

CLEAN ENERGY MARKET REVIEW

H1.2018



clean energy
pipeline

H1.2018 Clean Energy Market Review

This Clean Energy Market Review, sponsored by Eversheds Sutherland, analyses venture capital, private equity, project finance, mergers and acquisitions, public markets and green bonds activity during the first half of 2018 (H1 2018).

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The global clean energy sector in the first half of 2018 yielded a nearly \$166 billion of investment, up by 37% compared with the corresponding period of 2017.

Renewables financing has been falling year-on-year since peaking in 2015, but an upturn in project financing activity across emerging markets this year has resulted in substantial amount of green capital expenditure in the first of half 2018.

Developers will be hoping that the news of a positive start to the year can put the sector on a stable upwards trajectory for the foreseeable future.

This figure means 2018 has gotten off to its strongest ever start to a year, excluding the record-breaking investment levels documented in 2015, which is still the high-water mark for the industry.

Regional breakdown

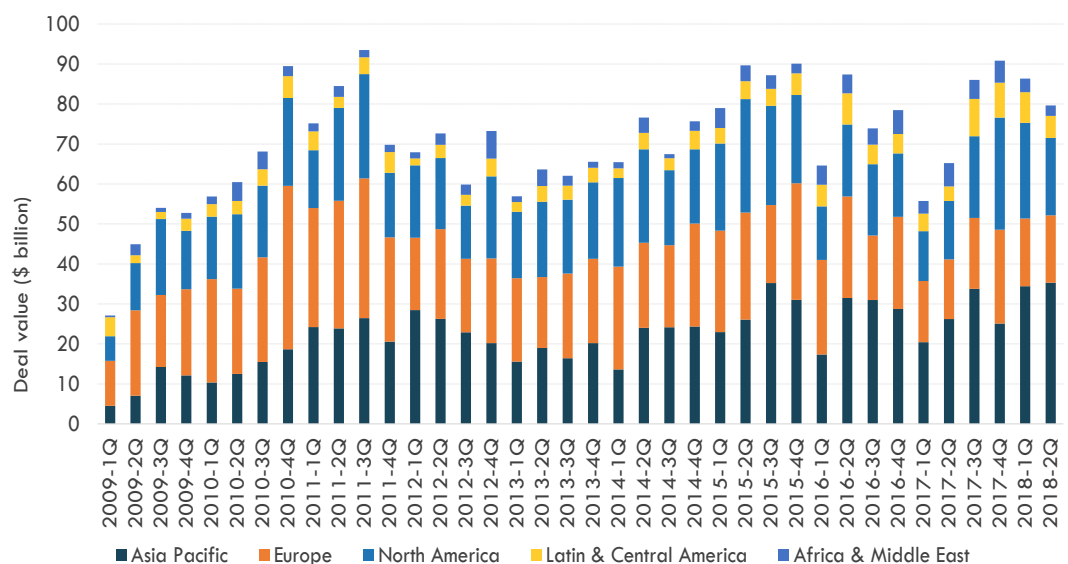
The world's three largest renewable energy markets: Asia Pacific, Europe and North America, all experienced increasing investment volumes.

Asia Pacific set a new record after close to \$70 billion of renewables financing transactions were made in the first half of the year.

