

The green-energy effect

Investments in clean energy are snowballing with better and cheaper finance options available



ONE of the biggest barriers to clean energy's advance has been finding funding to bolster its growth. But as financing has become cheaper and easier, global investment in clean energy has risen significantly, from \$60.2 billion in 2004 to \$310 billion in 2014 – a whopping 415% jump.

Still, if the global energy system is going to scale up renewable energy to 36% or more of the total energy mix by 2030, which would keep global warming at an acceptable threshold, then \$550 billion is needed every year – a rise of 80% on last year's spend – analysis from the Abu Dhabi-based International Renewable Energy Agency (Irena) shows.

In February, Citigroup, one of the world's largest financial institutions, made a down payment on that clean-energy future when it announced a new \$100 billion environmental finance initiative.

In 2007, Citi set a similar goal, to lend, invest, and facilitate \$50 billion by 2016. The group met that goal three years early, and is now doubling its commitment to the strategy, which will include – among other things – financing for large renewable-energy projects.

"Citi is showing that investing in clean energy is smart business, and that – with a bit of ambition and commitment – it can be done right now. It's a clear market signal that should resonate with the industry," said Mindy Lubber, president of non-profit group Ceres, which advocates sustainable business leadership.

Whether the level of penetration that Irena envisions can be met over the next 15 years is impossible to predict. But Bloomberg New Energy Finance (BNEF) is forecasting investment in renewable power capacity will expand to \$630 billion per year in 2030.

The Paris-based International Energy Agency's (IEA's) more conservative New Policies Scenario – which sees renewable energy's share of primary energy demand jumping from 13% in 2012 to 19% in 2040 – would need cumulative investment of \$7.8 trillion or \$270 billion per year – 70% higher than the average over 2000-13. The agency's more optimistic 450 Scenario, which makes

Revolution: investment in clean energy has risen by over 400% in 10 years

allowances for stricter international policies to limit global warming to a rise of no more than two degrees Celsius from pre-industrial levels, sees renewables' share hitting more than 30%. In this case \$9 trillion would be needed by 2035.

Either way, investment in the sector will continue to strengthen, largely bolstered by private investment.

Rising deployment in non-OECD countries and increased development of relatively higher-cost technologies, such as offshore wind, should help boost investment levels over time. While repowering and replacements of existing renewable capacity are also expected to play a larger role, particularly in the OECD, said the IEA.

Traditional factors that determine energy-sector financing apply to renewable energy, only in a different manner. Compared with fossil-power generation, most renewable energy technologies have a high ratio of upfront capital costs to operating costs, making their viability particularly sensitive to the cost of capital. For example, Irena estimates that the levelised cost of electricity on a wind farm project is around 60% higher when the cost of capital is 14.5% rather than 5.5%.

While a number of actions could help to cut risks that keep financing costs high, long-term policy frameworks that offer a degree of revenue certainty are particularly important for capital-intensive renewable technologies.

Falling costs

Fortunately for clean energy, relentless innovation is continually pushing down the cost of technology, which has helped pull down the cost of capital.

Market finance can be had for an average return of about 6-10% for most renewable energy projects in developed markets, while higher returns are expected in developing countries. Though this does not represent the cost of financing to the project developer, which is significantly higher.

Capital costs are likely to fall further as the investment community learns more about renewable technologies and the opportunities they offer.

In parallel, more sophisticated products that suit a wider

Looking at the alternatives

What is a YieldCo?

YieldCo is shorthand for “yield company”. In the investment world, yield equals income. So, essentially, a YieldCo is a corporate structure where the income component (generated by the underlying assets) is emphasised.

In its purest form, the YieldCo model is most easily illustrated by a company that both develops and owns renewables projects. The company sheers off its low-risk operational assets into a separate business (it will generally keep a majority share); it lists the new company – the YieldCo – on a stock exchange; and it channels the proceeds from the initial public offering (IPO) back into its riskier project-development activities.

On a basic level, nothing changes; the development pipeline and the operational assets are the same. But the IPO allows the developer to monetise its operational assets earlier than it otherwise would have been able to, recycling its capital back into project development – and, in theory, quickening the pace at which it brings new wind and solar plants online.

Meanwhile, the newly listed vehicle pumps out predictable dividends generated by its operating assets.

YieldCos are similar in concept to a master limited partnership (MLP) in the oil and gas sector – both are designed to provide a dependable stream of cash flow to investors. They emphasise cash flow over growth from a portfolio of lower-risk assets.

Unlike energy MLPs, however, cash flows from YieldCos are not dependent on fossil fuel prices, so they don't carry a commodity price variable.

Most YieldCos offer socially responsible investors a pure-play clean energy investment vehicle. While income investors have been attracted by the high yields for relatively low risk.

