and regulation



PPP: a sustainable model

Subsidy retreat triggers intervention

As the renewable energy sector initially evolved, rapid deployment of utility-scale projects and first-mover advantages became the top priorities for governments. Policy makers found that incentive mechanisms, such as FITs, tax breaks and green certificate regimes, were the quickest and most effective ways to attract investors and developers. But, in making the sector so attractive, nobody was quite prepared for the huge demand it would generate, resulting in swelling government budget deficits and industry overcapacity. This has since led policy makers to retreat via major policy revisions and even retroactive subsidy cuts.

But at the same time, energy security and energy mix optimization have come to the fore of the political agenda, with many governments developing a much clearer picture of what their energy needs are. It is therefore no longer desirable to just leave it to the market to expand capacity – governments are increasingly seeing the need to intervene in order to manage energy security in a cost-effective way.

Infrastructure PPPs share risk and costs

PPPs have been used for many years to facilitate infrastructure developments such as transport, housing and schools. PPPs provide the dual benefit of passing risk to private sector contractors while also reducing the cost through competitive procurement.

Such arrangements have also become increasingly attractive for infrastructure projects in the energy market, whereby future power purchase agreements and generation licenses are awarded through a competitive process. This still offers investors some power offtake security – similar to FITs – while also introducing market forces to influence price – similar to a tradable certificate mechanism. The result, however, is a more sustainable policy mechanism that reduces the impact on the public purse and controls deployment levels in line with energy needs and infrastructure.

South Africa sets the bar high

South Africa's Renewable Independent Power Producer (SARIPP) program has arguably been one of the most successful energy PPPs, becoming a model for other markets in terms of both successes and lessons learned.

In 2008, the South African Department of Energy announced its intention to procure 3.7GW of renewable energy by 2016, increasing this to 6.9GW by 2020 in October 2012. Despite numerous delays and challenges, the process has procured more than 2GW of power to date, with a number of rounds still pending.

Government resolve stands strong

The success of the SARIPP program has been due in large part to the South African Government's unwavering commitment to achieve its long-term energy goals. In a world of short-termism, the Government's 2030 vision (17.8GW of renewable capacity) created confidence within the investment community that the procurement process was more than just a fleeting enterprise. This commitment was strongly reinforced by the Government's willingness to underwrite the PPAs awarded.

The Department of Energy also worked closely with a large number of stakeholders to design a bankable process and robust documentation, seeking support from independent advisors to provide sector insights and impartiality. Support from the World Bank also added credibility to the process. The robust framework that resulted from such stakeholder engagement improved the quality of submissions while also giving bidders greater confidence in the process.

According to one bidder, "The SARIPP program is a very detailed and demanding program. It requires projects to be prepared to a high degree of certainty and to be significantly de-risked pre-bid ... this provides developers with a good template to develop. As a result, this raises the barriers to entry, which we view as a good thing."

Policy mechanisms that create power offtake certainty while reducing public spending will become much more critical.



The tariff truth

However, the proof of success from both a government and investor perspective is inevitably determined by the tariff offered. Too high and investors generate super returns; too low and there is no interest. The first draft of the process, designed by Eskom, resulted in no bid applications, as the prices for projects were too low, while the tariff and capacity caps set in round one of the redesigned process generated limited price competition. This resulted in a reverse auction mechanism being implemented in subsequent rounds, to drive value for money for the Government through price competition and avoid reliance on market research to set tariffs.

Brazil's bankability dilemma

Reverse auctions have also been used in Brazil to procure 1.5GW of wind energy, in addition to significant hydro and biomass capacity. The country is now producing some of the cheapest wind power globally as a result of the competitive tendering, even less than the cost of hydro power and natural gas in the country. However, with the price of wind power averaging US\$59/MWh over the last five auctions, questions are now being raised over whether these prices are sustainable and based on realistic assumptions. Brazil's experience has therefore highlighted the risk of projects collapsing further down the line where the process generates so much competition that bankability is jeopardized.

This dilemma is recognized by an active developer in the South African market: "Experience in countries such as Brazil, Ireland and the UK in the early 2000s shows that many developers end up bidding prices which ultimately they cannot deliver on. There remains a risk in South Africa that if the competitive tendering process is retained in the long term, it could lead to unrealistic prices being bid, which may affect the sustainability of the industry."

Supply chain catch up

Low bid prices also put pressure on supply chains to keep pace with the reduction in tariffs. Globalization has helped reduce technology costs, but the search for cheaper equipment to maintain returns often conflicts with government objectives to create a domestic supply chain and manufacturing base. In Brazil, for example, local

content requirements attached to cheap funding from the National Development Bank, BNDES, are making it difficult to align supply chain costs and lower power offtake tariffs.

Funders find their feet

The education of the financing community is also critical to the success of PPPs. Lenders must be involved in – and understand – the procurement process in order to facilitate the recycling of capital necessary to maintain healthy capital flows across multiple procurement rounds, while also allowing banks to maintain their credit ratings. Domestic lenders have been at the vanguard of financing projects under the South African program, providing over £3b (US\$5b) of funding to date.

One size doesn't fit all

Over the last 18 months, there has been an explosion of mega-capacity auctions in markets around the globe, including Saudi Arabia, India and France. But the PPP model comes in many forms. The UK's EMR, for example, has proposed strike prices for a range of low carbon technologies and is due to establish capacity payments to ensure demand is always met.

As such, it represents a form of quasi PPP, whereby generators submit tenders to produce power under the capacity mechanism at the lowest cost, even though there is no official "call for tenders." However, unlike the South African program, the EMR has arguably become complicated and difficult for investors to navigate, raising the issue of how clearly a government aligns program design with the ultimate objectives of a PPP.

Model for the future

In a world of constrained government balance sheets and a growing need to secure energy supplies, policy mechanisms that create power offtake certainty for investors while also reducing public spending through increased cost competition will become much more critical. PPPs, therefore, are quickly becoming one of the most effective ways for policy makers to stimulate long-term investment and galvanize the sustainable deployment of renewable energy capacity.