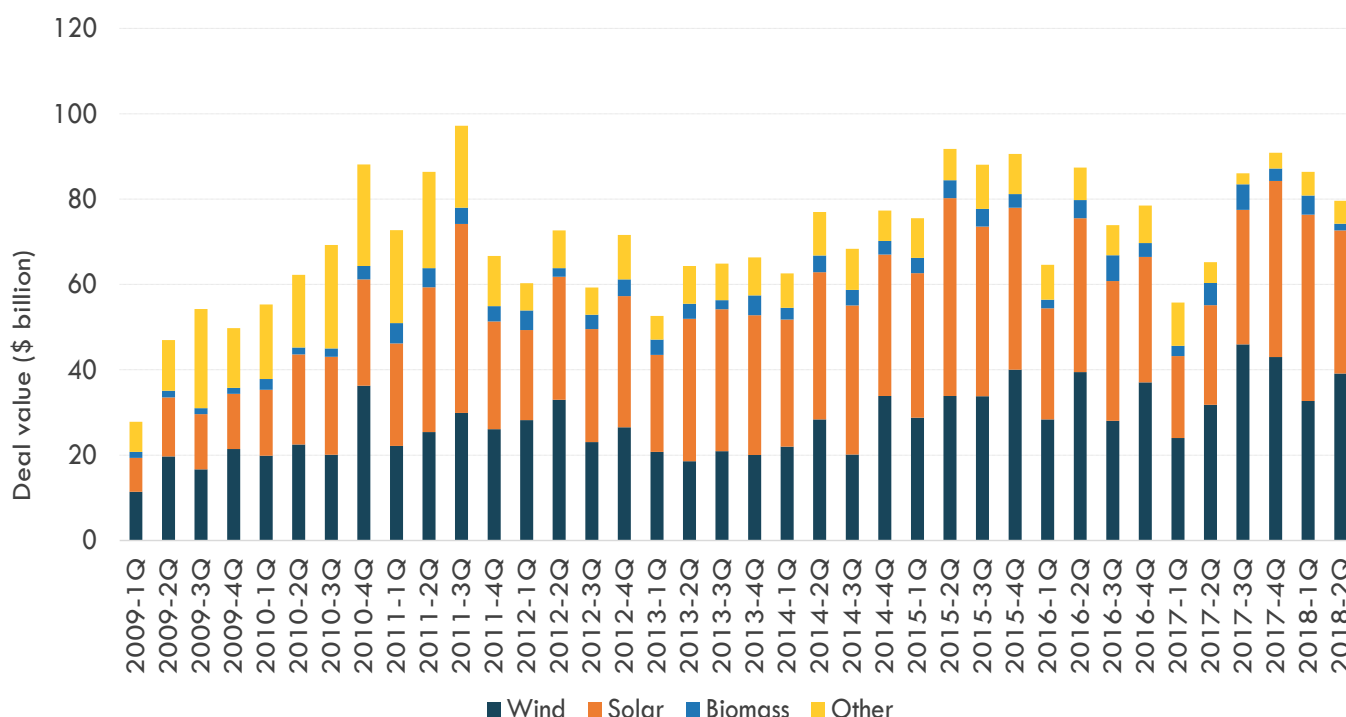
What is more impressive is that this was after \$46 billion worth of deals were closed in H1 2017 and \$58 billion in H2 2017.

North America overtook Europe to become the second most active renewables market in H1 2018 after total investment in the sector reached \$43 billion by the mid-point of 2018, an increase of 59% from the first half of last year.

**GLOBAL CLEAN ENERGY TOTAL INVESTMENT BY REGION
Q1.2009 TO Q2.2018**



GLOBAL CLEAN ENERGY TOTAL INVESTMENT BY SECTOR Q1.2009 TO Q2.2018



Investments in Europe totalled \$33.7 billion, a slight uptick from \$30.2 billion in the previous year's corresponding period.

Renewables financing also increased by 63% in Latin & Central America to \$13.1 billion.

Africa & Middle East were the only markets that experienced a decline in investment from \$9 billion in H1 2017 to just \$5.9 billion in H1 2018.

Sector overview

The falling cost of solar has helped the technology to continue its domination of the global clean energy financing markets, after it surpassed wind financing for the first time last year.

Across all financing segments, global solar investment totalled \$77 billion, placing it ahead of the \$71 billion that was invested into both offshore and onshore wind.

Biomass investment remained relatively stable at \$6.1 billion, while funding for other renewables technologies came to \$10.9 billion.

Despite the positives, clean energy financing uncharacteristically dipped in Q2 from Q1 of 2018 (\$79.6 billion vs \$86.3 billion respectively).

That said, Thai Tran, Clean Energy Pipeline's Head of Data, is confident that the remainder of 2018 will be a bumper year for renewables financing.

"There are many positives to take away from H1 2018's statistics, not least the surge in financing across Asia Pacific, Europe and North America," says Tran.

"Based on the amount of landmark project's in the advanced pipeline being developed across these markets, this year is set to be a transformative period for clean energy financing and should set a precedent for the year's following.

"The renewables industry is doing its best to continue the path towards global decarbonisation, but more effort is needed by central governments if we are to make the most of the opportunities being made available."

A record \$121 billion worth of project finance transactions in H1.2018

Clean energy project financing sector has reached an all-time high after a record \$121 billion worth of financing transactions took place in the first half of 2018.

The work put in by the renewables investment community in the first six months of the year accounted for 73% of the total renewables financing during this period, which includes public market, VC/PE, and green bond activity.

With Q1 2018 already being the strongest quarter ever for project financing at \$66 billion, the succeeding quarter then resulted in approximately \$55 billion worth of transactions.

There are several reasons for this sizeable uptick in project finance investment.

