

SOLAR PV FINANCE: 2014 UPDATE





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The solar industry is on the cusp of dominating power markets in coming decades. The technology is ready. The technical expertise is there. Storage is catching up and now finance for solar is getting serious.

Finance, more than anything else, is the disruption the industry needs and yield co have the potential to drive the US solar industry forward at a rapid pace. Recent yield co launches by some of the industry's biggest companies have left their competitors playing catch-up. Which is why Solar Media has launched Next Generation Solar PV Finance - a one-day summit taking place on 29 September 2014 on Wall Street, New York.

Join us in September as we examine this game-changing model, Tax Equity, Longer PPAs and more with 25+ expert speakers:

- **Jigar Shah**, Chief Executive Officer, **Jigar Shah Consulting**
- **Minh Le**, Solar Energy Technologies Office Director, **US Department of Energy**
- **Vishal Shah**, Managing Director, **Deutsche Bank Securities**
- **David L. Giordano**, Managing Director and Member, Renewable Power Group, **BlackRock Alternative Investors**
- **Albert Luu**, Structured Finance Vice President, **SolarCity**
- **David Sher**, Senior Managing Director, **Greenbacker Group**
- **Mahesh Jayakumar**, CFA, FRM, Vice President, Portfolio Manager, Global Fixed Income, Currency and Cash, **State Street Global Advisors**
- **John Eber**, Managing Director, Energy Investments, **J.P. Morgan Capital Corporation**
- **Bhaswar Chatterjee**, Head of Infrastructure & Energy Finance, Americas, **Deutsche Bank**
- **Chris Diaz**, Senior Vice President, Renewable Energy, **Seminole Financial Services**
- **Andrew Oh**, Vice President, Strategy and Project Finance, **OCI Solar Power**
- Senior Representative, **JA Solar**
- Senior Representative, **Conergy**
- **Dino Barajas**, Partner, **Akin Gump Strauss Hauer & Feld**
- **Daniel Mallo**, Managing Director, **Société Générale**
- **Jeff Eckel**, President/CEO, **Hannon Armstrong**
- **Jerry Smith**, Managing Director – Strategic Transactions Group, **Credit Suisse Securities**
- **Pierre-Emmanuel Frot**, Vice President, Solar Power Generation Business, **Schneider Electric**
- **Eric Xin Luo**, Chief Executive Officer, **Wuxi Suntech**
- **Edouard Klehe**, Chief Operating Officer, **SunLight General Capital**
- **Paul Spencer**, Founder and President, **Easy Clean Energy**
- **William Cannon**, Executive Director, **Sumitomo Corp of America**
- **Adam Nicolopoulos**, Chief Executive Officer, **ADN Capital Ventures**
- **Andrew Redinger**, Managing Director, Group Head, KeyBanc Utility, **Power & Renewable Energy**
- **John Joshi**, Director and Business Strategist, Founding Partner, **CapitalFusion**
- **Louis Berger**, Principal, **Washington Square Capital Management**

Ahead of the event, this report has been created to provide you with a comprehensive round-up of recent activity. I hope you find it useful!

Best Regards,

Jo-Anne Duff

Conference Manager, Next Generation Solar PV Finance,
New York, 29 September 2014

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<http://financeusa.solarenergyevents.com>



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SunEdison secures US\$250 million from first yield co

Major PV energy provider (PVEP) SunEdison has completed its first yield co securitisation with Goldman Sachs Bank USA, acting as the single lead arranger.

SunEdison recently noted that it plans to increase its PV project business to a scale that would require up to US\$15 billion a year in project finance capital. The company had noted that yield co vehicles as well as debt and equity deals would be used.

Carlos Domenech, CEO of SunEdison Capital said: "This is a significant step in exe-

cuting SunEdison's asset ownership strategy. SunEdison's yield co will utilise proceeds from the US\$250 million facility to acquire projects from third party developers as well as projects developed by SunEdison."

The company is planning to have a quarterly run rate of PV project completions totalling around 200MW in 2014, double the level achieved in 2013.

"SunEdison has installed over 1,000 projects, and has significant expertise as an asset manager with close to 2GW of solar



SunEdison has completed its first yield co securitisation with Goldman Sachs Bank USA, acting as the single lead arranger. Image: SunEdison

PV projects under management. We believe SunEdison's development teams and our growing partnerships with third party developers will provide significant ongoing project opportunities," added Domenech.

Solar yield co launched to 'protect EU PV investors'

The investment arm of Photon Energy has launched a new 'yield co' investment vehicle for European solar assets.

Photon said the vehicle, European Solar Holdings (ESH), had been designed to protect solar investors from the growing trend of European governments applying retroactive subsidy cuts and taxes to solar projects.

ESH will follow the yield co model widely touted as a crucial new method for maximising investment returns from solar projects.

Photon said ESH would be open to all

investors in PV power plants in Europe.

Subscribers will be able to swap their investments in power plants for shares in ESH. Once ESH has reached a target portfolio size of 250MW, it will be floated on a "major" European stock exchange, most likely in 2015, Photon said.

The target for ESH is to own-operate 1GW of PV assets by 2017.

Georg Hotar, CEO of Photon Energy, said the vehicle was aimed at protecting "bonafide" PV investors against further retroactive tax and regulatory changes such as those seen in Spain, Greece, the Czech Republic and Bulgaria.

"With no real recourse to national courts, a cynically unhelpful EU Commission and the toothless Energy Charter Treaty investors have become free-for-all sitting ducks," Hotar said.

A Photon Energy PV plant. The company has launched the European Solar Holdings yield co to protect solar investors from the growing trend of European governments applying retroactive subsidy cuts.

Source: Photon Energy.

"The high fragmentation of ownership and paper-tiger industry groups have rendered investors' defence very weak. As investors in this fundamentally attractive asset class we can either sit and pray or we can improve our defences and fight back."

Hotar said no investor in solar assets in the European Union could risk ignoring the threat of retroactive tax and regulatory measures. "This risk extends to all jurisdictions in the EU, including Germany, France and the UK," he said.

"The most recent final dismantling of the support mechanism in Spain and the consequential slaughter of equity investors and financing banks serves as the most relevant real-life example of things to come."

The yield co model has been widely used in established industries such as real estate, but is a new phenomenon for PV.

They allow investors to pool assets in a holding company, which then uses the assets to generate attractive long-term dividends.

The low risk of yield cos is expected to attract retail investors looking for steady returns.

Leading US-based PV manufacturer and developer, SunEdison, is establishing a yield co to maximise returns from its own projects and generate funds to build further installations.



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SunPower's PV project pipeline tops 7.5GW as demand exceeds supply

Major PV energy provider SunPower has said that demand for its PV modules exceeded supply and that its PV project pipeline has topped 7.5GW, boosted by around 300MW of secured projects through its majority shareholder, the oil giant Total.

SunPower noted that its project pipeline included 4GW in the Americas, 1.7GW in the MENA region, 1.45GW in the APAC region, notably Japan and China, and 500MW across Europe. SunPower's project pipeline has increased by 1.5GW since May, 2013.

The company noted that its global distributed generation (DG) business deployments in the first quarter of 2014 totalled 108MW, which included 52MW in the APAC region, 35MW in North America and 21MW in Europe, and that demand continued to exceed supply.

The company also noted that it was establishing a 'hold co' and 'yield co' strategy in relation to both ground-mount projects and its distributed lease/finance residential rooftop businesses, with at least 517MW set to be included in its new asset pipeline through 2016.

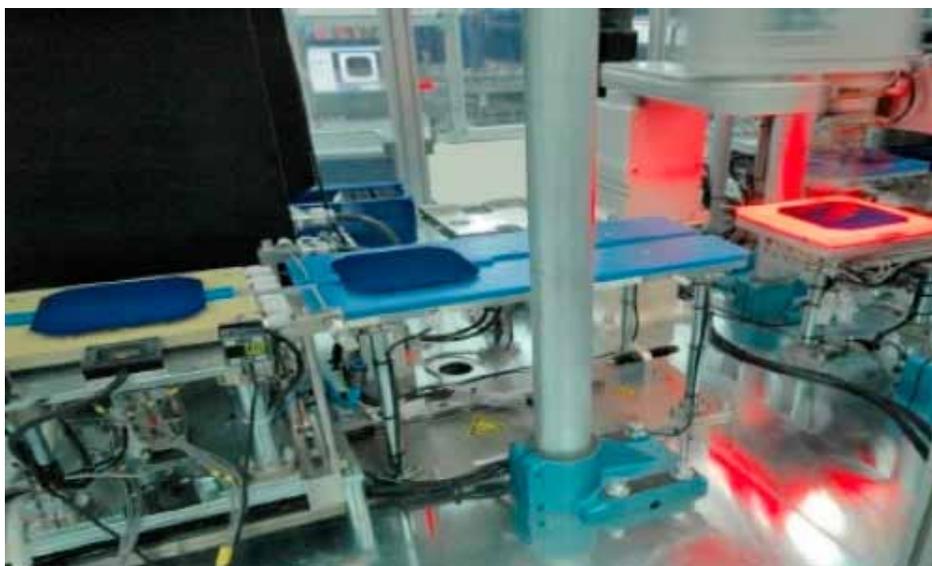
Production capacity update

Having been capacity constrained for several quarters and running production lines at full utilisation, management said in an earnings call to discuss first quarter results that its 350MW Fab 4 construction in the Philippines remained on-track to produce 50-100MW in 2014 and 250MW in 2016.

Significantly, management noted that Fab 4 technology and processes would not only produce its highest cell efficiencies but would also enable module production costs to be reduced by up to 35%, without providing further details.

Capital expenditures in the second quarter of 2014 were expected to be in the range of US\$30 million to US\$40 million mainly related to the ramp in construction of Fab 4, according to the company.

Although the expectation in SunPower's pre-earnings call was that the company could announce its next gigawatt plus greenfield production site, management reiterated that it



SunPower's management noted that Fab 4 technology and processes would not only produce its highest cell efficiencies but would enable module production costs to be reduced by up to 35%. Image: SunPower

was still in site selection mode with a decision expected in the next few quarters.

"SunPower once again posted strong quarterly results, reflecting the power of our full value chain integration and diversified market footprint. We benefitted from strong demand in our distributed generation channels as well as solid execution in our global power plant business," said Tom Werner, SunPower president and CEO.

"Construction of our new 350MW solar cell manufacturing facility (Fab 4) is on track with first silicon expected early next year. This new capacity will allow us to address the growing demand for our high efficiency solar systems and will incorporate technology that further advances SunPower's performance advantage. A pre-production solar cell incorporating Fab 4 technology was recently measured at more than 25% efficiency by the National Renewable Energy Laboratory.

Financial results

SunPower reported first quarter 2014 GAAP revenue of US\$692.4 million, up from US\$638.1 million in the prior quarter. GAAP gross margin was 23.5%, up significantly from 20.5% in the fourth quarter of 2013. Net profit was US\$65 million.

Shipments in the quarter were 327MW, down slightly from 333MW in the prior quarter, while production in the quarter was 306MW.

"We again exceeded our revenue and profit goals for the quarter as we benefitted from strong execution in all of our key markets," said Chuck Boynton, SunPower CFO. "Additionally, we strengthened our balance sheet as we successfully managed our working capital and cash balances. We were also pleased with our two new financings during the quarter. Our \$250 million Google tax equity partnership supports the profitable growth of our lease business over the long term, while the Hannon Armstrong \$42 million financing offers us a non-recourse debt structure that minimises interest rate risk, maximises the value of our existing lease assets and proves the high quality of our lease portfolio."

Guidance

SunPower guided second quarter shipments of between 275MW to 300MW on GAAP revenue of US\$500 million to US\$559 million.

However, the company raised full-year guidance on both shipments and revenue. Shipments in 2014 are expected to be in the range of 1.2GW to 1.3GW and GAAP revenue of US\$2.55 billion to US\$2.7 billion.

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SunEdison building yield co assets ahead of TerraForm IPO

Major PV energy provider, SunEdison, has completed the acquisition of a 50% interest in Silver Ridge Power, a PV power plant operator, for approximately US\$178.6 million in cash.