Since they are made up of completed projects with long-term power supply deals in place, YieldCos are less speculative and carry lower risk relative to other clean energy stocks (such as solar panel makers, biofuels etc). They also offer a geographically diverse portfolio of several power projects.

But YieldCos will likely be vulnerable to rising interest rates. Low rates have allowed power producers to borrow money on the cheap to build and acquire new assets. Higher rates will mean that these activities

will become costlier. Also, while historically low rates have drawn income investors into alternative asset classes, higher rates will mean they can return to the safety of bonds.

Also, YieldCos are equity investments, so they will tend to trade with the movements of the stock market, which means they are prone to stock-market volatility.

It's also worth noting that utility-scale solar and wind power are still relatively new sources of energy, so it's a bit of an unknown what the life cycle of these assets will be. For instance, it's not clear if energy production will degrade over time or what maintenance costs will look like in 20 years.

Still, there has been a flurry of activity in the space over the past two years, as companies such as NRG, NextEra, Abengoa, SunEdison and TransAlta, to name a few, have spun off renewable portions of their power portfolios into separately held YieldCos. And more are on the way. Whether YieldCos live up to their potential of marking a durable step-change in the cost of capital for renewable developers is to be determined.

Should they stand the test of time, David Giordano, managing director at BlackRock Alternative Investments, says they will mark a “level of capital and liquidity for the market that you couldn't get even if all institutional investors allocated a percentage of their investments to renewables”. Exciting stuff, indeed.

However, analysts and bankers warn that because YieldCos are so new, their performance during a period of rising interest rates has not yet been tested. They also warn that if YieldCos do not manage to secure new projects, perhaps because of a slowdown in the growth of the renewable energy industry as tax breaks and other government incentives are withdrawn, then the companies will not be able to deliver the growth they are planning.

By spinning off their renewable power assets into a separate, high-yielding entity, power producers are attracting interest from two types of investors who may not have been interested otherwise – socially responsible investors and income investors.

What is a green bond?

Green bonds – also known as climate bond – allow investors to tap into fixed income markets and finance clean energy. In short, they are asset-backed corporate bonds

issued to refinance operating renewable energy projects, such as a wind farm and its grid connections, freeing the developers capital for the next project.

Most climate bonds are asset-backed, or ringfenced, with investors being promised that all funds raised will only go to specified climate-related programs or assets, such as renewable energy plants or climate mitigation focused funding programs.

They are issued in sufficient quantities to be easily tradable and appraised by ratings agencies to ensure investment quality.

What is crowd funding?

Crowd funding is expanding rapidly, tapping into individual investors' desire to see where their investment is going and how it is benefitting a community. Specifically, in partnership with decentralised technology, crowd funding allows individuals and local communities to be the driving force behind the global energy transformation and to simultaneously benefit from the change. Investors own a tangible slice of a bigger project they would have been unwilling or unable to fund otherwise, usually in their own geographic area.

Crowd funding could be adopted to lower the cost of capital for investments in developing countries too, the International Renewable Energy Agency (Irena) said in its report *Rethinking Energy*. Crowd funding pioneer Kiva has already channelled more than \$600 million in loans to micro-entrepreneurs in 78 countries. Through crowd funding investment models, the entrepreneurial spirit in developing countries could be tapped and huge growth potential unleashed.

What is solar leasing?

Solar leasing allows rooftop panels to be owned, installed and operated by a third party on a rooftop, with the property owner receiving payment either through a bill reduction or by direct payment. This provides cheaper and cleaner electricity to the property owner, without the need for significant initial capital outlay. This financing mechanism has proved particularly successful in the US, including SolarCity's business, Honda/Acura's partnership with FirstSolar and SunPower's alliance with Bank of America to deliver solar leasing schemes. The concept has also been successfully implemented in Italy and Bangladesh. ●

range of investment profiles – from small-scale community financing to large institutional investments – are cutting investment risks and bringing in new investors. As a result, large businesses from outside the traditional energy sector are increasingly investing in renewables too.

Google has ploughed more than \$1.8 billion into renewable energy projects, including wind and solar farms on three continents. Some of this was for in-house use, some

for social good and some because it “generates attractive financial returns”.

Earlier this year, Google made its biggest bet yet on renewable energy – committing \$300 million to a SolarCity fund valued at \$750 million. Its investment will help support at least 25,000 rooftop solar systems. The deal, which may have a return as high as 8%, is a sign that technology companies can take advantage of

formats once reserved only for banks. It also reflects the success of renewable energy companies in tapping into a broader pool of investors. This is a positive sign as the bulk of future investment is likely to come from the private sector.