Firstly, every global clean energy project finance market increased their margin over the same investment period in 2017, with the exception of Africa & Middle East.

Furthermore, the overall amount of projects that reached financial close surged by 43% to 859 separate transactions across all renewables technologies.

Solar financing reaches half-year peak

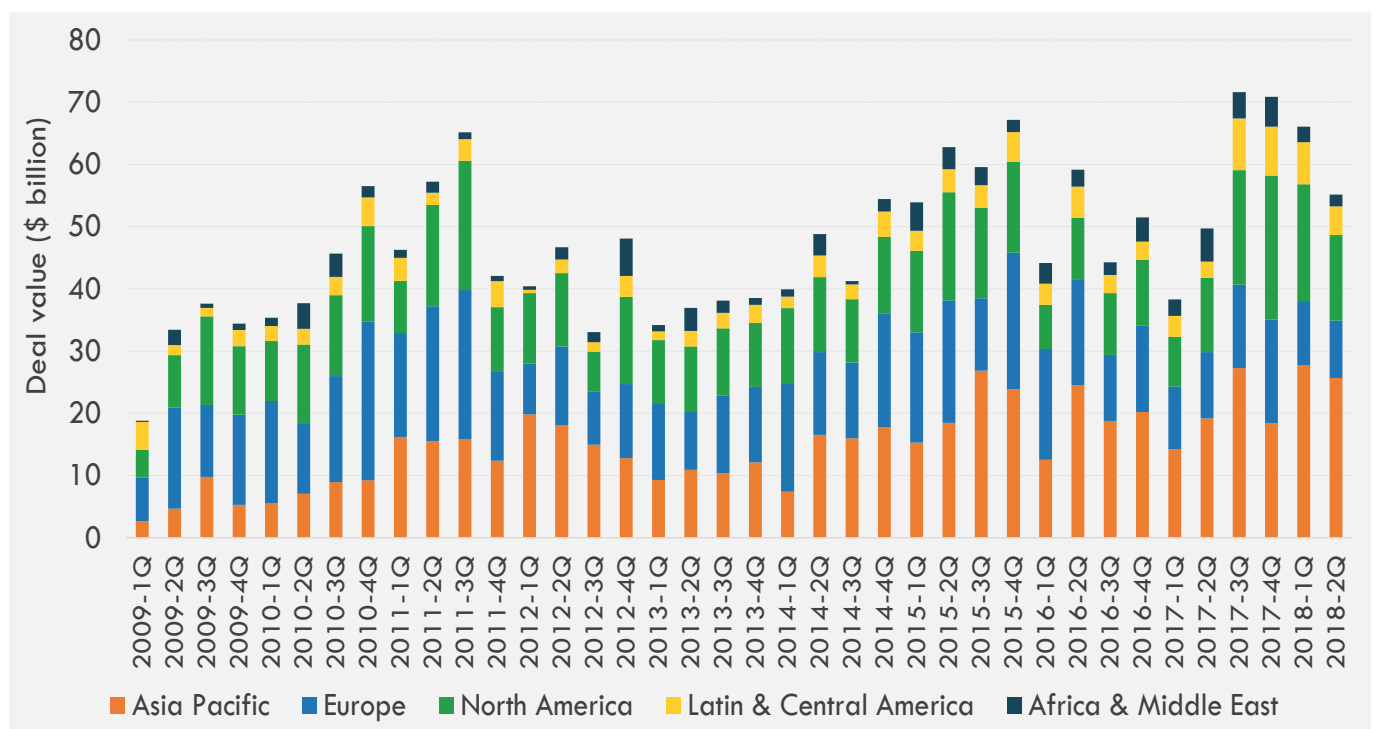
But perhaps most notably, large-scale solar project financing reached its highest ever level for a first half-year period, as \$53.4 billion worth of investments were made in the sector.

The margin of change for solar was much greater than for wind, where the total investment volume increased by 101% compared with just 23% for wind.

Octopus Energy Investments, a UK-based investor and manager of renewable energy assets, is among those companies finding new opportunities from the declining price of solar and the willingness of corporates and municipalities to back the technology without a subsidy.

‘With lenders eager to deploy capital into renewable technology we have found them increasingly attracted to the operational characteristics of solar,’ explains Matt Setchell, Head of Energy Investments at Octopus

GLOBAL CLEAN ENERGY PROJECT FINANCE BY REGION
Q1.2009 TO Q2.2018



“Originally this was restricted to subsidised projects but as we demonstrated with the financing of our unsubsidised Italian portfolio, for the right structures and sites, lenders are increasingly comfortable with merchant revenue.