Formerly known as AES Solar and a subsidiary of AES Corporation, Silver Ridge Power has over 50 PV power plants in its fleet with a capacity of around 522MW, according to data on the company's website.

According to SunEdison, the acquisition means its has a 50% interest in 336MW of operating projects, including the 266MW Mt. Signal PV power plant in California.

The deal also includes a 40% interest in the 183MW Tenaska Imperial Solar Energy Center West facility, which is not expected to

be completed until sometime in 2016.

SunEdison noted that 50% of the outstanding limited liability company interests of Silver Ridge Power would remain held by an affiliate of Riverstone Holdings, although following completion of the Tenaska Imperial project the company expects to acquire Riverstone's share of Silver Ridge Power's interest in the Tenaska Imperial project.

The company is also providing O&M and asset management services for Silver Ridge Power complete project portfolio.

As a result of the asset purchases, SunEdison is bulking up its portfolio of retained PV power plants ahead of the planned IPO of its yield co, TerraForm Power. The majority of existing PV power



SunEdison has completed the acquisition of a 50% interest in Silver Ridge Power, a PV power plant operator for approximately US\$178.6 million in cash.

Image: SRP

plant assets of Silver Ridge Power are located in Europe and are comprised of small-scale ground-mounted plants below 10MW, with many below 5MW in size.

SunEdison to initiate first 'yield co' PV project investment vehicle

Major PV energy provider (PVEP), SunEdison, has submitted its first draft registration statement to establish

a 'yieldco' financial vehicle.

The company had previously said that such financial instruments would be used to gain

access to low-cost finance to support its target of doubling PV project installations in 2014.

SunEdison said that it had submitted documents to the Securities and Exchange Commission (SEC) relating to a proposed initial public offering of common stock of a yieldco vehicle.

The yieldco vehicle would include PV power plant projects build and owned by the company that have power purchase agreements or other long-term revenue streams bundled into an investment offering that would guarantee investors regular interest payments over the course of around a 20-year period.

The IRR of the yieldco would be in the range of 6% per annum or higher due to the low-risk investment conditions now granted to PV power plants.

The SEC is expected to review SunEdison's registration before the public offering can be made, though timelines were not disclosed.

Major PVEP (PV Energy Provider), SunEdison has submitted its first draft registration statement to establish a Yieldco financial vehicle. Image: SunEdison



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SunEdison yield co nets extra cash from IPO

The initial public offering (IPO) of SunEdison's TerraForm Power yield co has exceeded expectations, according to the company.

TerraForm Power received US\$535.5 million from the initial public offering (IPO) as well as US\$65 million from the sale of stock in private placements.

The company also closed a US\$140 million revolving credit facility and a US\$300 million term loan facility.

TerraForm has used some of the net proceeds of US\$436.2 million plus additional finance from a new loan facility to repay outstanding debts and related fees from its

bridging loan as well as US\$47 million of project-related debt.

A further US\$86 million will be used for further acquisitions and payments related to projects included in TerraForm's original portfolio from SunEdison.

A total US\$194.4 million remaining with TerraForm will be used for general corporate purposes, which "could include" project acquisitions from SunEdison as well as unrelated third-parties.

The yield co model is becoming the increasingly attractive to investors and renewable developer's alike. NextEra raised US\$400 million from its own yield co's IPO earlier this month.



TerraForm will look to acquire more projects from SunEdison as well as third parties.
Source: SunEdison.



Neo Solar Power raises US\$120 million in bond issue

The largest merchant solar cell producer, Neo Solar Power (NSP) has raised approximately US\$120 million in a bond issue.

According to reports, NSP was expect-

Neo Solar Power (NSP) has raised approximately US\$120 million in a bond issue.

ed to use the proceeds for raw material purchases such as silicon wafers. The convertible bond was said to be a three-year deal.

NSP recently reported June revenue of NT\$2,208 million, down 15.82% compared to the previous month, ahead of US anti-dumping rulings expected at the end of July.

Etrion completes €80 million bond issue in Norway

Independent power producer, Etrion Corporation, has issued an €80 million bond in the Norwegian bond market, with plans to list the new bonds on the Oslo Stock Exchange within the next 30 days.

The proceeds from the issue are needed to refinance its existing €60 million corporate bonds that mature in April 2015, the company said.

The company recently reported 2013 annual revenue of US\$53.9 million with plans to expand PV project development in Chile and Japan in partnership with Total S.A. and Hitachi High-Technologies, respectively.

Etrion Corporation has successfully issued its €80 million bond issue in the Norwegian bond market, with plans to list the new bonds on the Oslo Stock Exchange within the next 30 days.



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SPECIAL REPORT: Solar gets grown up about finance

While SunEdison prepares to launch a yield co in the second or third quarter of this year, three have already emerged in Europe. Is the yield co the right model for the Europe, and will we see it crop up more and more in other regions?

Last year, NRG Energy in the USA established NRG Yield, a so-called 'yield co,' or investment vehicle which seeks to securitise energy generation assets, setting up a publicly-traded company which bundles the assets into one investment fund that pays out a coupon.

NRG Yield successfully floated in an IPO in July last year, offering up 1,324MW of generation capacity represented by just over 22.5 million shares. Since then the company paid out its first dividend in October and investors have seen the dividend go up at the beginning of this year, making the yield co model the darling of the clean energy press.

NRG Yield includes a mix of conventional and renewable energy sources rather than having a portfolio consisting entirely of solar, unlike three 'pure solar' yield cos recently floated, or about to float, in the UK. In the US, NRG Yield's mix of conventional and renewable energy sources was considered 'smart', as conventional energy plants bring in income but do not enjoy tax benefits and tax depreciation as renewable energy projects do.

Rob Sternthal, president at Reznick Capital Markets Securities told Solar Business Focus' sister publication PV Tech that in the US, by mixing the two types of energy generation, "you're able to utilise depreciation and tax benefits more efficiently and the more conventional assets you have in the more renewable assets you can add."

Increasing institutional appetite for solar investment'

On the other hand, in the UK the economic drivers are different. Iwan Walters, corporate finance partner at law firm Eversheds, which advises on clean energy and sustainability, said that subsidies offered in the UK currently make favourable investment conditions, as do their perceived security.

"Most of our European neighbours have slashed or changed retrospectively the subsi-



The key thing to remember is that yield cos offer an opportunity to provide liquidity in the sector and create a vehicle or structure in which people can invest, according to Steven Baird, executive director at alternative energy consultancy Kyra Partners.

dies on offer. Whereas the UK government has said it will not retrospectively change the tariff, it applies degression," Walters said in an interview with Solar Business Focus.

The first three UK 'pure-play' solar yield cos are Bluefield Solar Income Fund, Foresight Group's Foresight Solar Fund Ltd, both already launched at the time of press, and NextEnergy Solar Fund, which NextEnergy Capital is time-tabled to have listed on the stock exchange in the second week of April. All are investment funds established in recent months in the UK, set up purely to aggregate assets in solar power. A fourth, John Laing Environmental Assets Group, includes in its portfolio onshore wind farms, waste processing projects and a wastewater treatment project along with PV plants.

Foresight Group floated Foresight Solar Fund Limited on the London Stock Exchange for £150 million (US\$249 million) in October 2013. Jamie Richards, a partner at Foresight, told Solar Business Focus the company is now negotiating further assets in line with its intention to "increase the scale of this fund significantly".

"We are seeing increasing institutional appetite for Solar investment as institutions are made aware of the low volatility and index linked yields that can be achieved," Richards said.

"The fact that we were able to refinance our portfolio of UK solar assets 10 months ago with the listing of the £60 million (US\$100 million) index linked Solar Bond on the London

Stock Exchange, fully subscribed by two leading financial institutions was indicative that the sector had come of age as offering the risk return profile that appeals to institutions."

The key thing to remember is that yield cos offer an opportunity to provide liquidity in the sector and create a vehicle or structure in which people can invest, according to Steven Baird, executive director at alternative energy consultancy Kyra Partners. Baird was among the speakers at this year's Solar PV Investment and Financing EMEA conference, hosted in London by Solar Media, publisher of Solar Business Focus, along with representatives of Foresight Group and Eversheds.

Baird explained to Solar Business Focus that the expected return of a UK yield co sits competitively between around 6% and 8%, which as a coupon on an investment is far better than the readiest comparison, a government bond. Bonds from the UK government pay out around 3.5% per annum.

With solar recognised as an asset class, the opportunity to recycle capital offered is great for the solar industry to be able to keep building and projects able to leverage equity or debt accordingly. Yield cos are looking increasingly attractive to institutional investors such as pension funds and insurance companies, which look to secure a steady return over a number of years.

So do the risks and coupons in UK yield cos balance in a reasonable way? Iwan Walters believes they do.

"It's not crazy returns, it's a stable, medi-

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um to low return, which is attractive to certain investors like pension companies. It varies depending on the stage of the project, depending on what kind of investor is interested. And you're talking here about yield cos that will only have operating assets in them. So the private equity guys who want a higher return on their money will only be interested in getting in much earlier. But with a higher return there's a higher risk."

As Steven Baird puts it, the significance of the yield co model lies in more than just its catchy name. He echoed Jamie Richards' belief that their creation in the UK is a sign of solar's growing maturity.

"The fact that solar and other renewable assets are being placed into such structures is a testament to the fact that they are establishing themselves as a separate and acceptable asset class. The fact that the press like to call these vehicles "yield cos" is only because the nature of the asset, even in an externally managed structure, lends itself to paying out much higher regular income to investors than in other competing asset classes."

UK support programmes for solar have undergone managed degeneration in recent times. The return expected by investing through a yield co might be what previous generations would have hoped for out of a generous savings account. In today's choppy waters, coming as it does with a lifespan of up to 25 years, it looks like a decent yield.

This new asset class, in the UK at least, seems to make sense, according to our commentators and perhaps some of the stronger aspects of the UK yield cos will make it over to similar vehicles that might pop up around the world. Yet while we have alluded to the fact that there will be - as with any investment class - risks and hopefully rewards commensurate with those risks.

The main risk for the investor comes with looking very closely at the prospectus and identifying exactly what each yield co is promising to do as well as promising not to do. For example, some will only allow the asset manager to continue to operate the fixed capacity in operation at the beginning of the fund for its duration, while others will allow for capital reinvestment or additional inflows of capital. The investor's due diligence should also include looking very closely at the track record of the asset manager and the company setting up the fund.

An example of the kind of due diligence

and the risk involved, Iwan Walters mentioned the importance of solar panel selection when investing in a yield co structure. Walters said that, again, as the long-term performance of the investment is linked to the lifetime of the PV plants, it is better for a yield co to spread risk across a greater base by utilising several PV panel suppliers in its portfolio.

According to Walters, for a fund manager, setting up a yield co involves a "huge amount" of due diligence and legal work on how the fund is structured and what protection investors will get if everything goes wrong.

Jamie Richards at Foresight says that it took six months from the decision to float Foresight Solar Fund to the IPO taking place and describes a busy period in which the company appointed a brokerage which "approached city institutions, appointed advisers and negotiated binding contracts with owners and or developers of utility scale solar plant owners," as well as drafting the Prospectus, a process which involved four legal teams in two jurisdictions and three accountancy practices. Richards says the busy final period before the IPO included 100 meetings in five weeks.

Bilateral investment treaties

Photon Energy, headquartered in the Netherlands but with trading roots in the Czech Republic, also claims it has a yield co to launch. As a relatively small solar company acting as a general contractor and developer in addition to owning, operating and maintaining 26MWp of PV in the Czech Republic, Slovakia and Italy, chief executive officer Georg Hotar claims retroactive cuts to subsidies in the former caused a "corporate near death experience."

Now Photon Energy has founded European Solar Holdings, which Hotar hopes after offering an IPO in 2015, will be "one of the first yield cos in Europe giving investors steady returns from a portfolio of PV assets across the European Union".

The Photon Energy offering will not work in a drastically different way to the Foresight yield co and others. An aggregated portfolio of energy generation assets will serve to provide dividends for a group of investors, at a steady but attractive return. However, Georg Hotar explained that part of the reasoning behind launching the Euro Solar Holdings fund comes from previous bitter experience.