UK



Highlights

- ▶ Government releases proposed CfD strike prices that will save £5b (US\$8b) in low-carbon power generation by 2030
- ▶ Final investment decision program attracts 18GW of generating capacity seeking early CfD approval
- ▶ Additional £800m (US\$1.3b) boosts GIB funding pot by more than 25%
- ▶ 18GW offshore wind target shifts by a decade to 2030, but pipeline remains robust as three mega projects (>1GW) progress through the approvals process
- ▶ Project size for FITs doubled to 10MW for community-developed wind projects

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Flurry of Government announcements.

The UK renewables sector was taken by surprise by the Government's decision to publish draft strike prices for its proposed CfD mechanism on 27 June, a month ahead of schedule. It was also confirmed that the first capacity market will be run in 2014 to ensure sufficient electricity supplies from winter 2018.

The RO-X factor. The release of strike price details has been welcomed by a sector that was becoming crippled by uncertainty, although responses to the prices themselves have been somewhat muted.

The Government has adopted the phrase "RO-X" to explain the strike price derivation. Support under the new scheme would be aligned to the renewables obligation (RO) mechanism but would also assume lower required rates of return (i.e., the "X") given the certainty created by the Government accepting market risk via these top-up payments.

For example, the proposed rates of £100 (US\$153) and £155 (US\$238) for onshore and offshore wind, respectively, compare favorably to the £90 (US\$137) and £130 (US\$198) under the current subsidy system. However, developers will only receive CfD payments for 15 years compared with 20 years under the current RO scheme, lowering overall returns. This trade-off between certainty and returns is expected to save the Government £5b (US\$8b) by 2030.

Biomass misses out. Strike prices for dedicated biomass were notably lacking in the latest announcements, adding to the woes of a sector already faced with waning Government support. This follows December's announcement of a 400MW non-legislative capacity cap, which would trigger a review on future ROC (renewable obligation certificate) eligibility. A consultation on the issue was launched in May.

Uncertainty remains. The proposed strike rates are still subject to consultation and state aid approval, and the market will need to see far more detail to fully assess the risks and rewards when choosing between

UK ranking snapshot	Issue 38	Issue 37
Total RECAI	4	5
Onshore wind	4	4
Offshore wind	1	1
Solar PV	10	9
Solar CSP	39	39
Biomass	2	2
Geothermal	17	18
Hydro and marine	20	24

Increasing levels of funding and transaction activity suggest large-scale solar may now be poised to become a major investment theme in the UK.

ROCs and CfD in 2014-17. Details of the levy control framework and delivery obligation were also noticeably lacking in June's announcements.

Large projects get early admittance.

However, the Government is working hard to dispel the cries of "uncertainty" ringing out across the land. Earlier this year, it announced a "final investment decision" program which sought to qualify some large-scale projects for CfDs ahead of the full codification of the EMR. The application window for projects exceeding 50MW (100MW in the case of offshore wind) closed on 1 July, resulting in 57 projects representing around 18GW of generation capacity seeking CfD eligibility under the scheme. While it's unlikely all projects will go ahead, the Government has taken the strong uptake as a signal that its reforms are bringing forward investment in the UK.

Decarbonization defeat disappoints.

The third reading of the Energy Bill in June secured its passage through to the Upper House and it is expected to be passed into law by the end of this year. However, this success was dampened for many by the narrow defeat of a proposed amendment to include a 2030 decarbonization target in the bill. Many believe the failure to set such a target until 2016, after the next election, threatens the UK's ability to meet its climate change goals and undermines confidence in the Government's commitment to renewable energy.

Green bank topped up. Late June, meanwhile, saw a boost for funding in the sector, with the announcement that the government-backed GIB will receive an additional £800m (US\$1.3b), taking its total allocation to £3.8b (US\$5.8b) through to 2016. It also won the right to borrow up to £500m (US\$764m) of this additional sum from the National Loans Fund, enabling it to demonstrate a track record of generating profits from green infrastructure investments while borrowing at a commercial rate.

Offshore projects keep on coming. Activity levels in the offshore sector have remained high in 2013. Early July saw the official inauguration of the world's largest offshore wind farm, the 630MW London Array located in the Thames Estuary. The record is unlikely to be held for long, however, as July also saw a JV comprising Spain's Repsol and EDP Renováveis submit plans to the Scottish government for a 1GW wind farm off the Angus coastline, and RWE Npower Renewables received the green light for its 1.2GW Triton Knoll wind

farm off the coast of Lincolnshire, costing an estimated £3.6b (US\$5.5b). RWE's second 1.2GW offshore project – the £3b (US\$4.5b) Atlantic Array wind farm in the Bristol Channel – was accepted for examination by the UK's Planning Inspectorate in mid-July.

Transmission assets keep pace. Late June saw financial close on the £193m (US\$295m) acquisition of the offshore transmission assets for the Sheringham Shoal offshore wind farm by Blue Transmission, a consortium comprising Macquarie Capital Group and Barclays Infrastructure Funds. It represents the largest transaction to date under the Government's offshore transmission owner (OFTO) regime.

Offshore timetable slips by a decade.

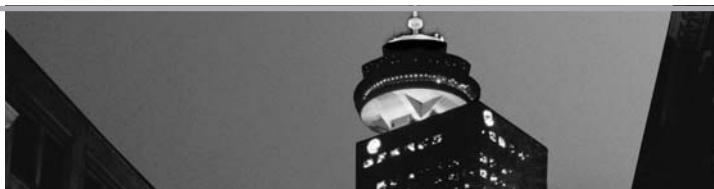
However, offshore wind scenarios released by the Government in mid-July indicate it has dramatically downgraded its ambitions for the sector. The central scenario showed the UK generating around 18GW from offshore wind by 2030, which had previously been pledged as the 2020 target in the Government's 2011 renewable energy road map. The downgrade is disheartening for a sector that is already battling hard to reduce costs and facing fierce competition for jobs with other offshore markets.

Solar ... the next big thing? In solar news, Bluefield Solar Income Fund Ltd. has become the UK's first listed solar power fund following its £130m (US\$196m) IPO on the London Stock Exchange.