Last year, asset finance made up the lion's share of renewable energy investment at \$170.7 billion, some 10% higher than in 2013, data from BNEF shows.

There were no fewer than seven European billion-dollar offshore wind projects reaching the final investment stage, including the \$3.8 billion, 600 megawatt (MW) Gemini array off the Netherlands – the largest non-hydro renewable energy project on record in terms of dollars committed – trailed by the \$2.6 billion 402MW Dudgeon project in UK waters, and the \$1.7 billion, 350MW Wikinger scheme in the German sector of the Baltic Sea.

Many big solar and onshore wind projects around the globe were also financed in 2014. They included the Setouchi Mega photovoltaic (PV) project in Japan, at an estimated \$1.1 billion for 250MW, the Xina Solar One solar thermal plant in South Africa, at \$1 billion for 100MW, the \$859 million, 310.5MW Lake Turkana wind project in Kenya and the K2 wind complex in Ontario, Canada, at \$728 million and 270MW.

The second biggest category of investment was small-distributed capacity – projects of less than 1MW – and largely rooftop solar. This saw \$73.5 billion committed in 2014, up 34%. Research and developments by governments and corporations totalled \$29 billion, 2% more than in 2013, while asset finance of smart energy technologies, such as smart meters, hit \$16.8 billion, up 8% on 2013.

Rising investment

New equity raised for clean energy companies on public markets struck a seven-year high in 2014, at \$18.7 billion, up 52% on the year. US electric car maker Tesla Motors raised \$2.3 billion, while a succession of US and UK-listed YieldCos (publicly traded corporations that own operational assets) and project funds tapped investors for \$3.9 billion in total.

Venture capital and private equity investment in clean energy stood at \$4.8 billion in 2014, up 16% on the year, but still far below the \$12.3 billion record set in 2008. The largest deals in this segment in 2014 were a \$250 million expansion round for US lithium-ion battery firm Boston-Power and a \$250 million expansion round for US Solar installer Sunnova Energy.

It's no surprise that as the markets mature, renewable energy projects are attracting a progressively wider range of investors, from private equity firms, project developers and governments, to commercial banks and institutional investors.

As the total number of renewables projects increases, and their scale expands, more opportunities will arise for institutional investors, who traditionally like refinancing proven, long-term, low-risk opportunities with values well over \$100 million. Potential future candidates might include large-scale wind farms in Brazil, China, the US and the North Sea, as well as certain large solar arrays and some biofuel plants, reckons Irena.

Institutional investors are also increasingly concerned about the longer-term risks of fossil-fuel energy investments, which could bode well for renewables. If climate policy tightens, then renewables become more attractive relative to fossil fuels, an analysis from Irena shows.

Increased institutional investment has a two-fold effect. More renewable energy asset finance not only ensures more projects are developed, but the greater supply also helps to lower the cost of capital generally, making other

clean energy projects feasible too, says Irena. Refinancing also frees project finance from long-term assets, allowing developers and multilateral organisations to initiate new projects.

Other areas of renewable finance that show particular promise include YieldCos, green bonds, crowd funding and solar leasing.

The ability to raise capital from YieldCos, seemingly at will, carries seismic implications for renewables developers.

"They are absolutely shifting the plates underneath our feet," David Giordano, managing director at BlackRock Alternative Investments, told renewable industry magazine *ReCharge*.

For years, there was really only one way for smaller investors to get exposure to renewables, and that was by owning shares in high-risk, crisis-prone solar and wind makers.

Ownership of low-risk operating assets was largely the domain of major investors. Even for them, owning wind and solar farms came with a significant downside – they were frustratingly illiquid. Consequently, financing costs for developers were high. But that is changing with the arrival of YieldCos and green bonds, which many see as kicking off a revolution in green-energy investment.

YieldCos and green bonds are just as beneficial to big investors too, like pension funds, that have long wanted to invest in renewables but have not always had the internal resources to do so.

The green bond market took off after a coalition of major global banks devised a common set of principles to catalyse and clarify the market in January 2014. As a result, \$38 billion worth of private green bonds – fixed interest securities tied to clean energy and energy efficiency – were sold last year, two and a half times the 2013 total of \$15 billion, data from BNEF shows. According to Climate Bonds Initiative, a UK-based research group, the green bond market will continue to balloon. They are expecting \$100 billion worth of green bonds to be sold this year.

At the other end of the spectrum, decentralised, co-operative renewable projects based on small-scale crowd funding investment opportunities are proving highly successful, as shown by US-market leader Mosaic. Cutting or eliminating fossil-fuel subsidies for power generation would also significantly lower the costs of financing renewable energy projects, both by sending strong market signals and by improving the competitiveness of renewables. **DE ●**

Figure 1: New investment in clean energy by region (\$ billion)