Hotar claims Photon Energy has struck upon a new way to protect investors' interests.

"We've spent a lot of time looking at ways we can still get protection for our own investment for us and other investors and we have come up with a defence strategy that is based on the bilateral investment treaties that host countries of the various power plants have with non-EU countries," said Hotar.

"...We are talking about millions of Euros in arbitration and legal fees and the idea is to spread these fixed costs over the largest possible installed base. So the lesson that we can see from investors that have grouped together to pursue legal action against Spain and the Czech Republic is that these costs are really high, and it's really necessary to have economies of scale, otherwise even for relatively large investors, the cost is too high and the cost of defence is too high. This is what we're trying to do and we believe there is demand for it."

It was difficult to pin down anyone who wanted to comment on the record as to whether the claims made by Photon Energy are likely to be substantiated. One source who did not wish to be named said it had a chance of working but impossible to prove until tested.

And why not?

As for the wider question of whether yield cos can work in Europe, Jamie Richards says Foresight believes they can.

"We don't see why not - in Italy our JV partnership with VEI Green, ForVEI, which has the support of CDC Infrastructure and other institutions has just announced a doubling of its commitment to the Italian solar sector to €75 million (US\$103 million)."

US PV plant owner and operator SunEdison only submitted its draft to establish a yield co in late February, and at the time of writing the company was unable to provide comment on the proposed investment vehicle. It stands to reason that it will be different in scope to the UK models and may require a degree of innovation to give a competitive yield in a different market. It is widely expected to be used to raise capital to finance future PV projects, for example.

It will be interesting to see if it and other recent yield co variants including Photon Energy's European Solar Holdings are successful. If so it could also be that the post-subsidy age of solar is characterised by steady investment rather than boom and bust spending.

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AEG Power expects bond restructuring success

Struggling power electronics and PV inverter manufacturer, 3W Power/AEG Power Solutions, has won approval from shareholders and bondholders to convert its €100 million bond by issuing a new €50 million bond and a debt for equity swap for the remaining €50 million.

AEG Power has faced continuing financial problems, partially due to the highly competitive PV inverter market, and has suffered from cash flow issues that have led to a number of business and asset sales as part of a major restructuring effort.

Agreements to restructure bonds at an AGM also approved the election of new directors to the company, including Dr. Dirk Wolfertz, Bernd Luft, Willi Loose, Jeffrey Casper, Keith Corbin and Klaus Schulze.

The company posted first quarter 2014 revenue of €45.4 million, down 51.9% year-on-year.

However, AEG Power expects revenue of approximately €220 million in 2014, while returning to positive EBIT and liquidity of approximately €20 million at the end of the year.



3W Power/AEG Power Solutions is to convert its €100 million bond by issuing a new bond valued at €50 million and a debt for equity swap for the remaining €50 million.

SolarCity's latest US\$70 million share offering is 'evolutionary step'

US installer SolarCity has announced pricing details of its second securitisation, which investment banking firm Roth Capital has described as an "evolutionary step on the path to lower-cost financing".

SolarCity is offering US\$70.2 million in 'Solar Asset Backed Notes' through its subsidiary, SolarCity LMC Series II. The notes will therefore be secured entirely by cashflow from PV, consisting of a pool of PV system assets, related leases and power purchase agreements (PPAs) as well as ancillary rights and agreements.

Notes for the latest round were priced on 2 April with the sale expected to close by 10 April, subject to conditions. Credit Suisse is sole agent and bookrunner on the securitisation.

Yield payable on the latest deal is set at 4.59%, in contrast to the previous US\$54 million deal where interest was 4.8%. The anticipated repayment date for the US\$70.2 million has been announced as April 2022, for a term of eight years, versus the previous round, where repayment will take place over 13 years.

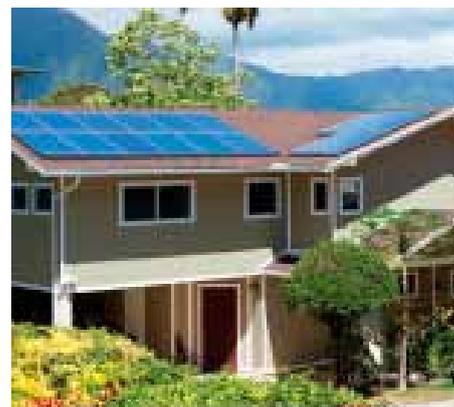
Roth Capital commented that investors may have originally expected a deal exceeding US\$100 million, the deal was limited by cash grant assets held by SolarCity and was also oversubscribed. The banking firm said that in a flash note on the deal that SolarCity, having altered the values of several key vari-

ables, is gauging the market to assess demand for its asset-backed securitisation (ASB) products. These variables include the advance rate, maturity and underlying asset profiles of the deals.

Roth Capital also noted that the new deal includes 6,596 PV systems, of which 87% are residential, while the prior deal consisted of 71% residential systems out of 5,033. This was among several "interesting differences" between the two deals, according to Roth, while weighted average electricity price in both offerings "appears similar" at US\$0.15 per kilowatt.

According to Roth, the majority of the next ABS deal offered by SolarCity will most likely comprise of tax equity. Roth put a price target of US\$80 on shares, having made a valuation of SolarCity based on a discounted cash flow model, before highlighting some of the risks that the company could face. These include SolarCity's reliance on key management talent including the co-founders, Lyndon Rive and Peter Rive, an IRS audit currently taking place and its reliance on net metering programmes. The note did however describe curtailment of net metering programmes as "unexpected".

The company previously raised US\$54 million through a securitisation which was launched in November 2013. Shayle Kann of GTM Research explained to PV Tech at the time of the previous deal why he felt it "broke



A SolarCity residential installation in Hawaii. SolarCity is offering US\$70.2 million in 'Solar Asset Backed Notes' through its subsidiary, SolarCity LMC Series II.

Image: SolarCity.

down barriers" for the US market.

Also announced this week was news that PV system designer and manufacturer SunPower has raised US\$42 million in non-recourse debt in order to finance the company's residential lease programme. Hannon Armstrong Sustainable Infrastructure Capital (HASI) will provide the financing.

According to SunPower, the deal will allow it to leverage existing lease programme assets and expand the programme as well as increasing cash position and improving its balance sheet. SunPower chief financial officer Chuck Boynton called the deal with HANI an "innovative partnership".

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Wells Fargo and Strata Solar team on nine North Carolina PV power plants

Banking giant Wells Fargo has invested US\$100 million of tax equity financing in nine PV projects in North Carolina.

Power from the utility-scale projects, built by Strata Solar, will be sold to state utility Progress Energy Carolinas.

Strata Solar said three of its projects – Bladenboro, Wagstaff and Nash 58 – exceeded 6MW in capacity, though a total capacity for the projects was not given.

All projects will take advantage of the 35% tax credit offered to renewable energy projects in North Carolina.

The policy has helped North Carolina become one of America's top performing solar states. According to analysts NP

Solarbuzz, last year the state leapt three places up the national rankings for solar, coming in second to California for capacity installed in 2013.

Markus Wilhelm, Strata Solar's CEO, said: "These projects bring jobs, significant local spend, and an increase in the tax base without the requirement of county dollars which is typical of development projects. On a number of occasions we've witnessed these projects having an impact on attracting additional investors who are looking for business-friendly environments."

Since 2006, Wells Fargo said it had provided over US\$4 billion in tax equity and construction financing for renewable energy



Strata solar Project, north Carolina. The company received US\$100 million from Wells Fargo to invest in nine projects in the state.

Image: Strata Solar.

projects, including over US\$1.3 billion for more than 300 solar projects.

Kyocera, US Light Energy partner on US\$38 million New York PV projects

Kyocera will invest in US\$38 million worth of PV projects in New York State, after entering a tax equity partnership agreement with installer US Light Energy.

Through the partnership, the Japanese PV and systems manufacturer will be able to leverage federal Investment Tax Credits (ITCs) at the 30% rate. The company's US sub-

siary Kyocera Solar, is headquartered in Scottsdale, Arizona.

US Light Energy, which was previously known as New York Light Energy and is still listed under that name on its company website, is currently in the "final stages" of installing 9.4MW DC of PV plants, according to Kyocera. Under the terms of the partnership agreement between the two companies, US Light Energy will utilise Kyocera Solar modules on all its installations. The 9.4MW of projects currently under construction are scheduled for completion in June this year.

Alex Lieb, chief executive of US Light Energy, cited Kyocera's competitive success over 20 years in the solar module market as a key factor in US Light Energy's decision to select the company for the partnership.

Kyocera claims the partnership has already led directly to the creation of 50 jobs. Both parties claim to have "high expectations for growth in 2014 in the North East (US) region and beyond".



A commercial rooftop PV plant constructed by US Light Energy in Albany, New York.

Image: US Light Energy.

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SolarCity continues installation race ahead of US tax equity changes

The largest US solar installer, SolarCity deployed 280MW of PV installations in 2013, with plans to top 500MW in 2014 as it continues to race towards installing as much PV as possible before US tax equity incentive schemes are significantly reduced in 2017.

The company reported that it had its 100,000th customer in March 2014 and guided residential booking to surpass 100MW in the first quarter of 2014, supporting its guidance of a back-half year loaded installation environment that should support deployments of between 475MW to 525MW for the full-year.

SolarCity reiterated that operating Lease and Solar Energy Systems Incentives revenue in the fourth quarter of 2013 was US\$22.4 million, up 79% from US\$12.5 million in the fourth quarter of 2012, with a gross margin of 48%. Total revenue for the quarter was

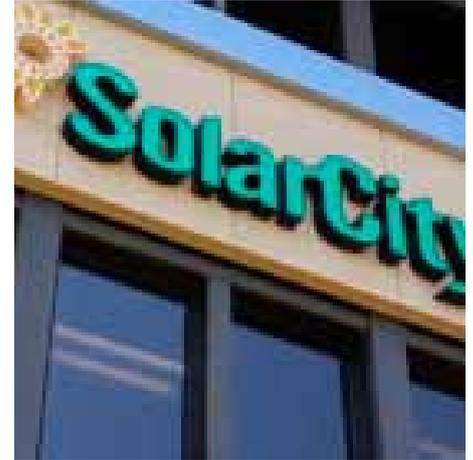
US\$47.3 million.

Profitability remains an issue with the company reporting a loss from operations US\$55.3 million, compared to US\$32.3 million in the fourth quarter of 2012. Total operating expenses increased 78% in the fourth quarter to US\$65.2 million, compared to the fourth quarter of 2012.

SolarCity's strategy is to push the expansion of its operations as fast as possible, knowing that it has just short of two years to attract customers before cuts to tax incentives for solar installations could prove a major obstacle to further adoption via its lease business model.

The company guided first quarter 2014 operating expenses would increase further to as high as US\$75 million as it expands its sales efforts.

The company has increased its contracted payments under its lease and PPA arrange-



The company has increased its contracted payments under its lease and PPA arrangements to over US\$2 billion (10-20 years), an increase of over 80% from US\$1.1 billion in 2012.

ments to over US\$2 billion (10-20 years), an increase of over 80% from US\$1.1 billion in 2012.

Vivint Solar secures US\$280 million for residential project funding



Major US residential PV provider, Vivint Solar has secured new tax equity transactions that would enable the company to fund around US\$280 million worth of PV system installations.

The company said it had already expanded operations in key markets such as California, New Jersey, Maryland and Massachusetts and would be expanding into further regions in 2014.

"In 2013, we grew our customer base by nearly 300% with our past fundraising efforts," said Greg Butterfield, CEO of Vivint Solar. "This new US\$280 million tax equity funding enables us to continue our expansion plans to deliver affordable solar solutions to homeowners."

According to GTM Research, Vivint Solar is the second largest US residential PV installer after SolarCity.

Vivint Solar has secured new tax equity transactions that would enable the company to fund around US\$280 million worth of PV system installations. *Image: Vivint Solar.*

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US\$550 billion renewables investment needed annually to avert 'catastrophic' climate change

US\$550 billion of investment is needed every year till 2030 to secure the transition to sustainable energy and to keep below a 2°C rise in global temperatures, according to Adnan Amin, director general of the International Renewable Energy Agency (IRENA).