Specialist investment manager Oxford Capital has launched its third solar infrastructure fund, seeking to secure £100m (US\$153m) from institutional investors.

These increasing levels of funding and transaction activity suggest large-scale solar may now be poised to become a major investment theme in the UK. However, at the same time, public opinion appears to be turning against large-scale solar farms on greenfield sites.

Community support doubled. A proposed amendment to the Energy Bill would see the project size eligible for FITs double to 10MW for projects that are developed by communities. The Government hopes community ownership will increase public support for renewables and help energy users become less reliant on centralized power generation.



Canada



Highlights

- ▶ **Competitive auctions to replace FIT program for large-scale projects, but concerns exist over impact on pace of deployment**
- ▶ **Small-scale FIT scheme awards 951 contracts worth an estimated US\$750m**
- ▶ **WTO ruling on local content requirements forces Ontario to rewrite Green Energy Act by 2014**
- ▶ **Samsung reduces its renewables investment commitment in Ontario by CA\$2b (US\$1.9b), reducing planned development to 1.4GW from 2.5GW**
- ▶ **Quebec's 800MW wind tender expected to generate around CA\$2b (US\$1.9b) of investment**

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FITs outbid by tender process. In late May, Ontario's Ministry of Energy announced that it would be developing a competitive procurement process for projects greater than 500kW, to replace the existing FIT program for large-scale projects. The new scheme is intended to increase the involvement of communities and municipalities in deploying renewable energy projects by requiring developers to jointly identify locations and site requirements with local groups.

Pipeline uncertainty. The announcement has caused concerns for equipment suppliers and manufacturers in particular. While it is acknowledged that competitive bidding can result in lower-cost power, they also anticipate a slowdown in the pace of renewables deployment due to prolonged processes and the potential impact on bankability in the absence of a FIT. The Ontario Power Authority (OPA) has already signed contracts for an additional 4.5GW of renewable energy capacity under the current FIT scheme, but there is some nervousness about the impact of this major change on the future pipeline.

Standing firm. However, a number of wind manufacturers, including Siemens and Vestas, have already confirmed that they continue to see Ontario as an attractive market and intend to remain active. In early July, Siemens delivered its first "made in Canada" wind turbine blade – produced at its plant in Tillsonburg, Ontario – to a 270MW project being developed by Samsung Renewable Energy and Pattern Energy. July also saw China Longyuan Power Group Ltd, the largest wind power producer in China and Asia, receive approval from the OPA for a 100MW wind farm in Ontario, the company's first overseas wind project.

Small FIT giveaway. There will be no such overhaul of the FIT scheme for small-scale projects sized 10kW-500kW. In early July, the OPA allocated contracts to 951 projects, totaling 146.5MW and worth an estimated US\$750m. The awarded contracts cover 934 solar plants, 16 bio-energy projects and one hydro plant. The OPA was authorized to offer up to 200MW, but the remaining 53.5MW of capacity will be carried forward to the next FIT allocation period later this year.

Canada ranking snapshot	Issue 38	Issue 37
Total RECAI	7	7
Onshore wind	5	6
Offshore wind	13	12
Solar PV	6	7
Solar CSP	21	21
Biomass	14	15
Geothermal	30	32
Hydro and marine	3	4

WTO ruling prompts Ontario to rewrite its Green Energy Act in 2014 to exclude local content requirements.

However, in May's announcement regarding the large-scale FIT, the Minister of Energy also confirmed that the state would revise the small FIT program to prioritize projects partnered or led by municipalities.

WTO's nail in the coffin. While the decision to move to competitive bidding for large-scale projects is likely to be driven by a number of factors, it has also undoubtedly been impacted by the World Trade Organization (WTO) decision in early May to uphold a complaint filed by the EU and Japan against the local content requirements attached to Ontario's FIT scheme. Under the Green Energy Act, above-market tariffs are awarded to wind projects provided at least 25% of goods and services are sourced within the province, increasing to 60% for solar projects.

The WTO ruled in December 2012 that the domestic content rules violate its "national treatment" rules, but the case was revisited following an appeal by Canada. May's decision to uphold the original decision, however, means Ontario must now rewrite its Green Energy Act by late 2014 to exclude local content requirements, although it is not expected that existing FIT contracts will be canceled.

Samsung scales back. The WTO ruling is also being cited by some as the reason for Samsung C&T Corp.'s reduced renewables investment in the province. In 2010, the South Korean construction company pledged to spend CA\$7b (US\$6.7b) to develop 2.5GW of wind and solar projects by 2016, but an announcement in late June reduced this commitment to 1,369MW with an estimated price tag of CA\$5b (US\$4.8b).

Samsung denies the connection to the WTO ruling and attributes the reduced commitment to the impact of changing economic conditions in the province and community engagement activities on the original timelines. Fears of insufficient electricity generation and power blackouts predicted by the Government back in 2010 have also failed to materialize.

Alberta pipeline could prompt renewables rush. The province of Alberta, meanwhile, is also looking to boost its renewable energy deployment, but partly as a response to the highly controversial US\$5.3b Keystone XL oil pipeline which is currently being reviewed by US officials given its cross-border nature. Alberta represents a third of Canada's greenhouse gas emissions, largely driven by oil sands emissions such as those that would result from the proposed pipeline.

The province may therefore need to take active measures to reduce emissions and demonstrate its commitment to tackle climate change if it is to secure the project. The Energy Minister is urging the renewables industry to bring forward proposals and is in talks with wind, solar and hydro power companies in particular about how best to spur development. June saw the timely announcement that Alberta's 300MW Blackspring Ridge wind project has started construction.

Quebec puts wind back on the market. May saw positive developments in Quebec with the launch of the much-awaited fourth round of wind power tenders. Quebec's Premier called for 800MW of wind capacity, which could generate almost CA\$2b (US\$1.9b) of investment.

The latest tender, which contributes toward the Government's overarching goal of achieving 4GW of installed capacity, is in response to urgent calls from the wind sector to speed up the process to prevent a deployment gap given that the last of the wind projects contracted under previous tenders are due to come online in 2015. Quebec currently has 1.7GW of installed wind capacity and a pipeline of approximately 1.6GW under Government contracts.