“We expect this trend to continue and are experiencing even more appetite for our next Italian solar financing which we will be bringing to market later this year.”

Regardless, onshore and offshore wind project investment remained buoyant with \$59 billion of project financing transactions closed.

In the first six months, Asia Pacific renewables project financing totalled \$53.4 billion, considerably more than the combined investments made in Europe (\$19.4bn), Latin & Central America (\$11.3bn), and the Middle East & Africa (\$4.3bn).

Investors in North America, which is the world’s second largest project finance market, increased their project finance activity by close to 80%, taking the region’s total value in H1 2018 to \$35.5 billion.

The top 10 clean energy project finance transactions in H1 2018 carry a total investment value of \$11.1 billion, the largest of which was the €1.3 billion Borssele III/IV offshore wind farm in the Dutch part of the North Sea.

Top 5 Project Finance Deals in H1.2018

Borssele III & IV (Blauwind II) Offshore Wind Farm (700MW)

Country: Netherlands

Deal value: \$1.40 billion

Sponsor: Partners Group Holding / Eneco Holding NV / Royal Dutch Shell plc / Van Oord NV / Diamond Generating Europe

Uzbekistan Solar PV Plant (1000MW)

Country: Uzbekistan

Deal value: \$1.30 billion

Sponsor: SkyPower Corp.

Jiaxing, Pinghu Offshore Wind Farm (300MW)

Country: China

Deal value: \$890 million

Sponsor: Zhejiang Water Resources and Hydropower Investment Group

Cerro Dominador Solar Thermal Plant (110MW)

Country: Chile

Deal value: \$800 million

Sponsor: EIG Global Energy Partners

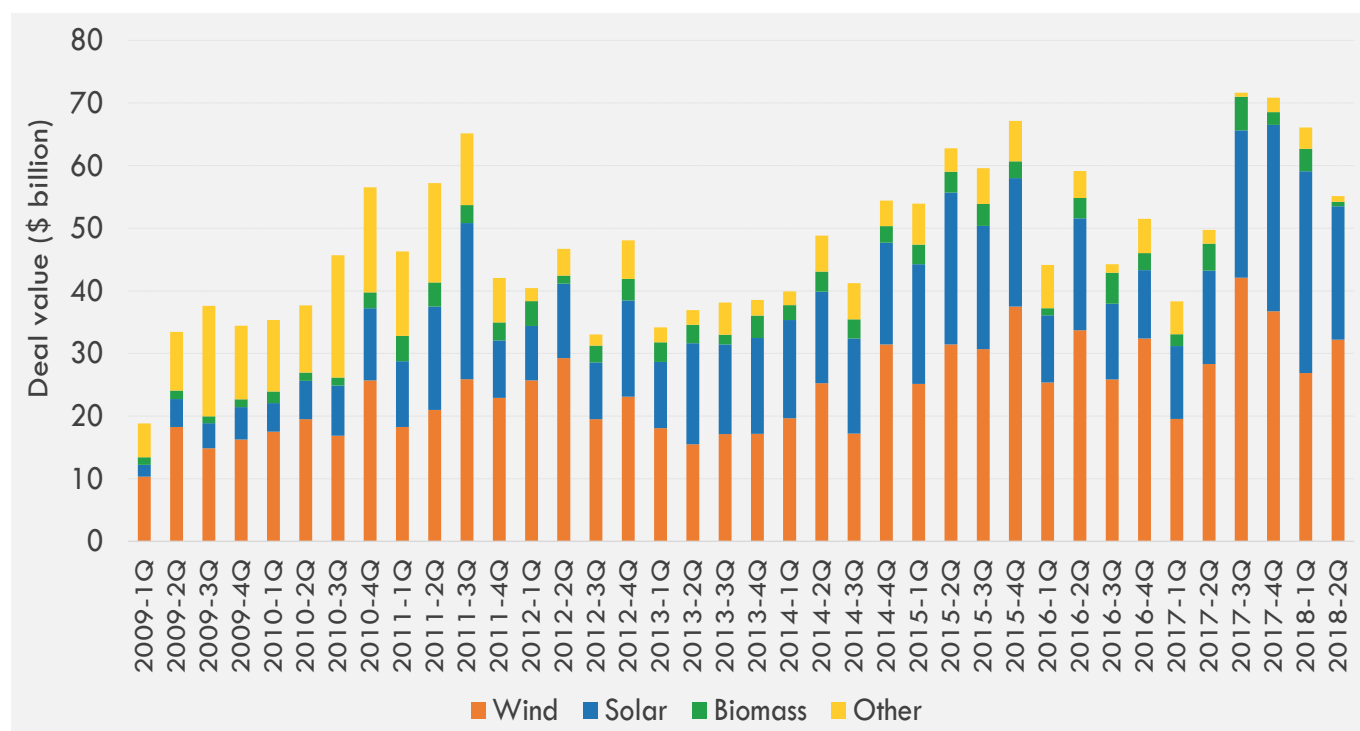
Persimmon Onshore Wind Farm (365MW)