"We need to double the level of investment that we are seeing today to significantly scale-up renewable energy and reduce carbon emissions to an acceptable level," said Amin at the Renewable Energy Financing Forum's (REFF) Wall Street event in New York last week.

Investment would also increase energy efficiency and see renewables account for 36% of the globe's energy, he said.

"This level of investment together with energy efficiency measures will help mitigate the catastrophic impact of climate change," said Amin.

IRENA said most of the investment is to go towards solar, wind and hydropower, creating nearly a million jobs by 2030.

"The emerging challenge we are facing today is financing renewable energy technologies in the end use sector. This is crucial to make the renewable energy transition complete," said Amin.

The investment would also save US\$80-200 billion a year in health related costs, according to IRENA's estimates.

At the beginning of June IRENA released its Renewable Energy Map (RE map) stating global solar deployment needs to increase by a factor of 12 and calculated the switch to renewables will also provides US\$740 billion of savings each year on environmental costs from burning fossil fuels – cancelling out the investments costs required to reach 36% renewables.

On the release of the REmap Dolf Gielen, director of IRENA's innovation and technology centre said, the world is "not on that path" to increasing renewables yet.

"All governments need to step up their efforts. We need to act now," said Gielen.

The latest IPCC report states: "Additional investments required in the energy supply sector by 2050 are estimated to be US\$190 billion to US\$900 billion a year to limit the temperature increase below 2°C."

The IPCC report also cited examples of renewables employment from Germany and Spain as "noteworthy where 500,000 to 600,000 people could be employed in the renewable energy supply sector in each country by 2030".

Already this year, the European Investment Bank is to provide US\$1 billion to support renewable energy development, US\$219 million has been invested in the Danish Climate Investment Fund (DCIF) from various pension funds, and US\$8.4 billion is to be invested in renewables from Norway, via its oil-generated sovereign wealth fund, Government Pension Fund Global (GPF).

IRENA consists of 130 states and the European Union for cooperation in renewable energy.

Energy storage to benefit in US\$4 billion loan guarantee scheme

The US department of Energy has included energy storage projects in a US\$4 billion loan guarantee programme announced yesterday.

The programme is intended to help support new renewable energy and energy efficiency projects in the US that help to mitigate greenhouse gases, as part of President Obama's Climate Action Plan.

The department singled out advanced grid integration and storage as a core focus.

The loan guarantee programme is aimed at supporting the deployment market ready clean technology to scale in the US, to aid finance for projects that improve renewable energy variability, dispatchability, congestion, and control, for example by funding demand response or local storage.

The department hopes this will allow great-

er grid compatibility, so renewables can take a larger role in US power generation.

The department also identified preferential projects as: drop-in biofuels, waste-to-energy, enhancement to hydro power, and efficiency improvements as key areas of interest.

The loan guarantee was awarded from the department's Loan Programs Office.

As part of the Renewable Energy and Efficient Energy Projects Loan Guarantee Solicitation, a 30-day comment period to gain public commentary with six public meetings was held in advance of the loan's announcement.

Energy secretary Ernest Moniz said it was "critical" to "address the effects of climate change and protect our children's future", adding that the investment would provide economic opportunity and jumpstart low car-



Storage will be included in the US\$4 billion loan guarantee programme announced yesterday.

Source: Flickr/Portland General

bon and clean technology industries.

Previous loan guarantees have supported PV, CSP and wind projects, including the world's largest PV project, Agua Caliente.

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Q CELLS back in the game

The list of companies that went bankrupt, restructured, consolidated or exited the PV industry up and down the value chain over the last two years is a long one.

One of the major bankruptcies was Q-Cells. The manufacturer had made all sorts of attempts at business restructuring, but pesky bondholders brought proceedings to an end and a Korean conglomerate ultimately took over the company.

Even when companies undertake a successful restructuring the challenge afterwards is not that they regain bankability but often the more subtle but no less critical restoration of credibility, not least if the company is a PV manufacturer.

Fast forward over a couple of years and Hanwha Q CELLS is on much stronger financial foundations and is riding the boom in the industry once again.

In mid-May this year, the company issued a press release claiming that it had reached a positive operating result in the first quarter of 2014 and was now “the largest European PV provider”.

It should be immediately pointed out that the company has not been public since being sold through receivers so claims of financial performance are not transparent.

However, the fact that the company also noted claimed shipments of 247MW and a module production volume of 244MW in the first quarter of 2014 is welcome; even though unverifiable, the figures are the first the company has publically provided since its takeover, a sure sign that things must be going well.

Indeed the shipment figures (believed to include module tolling by sister company Hanwha SolarOne in China), suggest Q CELLS’ production utilisation rates are high and suggest facilities in Malaysia and Germany are probably close to running at full capacity.

Though the 244MW production figure for Q1 suggest the company is at its 1GW annual run rate, additional capacity is being added in Malaysia with equipment ordered (de-bottlenecking mainly), nameplate capacity is expected to reach 1.3GW mid this year.

It comes as no surprise that Hanwha Q CELLS CEO, Charles Kim, said that the



Busy trade at Q CELLS booth at the recent Intersolar Europe event. *Image PV Tech*

company had “successfully managed the turnaround and today is the largest European Photovoltaics provider”.

I would have to agree with the turnaround aspect but will leave the PR spin based on meaningless metrics for others to debate. A more meaningful metric was the fact the company said it had increased its workforce to 1,350, up from 1,225 previously.

Returning to full capacity not only provides the company with greater revenue but it was quite clear at Intersolar Europe that booming business has given the company renewed optimism and confidence.

This was typified by Kim when speaking with PV Tech during Intersolar Europe, the first time the executive has been made available to press since taking charge of the company in October 2012.

Kim reiterated that shipment growth was confirmation of the turnaround in the company’s fortunes and said the company had the capacity to expand to meet future demand.

The CEO noted that its focus on high-efficiency modules and rooftop markets was paying off, as confirmed by Japanese PV magazine, Solvisto, which recently said that the company was the top foreign PV provider in Japan.

“Our high-efficiency Quantum cell tech-

nology enables customers to maximise self-consumption and maximise returns, especially in key markets such as Japan,” noted Kim.

Kim pointed to key rooftop markets as the UK, Germany and across Europe as well, and emphasised that rooftops markets would continue to be strong markets for the company.

However, when asked about the possible new business opportunities open to the company pending the outcome of the latest round of anti-subsidy and anti-dumping investigations into Chinese producers by the US, Kim was more cautious in his remarks.

“I guess we will be waiting and seeing,” responded Kim, recognising that the US has been a good market for the company in the past, notably in downstream PV project business.

Kim wouldn’t be drawn on the idea of either expanding capacity in Malaysia or building a new plant to meet potential increased US market demand, especially as the company under different management had planned to build a plant in Mexico to do just that.

That said, Kim was confident that the company had the ability to expand to meet demand, especially in the rooftop space.

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The Wild West of solar project finance

The solar industry is looking around for fresh sources of project finance. Felicity Carus explores some of the new frontiers that are opening up

Solar finance has seen dramatic change thanks to third party financing in the US. But innovations in asset financing are emerging that could transform the way homeowners and businesses pay for solar installations and accelerate growth of the US market at unprecedented levels.

Bank loans, power company investments and government funding have to date mostly fuelled market growth to more than 6GW of installed cumulative capacity, a figure that is set to soar to 30GW by 2020, according to Bloomberg New Energy Finance (BNEF).

Michel Di Capua is head of research North America at BNEF in New York, and authored a white paper last year, *Re-imagining US Solar Financing*.

"Solar is a success story, all things considered," says Di Capua. "We can talk about pinch points but in general there is a good degree of excitement about a combination of factors, low cost systems, new markets beyond California and a greater realisation among customers that the economics for solar finance and third party finance leases can work."

In that same report, however, BNEF reported last year that asset financing for US PV projects has grown annually by 58% since 2004 and surged to \$21.1 billion in 2011, fuelled by the extension of the Department of Treasury 1603 cash grant programme.

But traditional channels of funding have already been stemmed or will run dry in the near future. Basel III regulations implemented after the 2008 financial crisis restrict the length of loans from European banks to US developers, federal loans and cash grants from the American Recovery and Reinvestment Act are no longer available and the Investment Tax Credit will be reduced from 30% to 10% in 2016. It is estimated that as many as 40-50% of projects would not be economically viable without the ITC. In addition, many state-based programmes such as Renewable Portfolio Standards and the California Solar Initiative are reaching their mandated targets.



The 500MW Topaz Solar project in California The 500MW Topaz Solar project in California had a successful \$850 million bond issue. Source: First Solar.

Kristian Hanelt is the Senior Vice-President of Renewable Capital Markets at Clean Power Finance, a third-party intermediary that connects financiers with installers who can draw down from six funds totalling \$600 million with investors such as Google and Morgan Stanley.

"The industry is realising that the free lunch is over," says Hanelt. "Panel prices have dropped precipitously; there's not much more room for them to drop. Really the last two things that need to go down are the cost of acquiring a customer and the cost of capital. The industry is looking ahead to 2016 and there are not a lot of new states that are going to be effectively funding renewables around the country.

BNEF analysts estimate that funding the anticipated US growth of PV until 2020 will require about \$6.9 billion annually. But participation in solar investment is going to have to expand dramatically to meet these costs.

Less than 5% of the country's 6,500 banks and lending institutions are involved in financing solar, according to the truSolar Working Group launched this month to reduce the cost of finance by developing project standards in the industry. Google is one of the few major non-energy corporations involved in solar and new funding mechanisms are

essential to capture the attention of other corporations and Wall Street, potentially unlocking hundreds of billions of dollars in the capital markets.

Solar projects require three types of capital in the construction phase: equity; debt; and tax equity. Utilities or independent power companies often provide the 20-30% equity, such as NRG Energy, MidAmerican Energy, who have large enough balance sheets and can raise their own capital by issuing more stock. Typically, banks such as JP Morgan will make loans to developers that will be repaid via interest payments of around 6-7%. Tax equity investors with large liabilities, such as Wells Fargo, that use the ITC to offset taxes can expect a 14-18% yield.

Financing has been made more expensive by the reduction in the loan's "tenor" –how quickly the loan needs to be repaid – thanks to Basel III, from an average of 15 to 20 years before the financial crisis to seven to 10 years.

Partho Sanyal, managing director of global energy and power group at Bank of America Merrill Lynch, says:

"When you finance with shorter tenor debt, effectively you're making it more expensive because either you have to re-finance the debt after, say, 10 years, and that adds addi-

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tional risk, or you're amortising the debt over a 10-year period instead of a 20-year period and that has a cost. If there are fewer dollars available that hits the bottom line, which makes the project less profitable. So the financing terms have changed and that has indirectly increased the cost of capital."

SolarCity's successful IPO last year proved the economic effectiveness of third-party financing, where customers can have solar installed on their roofs with little or no down payment. A customer will reimburse the third-party through monthly payments at a fixed cost, or power purchase agreement payments based on how many kilowatt hours the system produces over a 10 to 25-year contract period.

SolarCity was the first developer out of the gates to the public markets. But SunRun, another California company with a third-party business model, is expected to launch a radical financial innovation very soon on the public markets.

Securitisation has become a dirty word since 2007/8 when derivatives of mortgage debt precipitated the housing crisis. But adoption of mortgage-based asset-backed securities drove significant decreases in the cost of capital for homeowners. A similar effect could happen in solar, claim BNEF analysts.

In addition to third-party financing and securitisation, there are other funding mechanisms gathering momentum. Project bonds have already been successful for sizeable projects. Early last year, MidAmerican Energy raised \$850 million from a bond issue for its 500MW Topaz project.

Master limited partnerships (MLPs) are exempt from income tax but their shares still trade on the public markets. MLPs are used extensively in the oil and gas industries, but are not yet available for clean energy projects without legislative action.

Solar real estate investment trusts would expand tax benefits for property investors to

solar. Yield companies could see the operations division of a clean energy company publicly traded, while the riskier development division remains private.

Tax equity investors tend to need to deploy \$15 million-\$30 million because of high transaction costs. But crowd funding can allow smaller investors to participate in individual solar projects.