South Korea



Highlights

- **Corruption in the nuclear sector triggers shutdowns that could spur clean energy deployment; but an emphasis on demand-side policy measures could jeopardize a US\$35.2b renewable commitment**
- **Ambitious ETS could result in carbon price as high as US\$90/tonne if scheme not amended**
- **Industry body calls for 30GW of solar PV by 2030, up from Government's target of just 3.5GW**
- **Offshore sector appears on track to invest US\$8.2b in 2.5GW of capacity by 2019**

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Energy on the edge. South Korea's renewable energy policy stands at a crossroads. The ambition is there, heightened by new energy security concerns and an environmental agenda. But policy signals from the new Government are also somewhat mixed. The question is, will South Korea seize the opportunities or will it fall into a policy black hole?

Nuclear goes pop. Renewable opportunities may result from the shutdown of several nuclear plants in May following revelations over fake safety certificates and the use of unauthorized components. Nuclear represents around a third of South Korea's electricity and the lost reactors are expected to cause the country's first power shortage crisis, exacerbated by peak demand through July and August.

Wasted renewables opportunity. The Government has responded by compensating major industrial electricity users to shut down operations during certain periods and pledging to reduce electricity consumption in public offices by 15%. But perhaps this is also the time to put renewables into the limelight given their potential to boost long-term energy security. The Korea Photovoltaic Industry Association (KOPIA) thinks the Government should be using these compensation funds to install PV instead.

Reducing energy consumption is of course sensible, but the emphasis on demand-side measures may also reflect the new President's pro-nuclear stance. While detailed policies on renewables deployment are yet to be announced, the sector is already concerned that the ambitions of the previous Government to invest US\$35.2b in renewables by 2015 could disappear into the abyss.

Renewables vs. carbon reduction? And yet, the unclear stance on renewables in the country's long-term energy policy is somewhat at odds with the ambitious ETS announced in May and due to be launched 1 January 2015. This has recently been followed by the submission of a bill by 29 cross-party lawmakers to enact a statutory carbon tax from 1 January 2016.

South Korea ranking snapshot	Issue 38	Issue 37
Total RECAI	12	12
Onshore wind	24	22
Offshore wind	11	11
Solar PV	11	11
Solar CSP	22	22
Biomass	13	12
Geothermal	24	23
Hydro and marine	19	17

Perhaps the Government is also simply trying to motivate the private market to make commitments for self-survival and competitiveness.

ETS too ambitious. South Korea's heavy industry has resulted in extremely high carbon emissions, but a recent report co-authored by BNEF and EY³ indicates that an emissions reduction target of 30% below business-as-usual levels by 2020 is ambitious and that changes to the proposals may be required to avoid heavy costs for industry. While the Government will award 95% of the permits for free in the initial phases, the report concludes that the price of carbon is likely to be high compared with other schemes because a lack of offset projects would effectively set the price close to the penalty levy of around US\$90/tonne.

More solar please. But policy ambiguity can be overcome in theory. What cannot be ignored is the country's significant renewables potential and the great sense of ambition that is still there. KOPIA is currently putting pressure on the Government to increase its solar ambitions to more accurately reflect what is possible and to boost investment in the sector. The PV industry body claims the country could install 30GW of solar by 2030, eclipsing the Government's current target of 3.5GW. Total solar PV capacity stood at 982MW at the end of 2012.

The solar spotlight. The Government is due to revise its long-term installation goal by the end of 2013, but it's unclear how ambitious this will be. Increased activity in neighboring China and Japan could trigger more vocal support for solar from the Korean Government, while China's recent decision to impose anti-dumping duties on polysilicon from the US and South Korea could also boost the focus on domestic deployment. In May, Korea's large car manufacturer, Hyundai Motor Co., announced plans to install 10MW at one of its factories. This would be the country's biggest rooftop solar power plant.

Offshore ambitions blow hard. Onshore wind potential is limited due to land availability and a mountainous terrain, but the country's offshore ambitions remain high. An updated road map is due later this year, but the country already has a pipeline of pre-consented offshore wind projects totaling around 3.5GW, in large part driven by its 2010 road map, which stipulated plans to invest US\$8.2b in 2.5GW of offshore

capacity by 2019. In mid-March, SK Engineering & Construction Co. announced plans to build a 196MW offshore wind farm by 2017 at a cost of US\$726m – the country's largest wind farm to date.

So what of the future? While changes to the proposed ETS could be introduced over the next 18 months, businesses must still prepare for the likely impact of the scheme and look at carbon mitigation options. The ETS sends strong signals of the Government's commitment to a low-carbon economy. But an ETS may be doomed to fail unless commitments are also made to encourage investment that will help bring down the cost of renewables and exploit the country's shipbuilding expertise and technological know-how.

Private sector to step up. But, perhaps, after spending US\$2.6b on renewable energy loans and subsidies through 2012 and creating one of the most developed grid infrastructures in the world – including plans to invest US\$7.2b in the country's smart grid by 2030 – the Government is also simply trying to motivate the private sector to make commitments for self-survival and competitiveness.

And so, maybe the future is now in the hands of the investors and developers who can see beyond mixed policy signals, to the energy security and renewable resource opportunities that are being created by a precarious nuclear sector and overly ambitious emissions reduction scheme.

3. *South Korea's Emissions Trading Scheme* white paper, BNEF and EY, 10 May 2013.



Brazil



Highlights

- ▶ Four large-scale capacity auctions in 2013 will address energy needs in 2016-18
- ▶ Wind excluded from A-5 auctions, as low prices averaging US\$59/MWh threaten ability of other sources to compete
- ▶ Solar to make its auction debut but is still too expensive to compete
- ▶ New rulings on transmission lines and additional turbines jeopardize 16GW backlog of registered wind projects
- ▶ Creation of "retail traders" could unlock around 21GW of demand for renewables

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After a disappointing 2012, characterized by auction cancellations, record low wind power prices jeopardizing bankability and the fallout from strict local content rules, 2013 looks set to be a stronger year for the Brazilian clean energy market.