Country: USA

Deal value: \$758 million

Investor: GE Energy Financial Services (GE Capital) / Gestamp Wind (Gestamp Eolica) / Quinbrook Infrastructure Partners

GLOBAL CLEAN ENERGY TOTAL PROJECT FINANCE BY SECTOR Q1.2009 TO Q2.2018





Green bond issuers raised nearly \$92 billion in H1 2018

The volume of new global green bond issuances shows little sign of abating.

Clean Energy Pipeline's data team has tracked \$91.6 billion worth of global green bond issuances in H1 2018, putting it some way above the \$60.4 billion worth of issuances in H1 2017 and \$80 billion issuances in H2 2017 – which were themselves record breaking investment periods at the time for green bonds.

Market fluctuations resulted in the amount of project bonds crashing quite significantly from H1 2017. The figures show \$2.3 billion worth of project bonds being issued in the first half of last year. But this year, project bond issuances totalled only \$3 billion.

Moreover, green asset securities completely crashed with zero transactions taking place in 2018.

But a significant upturn in corporate and investment/bank bond issuances kept the green bond streak going.

In H1 2018, the amount of corporate green bonds issued came to \$45 billion, a figure made even more impressive given the fact that there were over \$38 billion worth of corporate green bonds launched over the course of 2017.

Investment/commercial banks issued a similarly impressive amount of green bonds, valued at \$24 billion, which was just under the \$25 billion issued throughout 2017.

The sheer amount of corporate and investment/commercial bank green bonds more than offset the declining issuances from development banks and government/municipalities, which fell by 10% and 23%, respectively.

Europe retained its mantle as the leading global green bond market as issuances there came to \$50.7 billion.

The \$23.5 billion worth of green bonds issuances boosted the Asia Pacific market, while North American issuances totalled \$15.2 billion.

GLOBAL GREEN BOND ISSUANCES BY DEAL TYPE
2008 TO H1.2018



Top 10 issuing countries and green bond deals in H1.2018

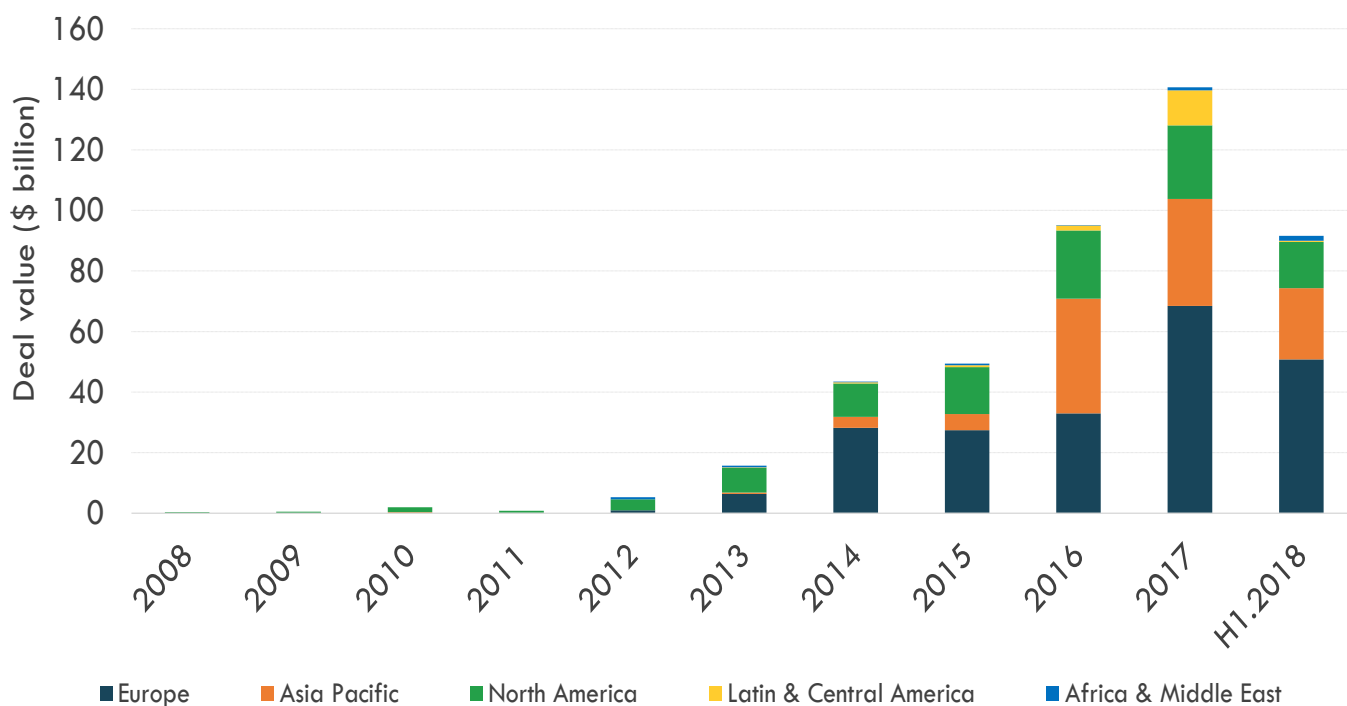
Top 10 green bond issuing countries in H1.2018