Constantino Nicolaou is president of PanelClaw, a mounting systems company that has thrown its weight behind truSolar's push for data-driven standards and codes. Without uniformity in evaluation standards, the US market will struggle to find access to capital as risk will always be over-priced, he says.

"We've moved from the Wild West phase of products and installers and developers to the exciting Wild West phase of financing," Nicolaou says. "There are so many people developing so many creative models to deploy more PV that it's an exciting time."

Barclays cites solar threat as it downgrades entire US utility bond market

Barclays downgraded the entire high grade corporate bond market for the US electric sector last week in a strong indication that solar PV-generated power coupled with storage presents a long term disruptive risk to utilities.

US financial news outlet Barron's reported on its blog that the credit strategy team at Barclays had downgraded the entire sector to 'underweight'. The report claimed that the utility industry is not preparing itself for the long-term challenges presented by solar, and in particular by residential solar, coupled with energy storage.

According to Barron's, Barclays believes the position of electric utilities as "a sturdy and defensive subset of the investment grade universe", will be threatened by the "confluence of declining cost trends in photovoltaic (PV) power generation and residential scale power storage". The combination of these two trends, falling costs in solar and the increased deployment of residential energy storage, is the first truly cost-competitive substitute available for grid power for over 100 years, the

Barclays credit strategy team claims.

Colorado-based sustainability research organisation Rocky Mountain Institute issued "The Economics of Grid Defection" in February, a report which looked at the possibility of "defecting" from grid networks by using a combination of solar power and electrical energy storage (EES) in five US regions. In Hawaii, solar-plus-storage has already reached grid parity, while New York could reach grid parity for such systems by 2025. The Institute claimed that even before grid parity is reached, solar-plus-storage systems could eat into utilities' revenues.

Barron's reported Barclays' recommendation that in the near term, investors should seek to move away from holding bonds in utilities in those regions where grid parity was closer and seek out bonds in markets where this competitiveness remains more distant. Barron's also quoted Barclays where the bank explained that the market is currently ignoring these disruptive risks, to some extent ascribing this inertia to "biases or analytical complexity".

Similarly, in March, former US energy sec-

retary Steven Chu said that in order to remain competitive, utilities need to respond by applying a new business model to prepare for the likely coming of cheap solar power and falling prices of residential storage batteries. Speaking at a University of Chicago event, Chu explained that it was possible to envisage a situation in five to 10 years where homeowners could be 80% 'self-sufficient' and off-grid with a US\$10,000 to US\$12,000 solar-plus-battery system.



Barclays explained that the market is currently ignoring these disruptive risks, to some extent ascribing this inertia to "biases or analytical complexity", according to Barron's. Image: Flickr/AdamKR.

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Breaking free: can solar survive without subsidies?

PV pundits frequently talk up the prospects of a solar industry operating without subsidies. But what would such a world look like, how would it work and are we anywhere near reaching it, asks John Parnell

A subsidy-free solar energy landscape has been the industry's Promised Land for a long time. Parts of the world already claim to have made it. Many bet big on predicting where the next subsidy-neutral opportunities could appear. Chile has been tipped by Deutsche Bank as a potential market for a sustainable solar market with rising demand for power, high electricity prices and high solar irradiation. It is one of many markets that Deutsche Bank to reach sustainability.

So how far away are we from the prospect of a widespread solar market walking on its own two feet?

Within the sector all the signs would suggest that is where it is heading. Technology costs are continuing to fall. Manufacturers emerging from the other side of a period of consolidation now appear to be on the brink of a growth period. Investment in research and development is set to rise, albeit cautiously, and manufacturers are beginning to talk about raising their capacity.

New emerging markets are likely to offset the slowdown in Europe, and competing technologies, particularly nuclear, are struggling to improve their offering.

Despite all this, the odds remain stacked against wholesale freedom from subsidies in the immediate future.

Cédric Philbert, senior analyst with the International Energy Agency's renewable energy division expects them to be necessary for the foreseeable.

"The IEA expects adjustments to subsidies based on reduced PV costs, not their disappearance," he says.

"Feed-in tariffs (FITs) in many countries, Germany for example, or net metering in most US states or more complex incentives systems as in Italy, remain important. Concerns have been voiced about their costs. However, plummeting PV costs allow for strongly reducing the level of subsidies involved in support mechanisms."

Edmund Phillips, senior manager with the

energy consultancy Baringa Partners, says even if subsidies are not going to vanish tomorrow, the falling costs of solar and the possibility of a sustainable industry must be included into investors' long-term planning.

"We're getting to a place where grid parity is becoming relevant. A utility may be making investments on a 25-year timescale and making forecasts of what retail electricity will cost throughout that period as part of the process," he says.

"Currently utilities have the comfort of making investments in solar with a government's assurance that they will know what they will make from that investment for 20 or 25 years. If that was removed and solar was suddenly competing on its own terms that would be a radical departure from the current circumstance. It's hard to imagine people continuing to invest in solar in the same way if tomorrow subsidies were removed.

"Hopefully we will arrive at a point where the industry is more sustainable and is in a more steady and predictable state of growth. That way instead of chasing subsidy regimes and landing on the next country that offers a juicy feed-in tariff the industry can actually do things in a more long-term and sustainable way. Investments could be made on a more economically rational basis, in areas with the best solar resource and the highest electricity prices."

Are we nearly there yet?

Europe is the most developed PV market with the longest running policy support schemes and well-developed supply chains. The EU-China trade row coupled with the recession has cut PV growth, while changes to support schemes have slowed that growth in key markets such as Italy, Spain and even Germany.

So what needs to be done to get the market in Europe to a point where it too can consider the prospect of a subsidy-free solar electricity market?

"A lot," says Frauke Thies, policy director at the European Photovoltaic Industry Association (EPIA).

"We can't even speak about a whole-sale [electricity] market on the basis that

PV can enter and compete. The market is designed to suit a largely fossil fuel, partly nuclear, centralised electricity system and of course PV has a different nature and different needs."

For Thies, a sustainable solar industry is not as much about subsidy reform as it is about an overhaul of the entire electricity market structure.

"I don't think we will talk about subsidies in a couple of years from now. The issue is about how electricity is remunerated. What we need to find is a market design in which power generators get remunerated for the electricity that they generate. It is highly questionable if the current market design can do that with PV. It is sold at very low marginal costs and if the market price goes down the revenues get lower and lower. Somehow a market design needs to be found that is healthy and stable to ensure sufficient prices can be generated on the markets themselves.

"Even though PV is approaching competitiveness on the basis of generating costs quite rapidly, that theoretical competitiveness does not equal market competitiveness under the current circumstances," she warns.

While Thies admits it is hard to describe what this market may look like, she suggests that improved interconnections and a move toward a single European market could help.

"I think generally we are headed for a larger European electricity system integration which makes perfect sense when you look at the integration of renewables and at keeping costs affordable to balance power [supply and demand] across regions.

"But, let me clarify that, Europeanisation can bring advantages but I'm not talking about massive investment in interconnected systems. The beauty of PV is that it is quite decentralised and much of what we would be doing is trading on the regional. We're not talking about enormous scale interconnections with outrageously high costs."

Avoiding the Spanish Requisition

The pitfalls of relying on subsidies have been amply demonstrated in Spain. The country's over generous FITs triggered a boom in PV

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deployment that saddled the government with a US\$34 billion deficit that was set to grow by an additional US\$5.9 billion this year alone.

Spain's economic growth pre-recession was also catered for with a raft of other new electricity generation investments, many of which now lie moth-balled. The government installed 26GW of gas fired power between 2002 and 2010. It estimates that its installed capacity has exceeded 100GW while peak demand is now closer to 40GW.

Drastic times call for drastic measures and the country's biggest utilities, many themselves owed money by the government, needed something very drastic indeed.

The retroactive cut to solar support caps investors' profits at around 5% (after tax) of their outlay. In many cases this is less than the rate of borrowing that funded the projects in the first place. Support from Madrid has turned into government mandated losses.

A first step on the way to a sustainable solar industry could be sustainable support regimes that consign the events like the volatility in Spain to the past.

"If governments want to continue to encourage solar deployment but avoid the situation such as the one in Spain, where subsidies were locked in for the long term, the obvious solution is to persevere with the current situation," says Phillips.

"The FIT remains, but it continues to step down year on year as the competitiveness of solar improves. Eventually the level of the tariff offered continues to close down to the point where it is only marginally different to the prevailing retail price of power. Rather than providing a premium on that price, you are just providing that certainty.

"It will be good for solar, it will become more mature and less focused on political interaction and policy analysis. Decisions will be made on an economic basis and a more stable industry will develop," says Phillips.

These are lessons that promising emerging markets like Chile and others would do well to draw on.

Grid parity

'Grid parity' is the largely accepted mainstream measure of how far a particular market has come towards a point where it

would be able to jettison subsidy support. Phillips warns that putting all the focus on this particular metric is not necessarily wise.

"There were articles earlier in the year that were claiming 'Grid Parity: Arriving in a European Country Near You' and linking that to the end of subsidies or government intervention in the solar market. I think that is unlikely," he warns.

"Grid parity is a milestone on the way to the destination of the solar business but it does not by itself herald the arrival of solar competitiveness.

"It's a term that gets bandied around quite a lot and used quite extensively in consideration of solar, it's a nice catchy term that sticks in the mind. It seems to have an obvious meaning but actually it's not as clear cut as is made out. It depends on a calculation that is quite complicated and itself depends on a number of assumptions. It's not an obvious thing, it's not like there is a light that comes on when it is reached, it is subjective to some extent."

One region frequently touted as having reached grid parity is San Diego in California. A combination of high insolation, rising electricity prices (they jumped 20% for some customers recently), the state's 33% renewables target for 2020 and air conditioning related daytime demand make the region perfect on paper.

So is anything holding back a sustainable, subsidy free market in California?

Michael Powers, vice president of sales and marketing at Steller Solar in San Diego has been involved with the industry for 10 years. He says the utilities needs to change their entire mindset about the power market if solar is going to be unleashed to its full potential and says they could learn some lessons from the transition telecoms giants have worked through.

"If the telecom companies behaved the same way as the utilities we'd still be making calls on rotary phones," says Powers.

"It's a joke but it is sort of true. [The market] is so heavily regulated, it has created a big barrier to changing the utility companies' model."

Telecoms companies have switched from owning the infrastructure and charging for access to providing a wider array of services, renting their networks to virtual operators and turning a very binary service into the backbone of modern productivity,

entertainment and communication.

Utilities' grip on grid access is holding solar back in the US, but a new grid connection project could undo that he says.

The US grid is currently split into three with Texas and other parts of the south on one grid, and the rest of the lower 48 split east and west by the Rockies. The Tres Amigas Super Station in New Mexico will knit these three together for the first time. It could eventually permit the exchange of surplus solar power into different time zones that are experiencing their peak demand.

"It's often said that if the grid capacity was up to it, there would be 30% more wind power built in the US than there is now."

Powers says improving grid technology will help manage the complex demands of a renewable-heavy network in the future, leaving one last piece of the puzzle. "The question will be the finance," says Powers.

Deutsche Bank's report triggered more of the reactionary news coverage described by Phillips, much of which missed out the disclaimer included by its author Vishal Shah, chiefly that all this potential will be constrained by regulatory conditions and the shortcomings of transmission networks. Changes are afoot in the US; India too has announced billion dollar investments in its grid but the generating technology will be ready first.

When you look at a utility-scale project in isolation, sustainable solar energy is within reach. But persuasive economics alone are not enough. Market competitive solar needs the incumbent institutions and the supporting infrastructure to lay some of the track, not form the most significant roadblock.

Subsidy free contenders

Europe: UBS predicts that by 2020, Germany, Italy and Spain will see reductions in the power demand of 6%-9% placed on utilities as unsubsidised solar steals its share.

Chile: Deutsche Bank has touted Chile as an early sustainable market but with just 70MW under construction and a 3.1GW back-log in projects, it won't feel the full benefit just yet.

US: Rising electricity prices in the States are pushing solar towards competitiveness. A number of utilities are responding with the imposition of fees for PV grid connections.