Auctions galore. Four capacity auctions have now been scheduled to help meet the country's growing energy demands. An A-3 auction, which requires plants to be operational by 1 January 2016, will be held on 25 October, while two A-5 auctions are planned for 29 August and 13 December, with commercial operations by 1 January 2018. December's A-5 auction is effectively a backup tender to give hydro projects additional time to obtain environmental permits.

Wind left out in the rain. Interestingly, the Government's Energy Research Agency (EPE) has excluded wind projects from both the A-5 auctions amid fears that low prices will make it near impossible for other sources to compete, averaging around US\$59/MWh over the last five auctions. Wind power has therefore been allocated its own exclusive auction on 23 August.

Thermal stays warm. So does this mean the Government has turned its back on wind? Not quite. The impact of adverse weather conditions in 2012 on the country's hydroelectric reservoir reserves, and the surging cost of new hydro developments resulting from construction delays and rising tensions with indigenous groups, have created a potential energy security crisis.

The Government has therefore increased LNG imports for 2013 and is placing significant emphasis on fossil fuel base load power projects in the upcoming auctions. Around half of the 7.5GW backlog of non-wind registered projects are reported to be fossil fuel (the remaining being hydro and biomass), and the Government will be keen to ensure that potential capacity is not squeezed out by cheaper wind projects.

Solar makes its entrance. The A-3 auction in October will see solar make its debut on the renewables stage, with the Government welcoming projects over 5MW. However, there is a general consensus that the

Brazil ranking snapshot	Issue 38	Issue 37
Total RECAI	15	15
Onshore wind	18	17
Offshore wind	25	24
Solar PV	22	23
Solar CSP	10	13
Biomass	6	5
Geothermal	32	31
Hydro and marine	5	5

Some appear committed to fight it out in the increasingly competitive Brazilian wind market, while others continue to analyze the pros and cons of staying in an uncertain market.

technology is still too expensive and will be unable to compete effectively. While solar PV panels are being installed on many of the new stadiums under construction ahead of the 2014 World Cup, various studies indicate that the power generated will cost roughly the same as an oil-fired power plant and around 3-5 times the average price of wind power.

Getting ready for the rays. However, there is optimism that the sector will take off as costs come down. Since 2011, around 4.5GW of solar projects have requested permits from ANEEL, the Brazilian electricity regulator. Eletrosul, a unit of state-owned utility Eletrobras, has already solicited bids to install devices in two Brazilian states to measure solar radiation potential and is starting to develop large-scale projects ahead of anticipated 2014 power auctions.

Private sector interest is also heating up, with module supplier Canadian Solar announcing in June that it will develop commercial, utility-scale and off-grid projects in the region after setting up a sales and business development office in Sao Paulo. It would therefore seem that there is appetite for solar in Brazil and that players are intent on positioning themselves for when the price is right.

Wind prices set to rise. The wind sector is inevitably disappointed to be excluded from the A-5 auctions; the EPE has a backlog of registered wind projects totaling around 16GW, although unofficial figures indicate that only 4GW-5GW will meet technical conditions.

However, new rules announced by the Government in April will require developers to install more turbines to guarantee certain generation volumes, which could increase wind prices by at least 15% according to energy trade group Abeeolica.

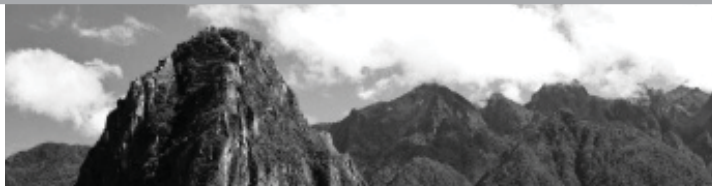
Developers will also be required to build their own power lines to connect wind plants or install turbines closer to existing cables, potentially jeopardizing optimal siting. Both measures could increase project costs, although Abeeolica has also confirmed that Brazilian wind farms achieved an average efficiency of 54% in 2012, around 12 percentage points higher than forecast.

The wind conundrum. Wind developers aren't the only ones facing difficult conditions. Turbine manufacturers appear to be divided over the merits of compliance with strict local content rules to secure development bank (BNDES) funding. Some appear committed to fight it out in the increasingly competitive Brazilian wind market and have already secured the necessary approvals (e.g., Gamesa, Impsa and Alstom); while others continue to analyze the pros and cons of staying in an uncertain market (e.g., Vestas, Suzlon and Acciona).

The threat of wind power being marginalized by a new focus on fossil fuel capacity, on top of stringent local content rules, may just force some of these turbine manufacturers to seek opportunities elsewhere.

Untapped green energy users revealed.

A new regulatory framework that allows the creation of "retail traders" could unlock around 21GW of demand for renewables, according to the energy trading chamber, CCEE. These new entities will represent large numbers of small and medium-sized consumers with the appetite to switch to green energy but thus far hindered by complex rules at the CCEE. Energy users with demand between 500kW and 3MW receive very competitive tariffs for buying green energy, but only 2% of the estimated 16% of eligible consumers are currently claiming these. Mass representation by retail traders will enable the creation of specific renewables portfolios and better negotiating positions for long-term PPAs with wind developers.



Peru



Highlights

- ▶ Peru's strong macro conditions and investment climate open it up to foreign investment
- ▶ Surging energy demand and abundant untapped resource creates renewable energy investment potential of US\$10b-US\$13b in the period 2012-20
- ▶ Structured power offtake mechanism calls for multi-technology reverse auction at least every two years
- ▶ Government preparing to launch a third round of concessions worth around US\$3b, including 1GW of hydro capacity and 300MW of renewables projects

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Peru made its RECAI debut in May 2013, reinforcing our view that South America represents a market with significant investment and deployment potential. But what of the country itself? How has it earned its 27th-place ranking in the index?

Macro environment excels. Compared with its regional neighbors, and indeed many other countries in the index, Peru has a strong and stable macroeconomic, political and investment climate. GDP growth of around 6% and inflation of around 3% are among the highest and lowest in the region, respectively, while strong political institutions and a relatively representative legislature support longer-term political stability. The country came 43rd in the World Bank's ease of doing business rankings in 2013 – far above Brazil's 130th place. Favorable legal frameworks also make the country extremely open to foreign investment.