Country	H1.2018 (\$m)	Since 2008 (\$m)
China	14,774	64,547
Spain	12,308	25,064
USA	11,555	87,293
France	10,035	47,030
Germany	4,982	38,931
Netherlands	4,313	20,855
Sweden	4,077	14,155
Luxembourg	3,931	21,998
Canada	3,687	13,256
Norway	2,969	6,249

Top 10 green bond deals in H1.2018

Issuer	Deal value (\$m)	Date
Iberdrola S.A.	6,580	2018-01
Government of France	4,670	2018-06
Bank of America	2,250	2018-05
DNB Group	1,770	2018-05
Industrial and Commercial Bank of China	1,580	2018-06
European Investment Bank	1,500	2018-04
Enel Spa	1,499	2018-01
African Development Bank	1,486	2018-05
TenneT Holding BV	1,473	2018-05
Permodalan Nasional Berhad	1,440	2018-02

GLOBAL GREEN BOND ISSUANCES BY REGION 2008 TO H1.2018



Over \$65 billion worth of M&A deals took place in H1 2018

A number high-profile corporate acquisitions in the clean energy and tech sector significantly ramped up the M&A deal value for H1 2018.

As a result, Clean Energy Pipeline's data team collated \$65.2 billion worth of M&A deals that were announced in the period, involving both corporate acquisitions and the secondary project market.

Continuing 2018's positive outlook for sustainable financing, this year's M&A activity was far greater than any other half-year period before it, breaking a seven-year record stretching back to H1 2011.

When compared to the corresponding period last year, deal movement increased by 38% as a result several noteworthy announcements.

The three largest acquisitions in H1 2018 comprised: E.ON's agreed takeover of innogy for c.\$26 billion, Canadian Pension Plan Investment Board's acquisition of \$1.76 billion worth of renewable energy assets from Enbridge, and Enel SpA's winning bid and acquisition of Brazilian electricity distribution company Eletropaulo Metropolitana de Sao Paulo SA for about \$1.4 billion.

Europe, which is the world's most mature renewables market, was responsible for close to 70% of the M&A activity that took place globally.

In fact, a staggering \$45 billion worth of clean energy corporate and project M&A deals were recorded by the Clean Energy Pipeline team in this six-month period.

Europe and North America both made serious gains on the M&A deal volume of H1 2017.

Deal flow in North America more than doubled in value, eventually settling at \$18.7 billion by the end of June 2018, compared with the \$9.5 billion of M&A deals recorded a year prior.

Asia Pacific's M&A market is nowhere near as active as its project finance segment, where its deal volume totalled just \$4 billion.

Moreover, the total value of M&A deals announced in Latin & Central America, \$4.6 billion according to Clean Energy Pipeline, meant that it surpassed Asia Pacific in this investment category.

Given the size of the global clean energy M&A market in 2018, it should come as no surprise that there was a noted surge in the amount of invested into pre-construction, under-construction, and operational assets.

Clean Energy Pipeline's statistics show that the most capital being dedicated for projects that were under construction in the first six months of the year, with investors spending approximately \$39.5 billion on these types of assets.