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Warren Buffett plans to double Berkshire Hathaway's investment in renewable energy

Berkshire Hathaway, Inc. CEO Warren Buffett certainly made his presence felt at the Edison Electric Institute's annual convention in Las Vegas on Monday.

Despite speaking at an event hosted by perhaps the leader in anti-solar sentiment amongst utilities in the US, Buffett nonetheless announced that he plans to double the amount of money that Berkshire Hathaway has invested into both the PV and wind energy markets in the US.

While discussing his company's current plans of boosting renewable energy in the US, Buffett informed the crowd that Berkshire Hathaway has invested US\$15 billion into the industry.

The American business magnate then added: "There's another \$15 billion ready to go, as far as I'm concerned."

Such bold statements fit in perfectly with the "Wizard of Omaha's" strategy of investing in regulated businesses such as power companies.

Lawrence Cunningham, a professor at George Washington University, told Bloomberg: "Buffett has always steered Berkshire toward the future. Lately, that has meant intensifying the company's focus on rudimentary, long-lasting businesses."

Buffett entered into the power industry in 2000 after purchasing an energy holding company based out of Iowa and expanding it into

Berkshire Hathaway Energy, which operates electric grids, runs utilities and invests in wind and solar projects.

With Berkshire Hathaway Energy retaining all of its earnings, Buffett acknowledged that reinvesting US\$30 billion into the renewable energy market is certainly a feasible goal, stating: "We're going to keep doing that as far as the eye can see. We'll just keep moving."

The announcement of Buffett's continued support of wind and solar markets is good news to multiple industry leaders.

Nick Akins, CEO of American Electric Power Co. said: "It's encouraging that he wants to invest because as an industry we have a strong need for capital."

Falling polysilicon production costs a double-edged sword

Driven mainly by expectations of strong end-market demand growth this year, polysilicon spot prices increased significantly in Q1'14, up 15% Q/Q and 28% Y/Y. In Q2'14, spot prices are expected to remain relatively flat – or to decline moderately – as more polysilicon makers ramp-up production, in an effort to take advantage of the current price environment.

With spot prices above US\$21/kg, polysilicon makers are feeling more confident that they can build new, highly efficient plants that may be able to produce low cost polysilicon and enable satisfactory returns on their investments.

Somewhat surprisingly, over the past several months Asia Silicon, GCL, REC-Shaanxi Tianhong, Xinjiang TBEA and PMD (Saudi Arabia based Project Management & Development Company) have indicated they may expand capacity, totaling more than 110,000MT (metric tons per year). This comes on the back of 150,000MT currently being built or previously planned.

Despite all the turmoil in the PV industry over the past couple of years (including the dramatic drop in polysilicon prices), NPD

Solarbuzz is now forecasting that more than 260,000MT of new polysilicon capacity is likely to be added through 2018.

The rapid increase in demand has reduced the gap with polysilicon capacity available; however, as new capacity in the funnel begins to ramp this year, the gap trend is now forecast to reverse directions from 2015 onwards. The polysilicon industry is again in danger of perpetuating a state of chronic excessive capacity for several more years and once more pushing prices lower.

According to new research contained in the NPD Solarbuzz Q1'14 Polysilicon and Wafer Supply Chain Quarterly Report, most of the new polysilicon capacity is targeting very low costs.

Leading polysilicon makers have suggested they could achieve cash costs at new plants between US\$8-13/kg and production costs between US\$9-15/kg. These targets are 15-20% lower than current best-of-class maker costs, and considerably lower than industry averages. This implies that much of the polysilicon capacity built previously may struggle to remain competitive, could run at low utilisation or might be shuttered as new



Source: GTAT.

capacity comes on-line.

Companies in the polysilicon supply chain have often stated that, over the long-run, prices will need to recover to sustainably-profitable levels. This may well be true, but with substantial amounts of polysilicon in the pipeline driving costs below US\$15/kg, profitability might be achieved at lower prices than was imagined just a few years ago. This should continue to help push down the costs of solar modules and systems, but it could also challenge the viability of considerable amounts of legacy capacity at smaller and tier 1 suppliers alike.

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Financial sector's disinvestment from fossil fuels 'functionally impossible'

Investment in renewable energy is being hindered by public demand for fossil fuels, according to the managing director of a major UK investor.

Speaking at a debate on climate change in London yesterday, Peter Pereira Gray, managing director of the investment arm of medical research body, the Wellcome Trust, said market demand made disinvestment from fossil fuels "functionally impossible".

"Everyone drives demand for fossil fuels and we invest in demand," Pereira Gray told a packed audience at St. Paul's Cathedral in London.

Representing the finance sector in the debate, organised by think-tank the St Paul's Institute, Pereira Gray explained why investment firms are not moving fossil fuel funds to renewable energy investment. "We cannot disinvest from need," he said.

Wellcome Trust Investment manages an asset base of £16 billion, which includes investments in companies such as fossil fuel giants Shell, BP and Exxon Mobil.

Pereira Gray declared carbon capture and storage (CCS) an alternative to renewables, pointing out that the technologies work "in our labs" but require significant investment to bring to reality. To gain the necessary investment for CCS, Pereira Gray called for "more risk taking".

Pereira Gray said that over time "oil companies will become energy companies", and advocated promoting the transition to a low carbon economy as a shareholder, but affirmed finance firms "cannot stop investment" in fossil fuels and switch to renewables while there is strong demand.

Pereira Gray spoke alongside Christiana Figueres, the executive secretary of the UN framework convention on climate change, Rear Admiral Neil Morisetti, the former UK government climate and energy security envoy and UK environmentalist and author, Tony Juniper.

Figueres repeated a previous call for US\$1



Christiana Figueres, the executive secretary of the UN framework convention on climate change said we already have the technology to keep under two degrees Celsius global warming "This is not fairytales, and not optimism".

trillion annual investment in renewables, saying in the lead lecture, highlighting the extent to which the costs of solar and wind have dropped and new technologies such as electric vehicles and energy storage.

"This is not fairytales, and not optimism, we already have the technology to keep under two degrees Celsius global warming" she said.

In the question and answer session, Figueres also quoted Pope Francis that it is "immoral to invest in fossil fuels."

Mentioning the US's third national climate assessment released 6 May, Figueres warned: "We are entering an unprecedented time for human kind" – after telling the crowded cathedral to "breathe in deeply" and saying to the audience they are "some of the first humans to ever breathe in air that is 400ppm carbon."

The frequent claim that renewable technology is too expensive was also dispelled repeatedly by the panel. Christiana Figueres said renewables were not expensive and called for carbon disclosure on fossil fuel investments to reveal high risk and stranded assets.

Also speaking at the event, Tony Juniper called upon editors of the mainstream media to face a "morale obligation to tell the truth", and make climate change a mainstream issue and bring climate change back to the political agenda.

Figueres ended by calling on governments to act swiftly on new climate policies and not wait for the next round of UN climate talks in 2015. "We need every government on board, with a policy draft by this December. [The international climate talks in] Paris December 2015 will be too late. It needs to be this year."

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Conergy's US\$100 million investment fund 'first step in new strategic setup'

Germany-based solar company Conergy plans to move into asset ownership by establishing a tax equity fund with an initial target volume of US\$100 million. The fund will enable Conergy to expand its US and Canada project business by around 50MW.

The fund, Conergy Fund I, will be used to finance the construction of large-scale power plants in the US market, which the company claims "will make resources available at a time when consistent funding is difficult to obtain". An unnamed Fortune 500 bank has agreed to provide Conergy with 100% of initial debt, equity and tax equity financing.

Conergy Fund I is expected to be used to finance projects of between 50kW and 25MW in size, for which Conergy or its partners will provide engineering, procurement and construction (EPC), act as project developer and remain responsible for operations and maintenance (O&M) once construction is completed.

Conergy claims the fund will provide customers with cheaper energy, without having to make large upfront investments. The company's customers will enter power purchase agreements (PPAs) with the fund, which will in turn provide third-party financing for the construction of plants. According to Conergy,

prices fixed by PPAs will be "significantly lower" than market prices for power from the grid. However Conergy Fund I will profit by bringing in steady cash flow.

Chief executive officer for Conergy Americas, Anthony Fotopoulos said: "Conergy has been working on a financing solution for months, and this fund is the first step in our new strategic setup and a milestone in expanding our large-scale projects business in the dynamically growing North American market."

Fotopoulos went on to say that the fund would be used by Conergy as a financing solution in other growth markets and that the company will continue to "intensify this financing concept" with its new investor Kawa Capital Management.

Various companies including SunEdison and Jinko Solar have been expanding downstream activities in solar for some time. Josefin Berg, a senior analyst with research firm IHS briefly explained Conergy's intended structure of ownership to PV Tech.

"In the US, First Solar, SunPower and SunEdison have all focused on in-house project development and sales to secure revenues. As for asset ownership, the most common approach is to sell projects once



The fund, will be used to finance the construction of large-scale power plants in the US market, which the company claims "will make resources available at a time when consistent funding is difficult to obtain".

Image: Conergy.

built in order to secure revenues. Following this trend, Conergy is not planning to directly own any projects, but plans to channel the projects to a fund," Berg said.

"We can expect this approach to spread in the US, as it frees up cash for companies to build up larger portfolios," added Berg.

"Conergy is not the first PV company taking this approach. In Europe, several developers built their PV strategy around fund-based financing. In the US, SunEdison and SolarCity tap into funds for project finance."

Independent asset management firm Kawa completed a takeover of Conergy in November which also helped to secure 350 jobs.

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SolarCity reverse engineers PV manufacturers' business models

The acquisition of US-based PV manufacturer, Silevo, by the largest US PV installer, SolarCity, has caused a storm and turned recent business trends within the industry on their head.

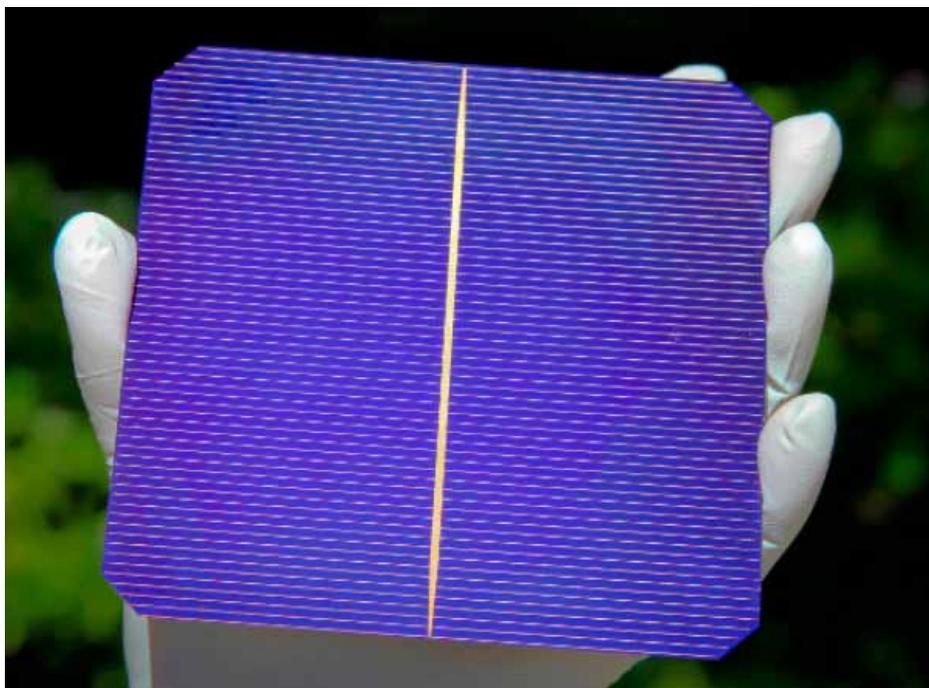
Since overcapacity raged through the industry, upstream PV module manufacturers in particular have moved downstream to carve out higher margins and ring-fence module sales by becoming EPCs, project developers and even PV energy providers. However, SolarCity, firmly rooted in the downstream sector, has elected to move upstream and become a PV manufacturer.