Prioritizing energy security. High economic growth has inevitably resulted in a surge in energy demand, forecast to grow annually by around 9% according to the International Finance Corporation (IFC). Peru has historically relied on hydropower and natural gas, but changing climate patterns have made the country's overreliance on hydro a threat to energy security, while local opposition to new gas plants is slowing fossil fuel power deployment.

The need to both diversify and expand the energy supply has therefore put renewables firmly in the spotlight. Peru's strong legal framework already confirms the promotion of renewable energy as a national priority, establishes an auction and tariff offtake mechanism and awards priority of connection and dispatch. The country was also ranked fourth in the 2012 *ClimateScope* index,¹ which assesses the clean energy investment climate of 26 markets across Latin America and the Caribbean.

1. *ClimateScope 2012*, Multilateral Investment Fund of the Inter-American Development Bank and Bloomberg New Energy Finance, June 2012.

Peru ranking snapshot	Issue 38	Issue 37
Total RECAI	27	26
Onshore wind	34	35
Offshore wind	28	27
Solar PV	21	20
Solar CSP	12	10
Biomass	24	18
Geothermal	14	13
Hydro and marine	7	6

The Government appears to be actively spreading new power projects across the country in order to encourage – if not force – investment in grid upgrades and expansion.

Untapped potential signals opportunities.

The Ministry of Energy and Mines (MINEM) has set a formal target of 33% of energy from renewables by 2021. In 2011, the IFC estimated that the country was only exploiting 4.7% of its hydro potential (despite already representing more than half of Peru's power generation), and only 0.65% of its wind potential, based on an estimated 22GW of exploitable resource. Around 6.1% of biomass potential has been tapped and less than 1% of solar, despite favorable conditions. It is unlikely additional deployment since 2011 has significantly impacted these estimates. A potential 6.1GW of renewables capacity was estimated to be required in the period 2012-20, generating investment potential of US\$10b-US\$13b.

Targets define auction structure. Under Peru's energy legislation, the MINEM must set a renewable power generation target every five years (excluding hydro), being up to 5% of national electricity consumption in the first five-year period (2010-15). The required generating capacity is then allocated to different renewable technologies and a (maximum) base tariff is set for each. A reverse auction mechanism awards power contracts to applicant projects with the lowest bid prices until the technology's quota is used up, or until bids are exhausted, although quotas not covered by a given technology may be covered by another.

Reconciliation payment tops up guarantee.

These auctions are to be called at least every two years, and prices determined through the process are guaranteed tariffs for 20 years. The project operator is paid based on the value of the power produced at the spot price, but an annual "reconciliation" calculates any premium payment required where the spot price income was insufficient to cover the guaranteed tariff.

There have been two auction rounds to date, resulting in a total of 232MW of wind power over four projects, 96MW of solar power over five projects and 31MW of biomass capacity over four projects, plus a large number of micro hydro projects. The solar energy requirement was broadly met across both auctions, while biomass and hydro were significantly undersubscribed, enabling some additional wind capacity to be awarded.

Auction results see the light. While the power awarded via the auctions did fall short of the power required overall, it has proved to be an effective way of boosting deployment, with these projects now coming to fruition. March saw ContourGlobal receive US\$193m in loans from OPIC (Overseas Private Investment Corporation) to build two of the wind projects totaling 114MW, while Spain's Solarpac Ingenieria SL and Gestamp Renewables Corp. have already started operations at two 20MW solar parks at a cost of US\$210m. Looking forward, MINEM Minister Jorge Merino announced in May that the Government is preparing to launch a US\$3b round of concessions covering 1GW of hydro capacity, 300MW of renewables and 800MW of dual gas and diesel plants.

Transmission woes to be spread. An underdeveloped infrastructure, however, is impeding efforts to boost deployment, in part due to a slow tender process. In 2012, 980km of new lines were built, compared with 8,028km in 2011. Most power infrastructure is located in the center of the country close to the Camisea gas pipeline. However, the Government appears to be actively spreading new power projects across the country in order to encourage – if not force – investment in grid upgrades and expansion.

Government sees through the price barrier.

Meanwhile, artificially low natural gas prices are making renewables less cost-competitive. But the country will likely face much higher gas prices when the current resource expires in 20-30 years and exploration costs are included. The signs are that the Government already has the appetite to make the necessary investments in renewables to address long-term energy security. The auctions have also enabled both local and international financial institutions to become involved in these new investment opportunities.

Explosion of opportunities. However, Peru still has limited experience of financing renewable energy investments. Peru also needs to streamline concession award procedures and environmental standards. There are, therefore, not only significant opportunities for project development and infrastructure expansion, but also for bringing technical and transactional assistance to financial institutions and government agencies to accelerate the deployment of renewables.



East Africa



Highlights

- **Overreliance on hydropower creates an energy imperative, with demand expected to grow 8% per annum in Kenya alone**
- **Uganda seeking to generate 61% of total energy consumption from renewables by 2017 from just 4% in 2007, while Kenya is targeting more than 8GW of additional renewables capacity by 2030**
- **Kenya FIT scheme in place since 2008, while Uganda's power offtake incentive gets a makeover in July 2013**
- **Great Rift Valley offers 15GW of geothermal capacity**
- **East Africa to benefit from President Obama's US\$16b Power Africa clean energy initiative**

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Entering the spotlight. Between South Africa's high-profile power procurement program and North Africa's political revolutions, it's perhaps not surprising that East Africa has been left out of the headlines. But not for long – the region has been preparing for its own energy revolution.

Supply vs. demand. East Africa continues to rely heavily on hydropower, but severe droughts in recent years have heavily impacted energy supply. As a landlocked country, Uganda in particular has been exposed to the high cost of fossil fuel power required to compensate for lost hydro capacity.