Another \$20 billion worth of transactions were for projects in the development stage, while the remaining \$10.6 billion went towards assets that are already in the operational phase.

Top 5 M&A Deals in H1.2018

Target: innogy SE
Country: Germany
Acquirer: E.ON SE
Deal value: \$25.6 billion

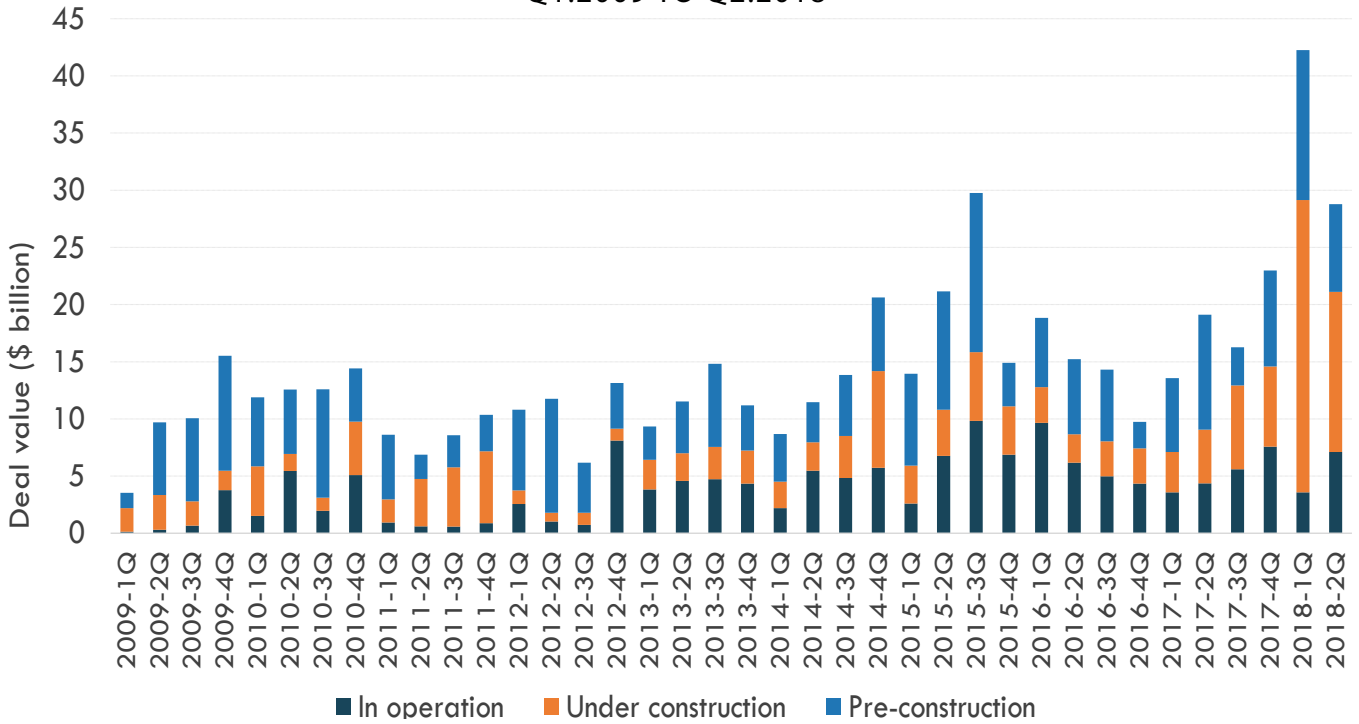
Target: North America Renewables portfolio (1300MW) / Hoho See Wind portfolio (609MW)
Country: USA / Canada
Acquirer: Canadian Pension Plan Investment Board
Deal value: \$1.76 billion

Target: Eletropaulo Metropolitana de Sao Paul SA
Country: Brazil
Acquirer: Enel Spa
Deal value: \$1.40 billion