The obvious catalyst for the upstream move by SolarCity is the fact that the latest round of US anti-dumping duties on Chinese-made solar cells and potentially those from Taiwan seriously impacts the ability of the company to gain access to quality but cost-competitive modules, given its heavy dependence at times on Chinese producers such as Suntech, Yingli Green and Trina Solar.

One interpretation of the move could be that the current key Chinese suppliers would be unable to either supply adequate module quantities from sourcing wafer/cells outside China or wafer/cell pricing would be uncompetitive, or a combination of both when sourced from companies with production operations outside those areas with duties imposed.

However, any strategy by Chinese module suppliers to retain SolarCity's business, even on a lower supply level, would more than likely include absorption or partial absorption of the new duty cost.

Only recently SolarCity announced a decent sized module supply agreement with REC Solar, technically a European company but with headquarters and cell/module manufacturing (1GW) in Singapore and therefore not under any import duties into the US. The deal with REC Solar could be interpreted as a direct move by SolarCity to de-risk the supply and increased cost hit of using Chinese modules and be seen to be a stop-gap until SolarCity ramps module production in the US over the next couple of years.



Silevo single busbar cell technology. *Image Silevo*

SolarCity could be planning to tap a number of other mid-sized cell/module manufacturers to fill the void left by the Chinese. An obvious supply candidate is Hanwha Q CELLS, which has 1GW of cell/module capacity in Malaysia.

However, it looks more likely that, with SolarCity's planned business expansions over the near term and importantly post the proposed 1GW fab ramp through 2016, the company would continue to supplement in-house module production with outsourced supply, which would more than likely continue to include modules from Chinese suppliers wherever they may be made.

The move to start in-house module manufacturing could also suggest that Chinese suppliers have balked at building plants in the US and that strategies touted to potentially build plants in Malaysia and Mexico to supply major players such as SolarCity, on cost or other grounds. However, this may be premature as the second phase of the anti-dumping ruling has yet to be concluded and Chinese manufacturers would be unlikely to have made any strategic decisions yet.

Yet the unique (family) relationship that exists between SolarCity and Tesla executives and initiatives by Tesla founder to build gigawatt-scale battery storage manufacturing plants also suggests that some manufacturing-mentality DNA also exists in SolarCity.

The company touted in a blog that the decision to start PV module manufacturing was based on the principle that PV adoption has only just started and will be a major energy producer for the world in the future, therefore getting into manufacturing now rather than later will be a key competitive part of the overall fully integrated business model and a key part of eliminating all types of secondary costs through the supply chain.

Simply stated, the move to in-house manufacturing reduces SolarCity's purchasing costs and provides extra gross margin to the bottom line in the future.

The move to acquire and ramp Silevo's module technology in the US could be interpreted as a major negative to SolarWorld's business model in the US.

Having a major domestic manufacturer

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with higher performing modules that has a major captive customer should not be underestimated. Bragging rights for being the largest US module producer with leading-edge technology owned and operated by a US firm could see SolarCity/Silevo gain customers in the US that would have previously remained SolarWorld customers.

Though this remains a moot point at the moment, it will certainly be a key aspect to watch unfold.

Manufacturing

The acquisition also raises interesting points in relation to Silevo. The period of acute overcapacity obviously took its toll on the start-up and its ability to become cost competitive.

Although the company had plans to expand capacity and raise funds for the expansion back in 2012, that didn't happen under its own steam.

Silevo was hoping that its focus on supply-

ing installers focused on high-end markets such as residential and small-scale commercial rooftops would provide the environment to survive and prosper. Its inability to go it alone and expand capacity (32MW only) and become competitive independently was not achievable.

Although SolarCity touted Silevo's technology differentiation and high conversion efficiencies the financial structure of the acquisition indicates that the Silevo management team and investors have a lot to prove in executing the plan outlined yesterday, specifically being able to ramp the technology and processes to large-scale production levels and achieve the competitive the production cost levels envisaged.

The financial terms indicate that Silevo owners could be in for a further US\$150 million windfall in future earn-out payments based on stock-based compensation but these are clearly tied to production and cost milestones.

It looks like payouts are being planned in two 50MW ramp phases at US\$50 million a phase, and a final US\$50 million in earnings for a 100MW production ramp and production cost level (undisclosed) by 2016.

SolarCity will also benefit from production plant site selection incentives from the State of New York, which could easily offset much of the capital cost of the facility and initial 300MW ramp phases.

Although there is no way of knowing if Silevo can meet or exceed the key milestones expected of it by SolarCity, it will benefit from having a captive customer.

Like key rival, SunPower, ring-fencing its production operations from outside competitive forces by using its own modules in projects has proved that the business model works and the same should be expected for SolarCity and Silevo.

Technically, Silevo may not now become the next SunPower, but SolarCity is definitely attempting that goal.

SunEdison buys AES stake in 336MW PV portfolio

Multinational energy company AES Corporation has agreed to sell a large chunk of its solar business to SunEdison, in a deal that could reach US\$207 million.

SunEdison will initially pay an equity purchase price of US\$165 million for AES's 50% stake in projects in India, Europe and the US. With a generation capacity of 336MW in total, the projects are owned by Silver Ridge Power, a joint venture formed by AES and a private equity firm, Riverstone Holdings.

Under the terms of the deal, SunEdison has an option to purchase a further 50% stake held by AES in 130MW of PV projects in Italy by August 2015. Should SunEdison decide to do so, it will cost the company another US\$42 million.

According to a statement by AES, it will retain its 50% stake in 55MW of projects in Puerto Rico and in Spain. The AES statement also clarified that SunEdison's acquisitions are still subject to regulatory approval and purchase price adjustments, expected to take place in June 2014.

In the same statement, AES also said that it would be receiving the US\$50 million tax



On completion of the sales, which include a US\$165 million deal with SunEdison that could rise to US\$207 million, AES will have sold the majority of its solar business. *Image: SunEdison.*

equity investment made by search engine giant Google into Mount Signal, a 266MW Silver Ridge-owned project in California. The plant went online in April.

AES president and chief executive officer Andrés Gluski said that the money raised would be used to maximise returns for AES' shareholders.

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Norway oil fund to invest in renewables

Norway's oil-generated sovereign wealth fund is to see a shift to investment in renewable energy.

The prime minister, Erna Solberg said the Government Pension Fund Global (GPF) would aim to focus 5% of its NOK5,000 billion (US\$800 billion) on renewables investment.

An official announcement, detailing the 5% mandate, is expected on 4 April. A white paper on the oil fund is also to come out in April.

Currently the Norges Bank Investment Management (NBIM), which manages the citizen-owned fund, discloses its investment strategy as 60% equity, 35% fixed income and 5% in real estate.

Out of the 60% equity investments, oil and gas accounts for 8.4%, or US\$44 billion, according to the fund's annual report.

The current average return on investments for the fund is 5.7%.

Yngve Slyngstad, the oil fund's chief executive, told the Financial Times newspaper: "This is the people's money. It's the people's representatives in the parliament who decide the main aspects of the fund and decide what they ultimately do or do not want to be invested in."

The debate on Norway's fossil fuel investment ratcheted up in headlines after a council for reviewing the funds investments was instated in February.

The 'Responsible Investment and the GPF' 2013 report, written by leading economists and academics in November 2013 said: "An increased understanding of risks and opportunities linked to environmental, social and

governance (ESG) issues are expected to lead to better investment decision making."

According to official Norwegian investment promoter, Invest in Norway, in 2010 the Norwegian renewable energy sector comprised 2,000 companies, 50,000 employees, and a revenue of NOK200 billion (US\$33 billion).

The inter-governmental Organisation for Economic Co-operation and Development (OECD) recently published an economic survey of Norway, released 5 March. The report advised disinvestment in fossil fuels and investment in infrastructure and liquidity.

Norway's government said in response, as part of a press release on 5 March: "Some first steps were taken already in the budget for 2014, where we introduced growth-enhancing tax cuts and redirected spending towards investments in infrastructure and knowledge. I am pleased to see that the OECD supports these efforts", says the Minister of Finance Siv Jensen.

International economic policy think-tank Re-Define's managing director, Sony Kapoor, former strategy advisor to the government of Norway, European Parliament, UN and World Bank said: "Norway has reached a critical point in how its oil wealth is managed."

Kapoor advised liquid investments, in infrastructure and disinvesting in fossil fuels with more democratic and accountable overseeing of the fund.

"It is still too early to say whether the government will go as far as Re-Define suggests in changing the investment strategy of the fund

to make it more consistent with the investment objective set by the Parliament, but it is at least moving in the right direction," he said.

Environmental charity, WWF ran a campaign 'Det Skjer!' to encourage Norway's sovereign fund invest in renewables and disinvestment in fossil fuels.

Nina Jensen, CEO of WWF-Norway said: "The pension fund is the largest state investor in the world. A solid renewable energy mandate will send a tremendously powerful signal and set the standard for other international investors."

"If done at scale, this will have global impact and redefine how we use money consistent with commitments to limit climate change."

WWF financial analyst, Lars Erik Mangset said: "The mandate should allow for direct investment in renewable infrastructure where a large scale of capital is urgently needed."

"We will be looking to see if the government award a mandate to allow up to 5% of the fund to be invested into renewable energy infrastructure and exactly how they extended the fund to invest in real estate."

Samantha Smith, leader of WWF's Global Climate & Energy Initiative said: "It is rare that one government alone can bend the curve on climate change. Norway, through its sovereign wealth fund, can."

"WWF now looks to Norway's leaders to commit to renewable energy investment at a scale that will make a global difference. This will be their legacy, and we are watching."

Canadian Solar draws US\$45.8 million investment from Manulife

Canadian Solar has received a C\$50.5 million (US\$45.8 million) investment from pension and insurance firm Manulife for a 10MW plant in Ontario.

The construction financing is for the Mighty Solar project, which will be acquired by Concord Green Energy, part of the Concord Pacific property group.

"Canadian Solar's scale and track record of both execution and quality continues to help

attract both world-class financial partners, like Manulife, and sought after end buyers, like Concord," said Shawn Qu, chairman and CEO, Canadian Solar.

"We are now firmly established as one of the power industry's fastest growing companies, with one of the largest global project development pipelines, spanning Canada, the US, China, Japan, and other developing markets," he added.



Canadian Solar sold a 49MW portfolio of projects to Concord in August 2013. Source: Canadian Solar.

Work has already begun on the project and connection is expected in the second quarter of 2014. It will receive Ontario's feed-in tariff for 20 years.

Canadian Solar sold a 49MW portfolio of projects to Concord in August 2013.

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Danish pension companies commit to international renewables fund

A consortium of pension funds in Denmark has agreed to commit DKK1.2 billion (US\$219 million) to the Danish Climate Investment Fund (DCIF), a vehicle for financing climate resilience projects and promoting Danish solar and other renewable energy technologies in developing countries.

The fund aims to assist small and medium-sized Danish companies gain access to new international markets, co-funding solar projects and opening markets for Danish suppliers of solar equipment, as well as funding other renewable energy, energy efficiency and environmental programmes in developing countries.

The agreement has been struck between pension funds Pension Denmark, PKA, Pædagogernes Pensionskasse (PBU) and Dansk Vækstkapital, the Danish government and the Investment Fund for Developing Countries (IFU). Another DKK200 million is expected from further investors.

The fund will run for four years, over which time it will invest in green projects in 150 countries in Africa, Asia, Latin America and in emerging European economies.

Investment is to follow corporate social responsibility (CSR) policy, using UN and international guidelines following on from the UN Copenhagen climate summit in 2009 and its decision to raise capital for climate investment in developing countries. The UN aims to raise US\$100 billion every year for climate change projects in developing countries till 2020.

Public funding of DKK275 million (US\$50 million) came from the Danish government and DKK250 million (US\$45 million) from the IFU.

Pension Denmark communications consultant, Kaare Nygaard Pedersen told PV Tech the company's investment is in keeping with its aims to increase investment in renewable energy infrastructure over the next three

years to account for 10% of assets.

Torben Möger Pedersen, Pension Denmark's CEO, said the fund "marks a win-win-win effort where we contribute to growth and employment in developing countries, fight climate change and provide better opportunities for Danish companies in new and difficult markets."