At the same time, the region is also experiencing a surge in demand thanks to robust economic growth and rising populations. Kenya, for example, currently has total installed capacity of around 1.6GW, while peak power demand of 1.5GW is expected to grow at an average rate of 8% per year. Tanzania forecasts demand to increase 471% through to 2031, requiring an investment of around US\$8b in its power sector.

Ambition. This urgent need for both energy security and increased supply has created an appetite to make renewables a cornerstone of the region's energy market. While Kenya does not have a legally binding target, its Vision 2030 energy plan sets out goals to build 5,110MW of new capacity from geothermal, 1,039MW from hydro and 2,036MW from wind. Uganda has set itself the ambitious target of sourcing 61% of total energy consumption from renewables by 2017, up from just 4% in 2007 when the target was set.

Fixed prices get a makeover. Both Kenya and Uganda have created FIT programs to attract private investment across a variety of technologies. Kenya's program, created in 2008 and revised in 2010, awards fixed price PPAs for 20 years, although there are cumulative caps on the total capacity eligible for these preferential rates.

Uganda updated its FIT program in 2011, but no PPAs have been concluded under the scheme due to the relatively low tariffs, high perceived offtaker risks and

Significant investment by international finance institutions and state-owned entities has sent a clear signal of the energy opportunities that exist in the region.

the lack of long-term financing available. This prompted the Government in July to launch its Global Energy Transfer Feed-in Tariff program, which will provide:

- (i) A premium payment per kWh in addition to the existing tariffs (funded by partners including the governments of Norway, Germany and the UK)
- (ii) A guarantee facility to secure against offtaker and political risks, managed by The World Bank
- (iii) Debt and equity at competitive rates via a private financing mechanism with Deutsche Bank.

The Ugandan Government expects to raise more than US\$385m in private capital under the scheme.

Geothermal fired up. The tectonically active Great Rift Valley, which runs through East Africa, offers significant potential for the exploitation of geothermal to create a reliable indigenous base load energy supply. Some experts estimate capacity potential of up to 15GW across the region, with around 7GW concentrated across 14 major sites in Kenya. In May, the country's largest power producer, Kenya Electricity Generating Co., sought proposals to develop 560MW of capacity via four 140MW plants costing US\$2b each over the next five years. A month earlier, the power company announced it would sell a 20-year, US\$343m asset-backed bond using steam already drilled as collateral.

Solar some way off. Despite the region being a strong solar resource, we are unlikely to see utility-scale power plants in the short to medium term, as current use is mainly focused on lighting and water heating.

Winds of change. Wind power shows much more promise, with Kenya in particular already developing a robust project pipeline. Its flagship 300MW Lake Turkana project experienced a turnaround in fortunes in 2013, after planned construction in early 2012 was hit by financing and transmission delays. A contract for the construction of a 428km, 400kV transmission line was awarded to Isolux Corsán in April, followed by confirmation in May that the African Development Bank will lend US\$149.5m to the project, more than a quarter of the funding required.

Other prospects include the 90MW wind farm being planned by Belgium's Electrawinds NV and the IFC, at a cost of US\$233m, and two wind projects at Ngong Hills being developed by General Electric Co., which is targeting 160MW of wind power in the country by 2015.

So what's holding the region back?

Notwithstanding strong ambitions, policy makers must do more. High levels of corruption in some parts of the region and highly regulated power sectors are limiting the ability of private investors to compete. They must also continue to prioritize the improvement and expansion of transmission networks to prevent power outages and facilitate increased renewables deployment. Existing developments such as the US\$1.2b interconnection between Kenya and Ethiopia already show a commitment to a regional power trading network.

Opportunities for the taking. But the private sector must also step up. Significant investment by international finance institutions and state-owned entities has sent a clear signal of the energy opportunities that exist in the region. This was reinforced in July by President Obama's Power Africa initiative, which would see US\$7b of funding from US government agencies and US\$9b in initial commitments from private sector partners injected into clean and efficient electricity generation.

The success of South Africa's flagship procurement program also creates a potential template for large-scale renewable deployment in East Africa. But, with Kenya alone requiring an estimated US\$4.4b over the next five years to meet rising power demand, the private sector will need to play its part in providing the funding that will become critical to keeping the lights on.

Technology-specific indices

The technology indices reflect a weighted average across macro, energy market and technology-specific parameters.

Rank	Onshore wind		Offshore wind		Solar PV		Solar CSP		Biomass	
1	US	74.2	UK	73.2	US	77.0	US	73.7	Germany	67.8
2	China	71.2	Germany	70.5	China	73.9	Australia	65.2	UK	63.8
3	Germany	68.4	China	66.5	Germany	73.8	Spain	62.3	US	63.7
4	UK	66.2	US	60.3	Japan	69.2	Chile	61.6	Japan	62.2
5	Canada	64.2	Denmark	59.2	Australia	65.5	China	61.3	China	62.1
6	Australia	63.2	Belgium	58.9	Canada	61.1	India	59.4	Brazil	60.2
7	Japan	60.3	Netherlands	56.1	Italy	60.2	Israel	59.3	Belgium	59.9
8	France	60.3	Sweden	55.8	India	60.1	Morocco	58.9	Finland	59.5
9	Ireland	60.3	Japan	55.1	France	60.0	South Africa	57.6	Denmark	58.1
10	India	60.2	Finland	54.4	UK	59.7	Brazil	52.8	Sweden	58.0
11	Denmark	59.8	South Korea	51.9	South Korea	56.7	Italy	52.7	Netherlands	56.5
12	Sweden	59.8	France	51.0	Thailand	55.9	Peru	51.5	France	56.3
13	Norway	58.9	Canada	50.9	Spain	55.9	Turkey	49.9	South Korea	56.1
14	Finland	57.8	Norway	45.9	Israel	55.5	Saudi Arabia	49.0	Canada	55.6
15	Netherlands	57.5	Australia	45.2	Belgium	55.2	Portugal	49.0	Italy	55.2
16	Belgium	57.3	Ireland	44.1	Portugal	54.3	France	48.7	Austria	54.2
17	Poland	57.2	Taiwan	39.2	Taiwan	54.0	Greece	47.9	Australia	54.1
18	Brazil	57.1	Poland	36.1	Chile	53.9	Mexico	47.6	Poland	53.2
19	Italy	56.6	Portugal	36.0	South Africa	53.8	Thailand	47.3	India	51.9
20	Spain	56.4	Chile	35.8	Saudi Arabia	53.8	Taiwan	42.3	Ireland	50.6
21	Austria	56.3	Italy	35.7	Peru	52.2	Canada	25.5	Thailand	50.6
22	Portugal	56.0	India	34.2	Brazil	51.9	South Korea	22.7	Portugal	50.4
23	Turkey	55.4	New Zealand	33.3	Austria	51.8	Germany	15.8	Taiwan	49.7
24	South Korea	55.0	Spain	31.1	Netherlands	49.6	Austria	-	Peru	49.4
25	Chile	54.9	Brazil	31.0	Slovenia	49.6	Belgium	-	Spain	49.3
26	South Africa	53.5	Turkey	31.0	Morocco	48.5	Bulgaria	-	Chile	47.9
27	Mexico	53.5	South Africa	29.7	Turkey	48.1	Czech Republic	-	Czech	47.6
28	Romania	53.3	Peru	29.1	Poland	47.7	Denmark	-	Norway	47.5
29	New Zealand	53.1	Ukraine	28.6	Mexico	47.6	Finland	-	Slovenia	45.9
30	Morocco	52.9	Mexico	27.8	Bulgaria	47.4	Ireland	-	Turkey	43.1
31	Taiwan	51.4	Romania	26.5	Denmark	47.4	Japan	-	Mexico	42.2
32	Thailand	49.3	Bulgaria	25.5	Czech	46.9	Netherlands	-	Ukraine	41.2
33	Czech	49.0	Morocco	25.0	Romania	46.6	New Zealand	-	Greece	39.8
34	Peru	48.6	Israel	22.2	Greece	46.1	Norway	-	South Africa	39.0
35	Bulgaria	48.2	Greece	21.6	Ukraine	44.7	Poland	-	Israel	38.4
36	Ukraine	46.1	Slovenia	20.1	Sweden	43.7	Romania	-	Bulgaria	38.3
37	Greece	45.6	Saudi Arabia	18.8	Ireland	38.3	Slovenia	-	Romania	34.5
38	Israel	45.4	Austria	-	Norway	35.5	Sweden	-	New Zealand	30.3
39	Slovenia	43.2	Czech Republic	-	Finland	35.3	UK	-	Morocco	23.0
40	Saudi Arabia	38.5	Thailand	-	New Zealand	34.8	Ukraine	-	Saudi Arabia	22.4

Glossary

Rank	Geothermal		Hydro and marine	
1	US	68.4	China	55.0
2	Japan	63.2	US	54.3
3	New Zealand	58.9	Canada	52.9
4	Italy	57.0	Japan	52.4
5	Germany	54.1	Brazil	51.0
6	Turkey	53.3	Germany	50.9
7	Mexico	50.3	Peru	50.8
8	China	49.8	Norway	50.6
9	Portugal	48.6	Italy	50.0
10	France	46.7	India	49.5
11	Chile	45.6	Sweden	48.9
12	Australia	43.6	Turkey	48.7
13	Poland	41.7	Chile	48.1
14	Peru	41.2	Austria	48.0
15	India	39.0	Australia	47.9
16	Slovenia	38.9	France	46.6
17	UK	37.9	Slovenia	46.0
18	Taiwan	36.6	Portugal	46.0
19	Austria	36.1	South Korea	45.9
20	Sweden	34.3	UK	44.1
21	Belgium	33.6	South Africa	43.9
22	Norway	32.5	Taiwan	43.9
23	Romania	32.2	Spain	43.7
24	South Korea	31.9	Poland	43.6
25	Thailand	31.5	Romania	43.1
26	Netherlands	30.7	Mexico	43.0
27	Greece	30.7	Finland	42.4
28	Bulgaria	29.8	Bulgaria	41.7
29	Saudi Arabia	28.2	Czech	41.4
30	Canada	27.4	Thailand	41.1
31	Czech	27.1	Israel	41.0
32	Brazil	26.4	Netherlands	41.0
33	Ireland	21.2	Denmark	39.9
34	Denmark	-	Morocco	39.6
35	Finland	-	Ireland	39.2
36	Israel	-	Ukraine	38.6
37	Morocco	-	Belgium	38.3
38	South Africa	-	New Zealand	38.1
39	Spain	-	Greece	37.1
40	Ukraine	-	Saudi Arabia	-

Abbreviation	Definition
b	Billion
BNEF	Bloomberg New Energy Finance
CfD	Contracts for difference
CFO	Chief financial officer
CHP	Combined heat and power
CREO	Chief resources and energy officer
EMR	Electricity market reform
EPE	Brazil's Energy Research Agency
ETS	Emissions trading scheme
EU	European Union
FIT	Feed-in tariff
FY	Fiscal year
GDP	Gross domestic product
GIB	Green Investment Bank
GW	Gigawatt
HMT	Her Majesty's Treasury (UK)
IFC	International Finance Corporation
IPO	Initial public offering
km	Kilometer
KOPIA	Korea Photovoltaic Industry Association
kW	Kilowatt
m	Million
M&A	Merger and acquisition
MINEM	Peru's Ministry of Energy and Mines
MW	Megawatt
MWh	Megawatt hour
OPA	Ontario Power Authority
PPA	Power purchase agreement
PPP	Public private partnership
PV	Photovoltaic
R&D	Research and development
REC	Renewable energy certificate
RO	Renewable obligation
WTO	World Trade Organization

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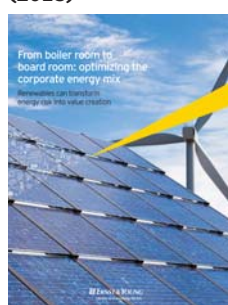
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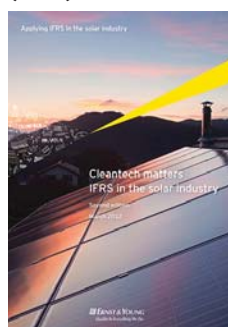
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