Pedersen said: "We expect the Danish Climate Investment Fund to deliver a solid return to our members and to contribute to Danish companies strengthening their position in the new emerging markets."

The IFU is to manage the fund, which has an expected 12% annual return. Tommy Thomsen, managing director of IFU said: "We have invested in projects which have had a positive impact in the developing countries and provided access for Danish companies to new markets, while IFU has continuously made a profit. We expect this to be the case with the new climate investment fund."

South African state pension fund to invest in 44MWp Soitec project

Institutional investment from a state pension fund will help finance a 44MWp concentrator photovoltaic (CPV) power plant being built in South Africa by Soitec after a refinancing scheme for the project was approved by the

South African Department of Energy.

The South African Government Employee Pension Fund (GEPF) will become a long-term investor in the 44MWp Touwsrivier solar CPV project. Half of the plant's capacity has

already come online, which Soitec claims demonstrates the ability of the project to meet contractual specifications for performance and validates power pur-

chase agreements (PPAs) for the entirety of the project.

Soitec, headquartered in France, announced the news yesterday. The company noted that it would remain the only foreign stakeholder in the project, retaining a minority shareholding.

The new arrangement with GEPF, which will see the pension fund ultimately hold 40% equity in the plant, required the final approval of the government's energy department. The department granted preliminary approval to change the financing structure of the Touwsrivier project in March.

Soitec signed an agreement with South Africa's Public Investment Corporation (PIC) which represents the interests of GEPF through an equity financing structure. PIC is owned by the South African government and manages public assets through the country's minister of finance.



Soitec CPV modules in use. The South African Government Employee Pension Fund (GEPF) will become a long term investor in the 44MWp Touwsrivier solar CPV project.

Image: Alstom.

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US mid-scale solar market to get US\$100 million finance boost

A new US\$100 million project finance fund for distributed solar in the US is to be set up by Hannon Armstrong Sustainable Infrastructure (HASI) and clean energy finance firm Sol Systems.

The construction and term debt financing will be offered to developers and owners of commercial, municipal and utility-scale projects in the US.



“With this programmatic finance solution for solar developers, we are looking to take the economic and documentation uncertainties out of the finance process and accelerate a developer’s ability to close on a project,” said Jeffrey Eckel, president and CEO, HASI.

“We believe this new offering will provide the distributed solar industry with a flexible source of capital for portfolios of smaller projects, along with the skilled staff needed to transact at scale, with speed,” he added.

On Thursday 17 April, the US department of energy will host a Solar Summit. The Washington Post reported that a US\$15 million programme to encourage the development of municipal solar would be launched during the meeting.

The US commercial rooftop sector has struggled in recent years but is poised for growth.

Source: Go Solar California.

“The lack of financing for mid-sized distributed generation has been a critical barrier to the solar industry’s continued growth,” said Yuri Horwitz, CEO, Sol Systems.

“There are few meaningful debt providers or products available, especially for commercial and industrial solar projects, and we are proud to work with such an accomplished partner to facilitate the deployment of capital in this underserved sector of the solar market,” added Horwitz.

In October 2013, Hanwha Q CELLS announced it would establish a commercial-scale development arm in the US to target the sector specifically.

At the beginning of April, it was announced that HASI will provide US\$42 million worth of non-recourse debt for the purposes of financing SunPower’s residential leasing programme.

Deutsche Bank to lend US\$1 billion for Japan solar projects

A director at Deutsche Bank has revealed that the company plans to lend around US\$1 billion for the construction of up to six solar power projects in Japan over the next 12 to 18 months.

Last week PV Tech reported that the Spanish developer Gestamp Solar will build its first large-scale solar project in Japan, with Deutsche Bank providing a non-recourse construction loan worth around US\$110 million for the project. This is in addition to other recent lending activity in solar by the German bank, including a deal with Conergy worth US\$60 million, for global expansion, that was announced yesterday.

The latest news was reported by Bloomberg following an interview with Hans Van Der Sande, the director of Deutsche Bank’s Tokyo-based structured products division. Van Der Sande referred to the first two years of Japan’s feed-in tariff (FIT) programme as a “gold rush” and said that as FIT rates dropped, “the smaller people are leaving and the real players are staying”.

Van Der Sande did not reveal the interest rates applicable to the loans but rates in Japan are currently at an all-time low. He did say however that Deutsche Bank was being approached by non-Japanese companies that are interested in projects in Japan but are “having difficulty” getting finance from Japanese banks. According to Bloomberg, Deutsche Bank will lend the US\$1 billion for three to six projects within the next year and a half.

Tokyo-based analyst Dr Hiroshi Matsukawa of RTS PV confirmed in a recent interview with PV Tech’s sister publication Solar Business Focus that Japanese banks tend to strongly favour projects made with domestically produced content over foreign imports. He said that while access to finance with Chinese-made panels, for example was not unheard of, it was far less common than lending to projects by Japanese companies, using Japanese-branded modules and other equipment.

Elsewhere, Deutsche Bank analyst



Deutsche Bank has revealed its intention to lend around US\$1 billion to companies developing solar projects in Japan over the next 12 to 18 months.

Image: Solar Frontier.

Vishal Shah put out a research note last month to the effect that in markets that are approaching grid parity, the bank expects the amount of long-term investment into solar via yield cos to rise. Yield cos allow investors to buy into an aggregated portfolio of solar generation assets to receive a regular dividend. Shah said that over the next 12 to 18 months, yield cos will be “the most significant positive catalyst for the solar sector”. According to Shah, as many as six more yield co financial structures of the type launched by SunEdison could arrive on the market in the coming period.

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NREL launches working group for solar lending

The National Renewable Energy Laboratory (NREL) at the US department of energy (DOE) has put together a working group aimed at examining and bringing



down barriers to lending in the residential rooftop solar sector.

The 50-strong group, Banking on Solar, is comprised of solar industry figures alongside members of the finance, regulatory, legal and other disciplines. The group will look at making it easier for homeowners to borrow money for purchasing PV systems outright.

While in the US the popularity of third-party leasing of rooftops from well known installers such as SolarCity and SunRun has grown in recent years, leasing models are not offered at present in some parts of the US. Commenting on Banking on Solar, NREL analyst Travis Lowder said that “greater prevalence and diversity” of loan products

Banking on Solar is aimed at reducing barriers to lending for residential systems in the US, focusing on areas where third party leasing from companies such as SolarCity is unavailable.

Image: SolarCity.

could “enable higher rates of solar adoption” in such areas.

Banking on Solar has identified that standardisation of contracts and underwriting processes is a key priority and has already begun working toward this aim.

The group has also been created with the aim of educating lenders and regulatory institutions with both the risks and rewards of lending for residential solar. Further to this, Banking on Solar is also expected to look at other debt markets that may be applicable, such as lending into tax equity structures.

According to NREL, the programme will run in parallel with another working group, Solar Access to Public Capital (SAPC), which NREL says is “designed to facilitate capital market investment via securitization”. Both programmes enjoy support from the DOE’s Sunshot Initiative.

Mosaic & Enphase Energy offer residential solar loan through partnership

Solar crowdfunding service Mosaic and solar energy systems leader Enphase Energy have entered into a strategic partnership to offer the first residential PV loan packaged with residential operations and maintenance (O&M) services.

The alliance was announced at Intersolar North America taking place in San Francisco this week.

The new offer, the Mosaic Home Solar Loan, will be packaged with Enphase’s O&M services and is expected to fulfill at least US\$100 million in loan volume over the next 18 months.

Through the loan, homeowners have the opportunity to install a residential PV system with no money upfront while also keeping the investment tax credit and owning the system. The loan can also be paid for at any time with no ramifications or penalties given to any new homeowners at the residence.

Enphase will utilise its “Enlighten” platform for the loan, which will allow the corporation to monitor the performance of its modules



The loan will be packaged with Enphase’s O&M services. *Image: Creative Commons/Chandra Marsono*

through microinverters.

Marty Rogers, vice president of global customer service and support at Enphase, said: “We are very excited to partner with Mosaic and offer installers and homeowners a new way to finance and manage residential PV

systems. Enphase offers a comprehensive solar energy system with proactive O&M services that will transform the installer’s ability to capitalize on the growing segment of solar loans by having more time and resources to contribute to the sales process.”

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Mosaic launches new portfolio of products and services for residential PV installers

Solar crowdsourcing service Mosaic has kicked off a new line of PV products and services, all of which are meant to benefit residential installers.

Billy Parish, president of Mosaic, said: "As more and more Americans come to Mosaic to go solar, we're excited to offer them their preferred installers alongside a simple way to own solar for zero dollars down. We look forward to helping installers close more deals."

Mosaic's new selection of solar loan products cast a wide range in both term and interest rate, while all products follow the service's commitment to no down payments, the integration of the Federal Investment Tax

Credit and set monthly payments.

Most customers have used Mosaic's efficient services in an attempt to cut down on "soft costs" – which are the large sum of costs for residential PV projects and serve as a minority of the total payment for commercial PV installations.

Mosaic also added on a new installer in PermaCity, which has installed more than 30MW of PV projects during its history.

John Mason, director of technical sales at PermaCity, said: "Mosaic has created an innovative and very competitive solar financing tool. Their residential loan offers the advantages of ownership for payments comparable to those of a lease."



Mosaic's new selection of products and deals vary in both term and interest rate. Image: Mosaic.

Mosaic has already made its mark in California, as the service has a system in place to offer loans to residents in the Golden State for PV arrays.

New solar crowdfunding platform launched in US

Another new solar crowdfunding website has been launched in the US, to join Sunfunder and Mosaic in the recently created market space.

Crowdfunding sites for solar use internet fundraising platforms to allow small investors to get involved with funding solar power projects. Mark Yegge, chief executive officer of the newly launched Crowdsun.com said the company's first project had raised US\$300,000 in three days.

"Most investors in solar projects are the big-money institutions, and they are privy to stable solar investments that can earn anywhere from 4% to 20% annually – until now. Smaller investors can now take advantage of the shift to green solar energy through

our crowdfunding site," said Yegge.

Crowdsun.com claims projects are carefully vetted before being offered to the public through the site. The company is able to offer interest on investments at a higher rate than currently offered by banks. Mosaic, registered with the SEC, is also able to return interest to investors, as long as they are US-based; Sunfunder on the hand, is not SEC approved and can accept funding from investors all over the world but is unable to return them interest. An additional difference between Mosaic, Crowdsun.com and Sunfunder is that Sunfunder is limited to projects outside the US, whereas to date Mosaic and Crowdsun.com have sought investment for US

projects only.

To date, projects financed through crowdfunding sites in the US have been relatively small in scale, such as rooftop projects at schools, community affordable housing projects and military installations. In June last year, Mosaic co-founder and president Billy Parish told PV Tech the biggest limitation to scale was growing the company's investor-base.

Crowdsun.com's website claims the company has already funded over US\$2 million across 11 campaigns.

The US's largest installer, SolarCity, announced in January that it too will be setting up an online investment platform for the public, although it will not be crowdfunded.

SunPower veteran joins Mosaic as COO

SunPower veteran Bruce Ledesma has joined crowdsourcing firm Mosaic as chief operating officer.

Ledesma will be charged with expanding the company's operations to match what it describes as a "growing base of investors, borrowers and solar installers".

"Bruce has demonstrated outstanding leadership in larger companies within the financial services and solar industries," said Dan Rosen, co-founder and CEO, Mosaic.

"He has extensive knowledge and talent to scale Mosaic's next growth cycle servicing home solar loans and crowdsourcing capital

to finance them. We're thrilled to have Bruce join Mosaic's executive team," added Rosen.

Ledesma has previously served as executive vice president and general counsel for SunPower as well as holding senior roles at Roble Capital, PowerLight Corporation and Barra Inc.

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JA Solar was founded on May 18, 2005, and was publicly listed on NASDAQ (NASDAQ: JASO) on February 7, 2007. By 2010, JA Solar had firmly established itself as the world's leader in solar cell production and shipments. The company shipped 1.7 GW over the course of 2012, an increase of 0.4% from the 1.69 GW shipped in 2011.



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