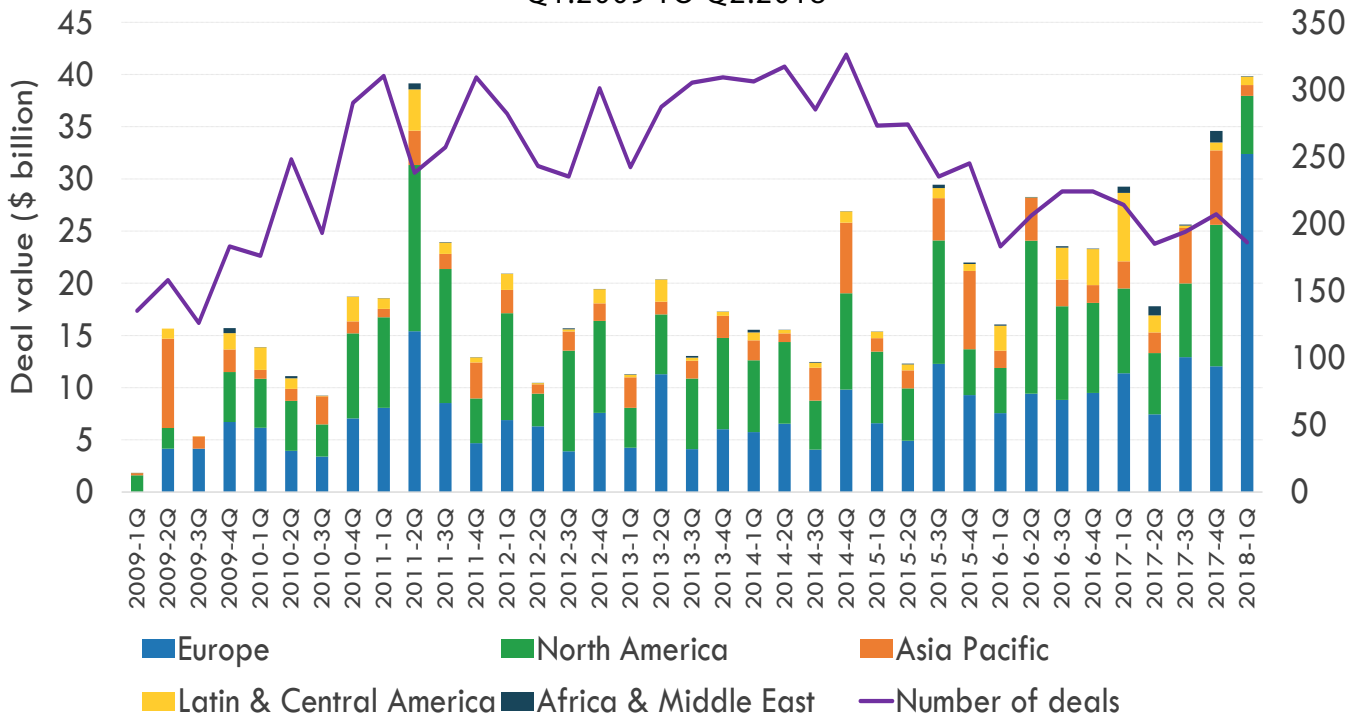
Target: NRG Yield Inc.
Country: USA
Acquirer: Global Infrastructure Partners
Deal value: \$1.38 billion

Target: Hochsee Windpark Nordsee (492MW) & Hohe See Extension (Albatros) Wind farm (112MW)
Country: Germany
Acquirer: Canada Pension Plan Investment Board
Deal value: \$1.36 billion

RENEWABLE ENERGY EFFECTIVE CAPACITY ACQUIRED Q1.2009 TO Q2.2018



GLOBAL CLEAN ENERGY M&A DEAL ACTIVITY Q1.2009 TO Q2.2018



Highest first-half-year VC/PE financing on record since H1 2011

Clean energy venture capital and private equity (VC/PE) investments totalled \$6.3 billion in H1 2018.

The first six months of the year resulted in the highest volume of VC/PE financing on record since H1 2011, and over \$1 billion more than the amount invested over the entirety of 2017.

Over the six-month span, Clean Energy Pipeline's data team tracked a total of 134 deals.

The bulk of that activity took place in the second quarter of 2017, with companies raising approximately \$4.4 billion of equity.

Late stage financing dominates VC/PE activity

Late stage growth investment into clean energy companies, Series D and onwards, amassed more financing in H1 2018 than ever before in a first six-month window.

Late stage VC deals increased by 509% from the same corresponding period last year, totalling just under \$4 billion in 2018.

For comparison, there were only \$651 million late stage VC investments made in H1 2017 and just \$201 million in H1 2016.

Early growth investment, Series A-C, resulted in a similar picture, with equity financing in this bracket valued at \$2.2 billion. This again was the largest amount raised in over seven years.

However, private equity development capital into clean energy companies cooled off significantly as only \$141 million of investments were made, compared with \$1.6 billion of funding reported in the first half of last year.

Robust backing for solar/wind technology companies

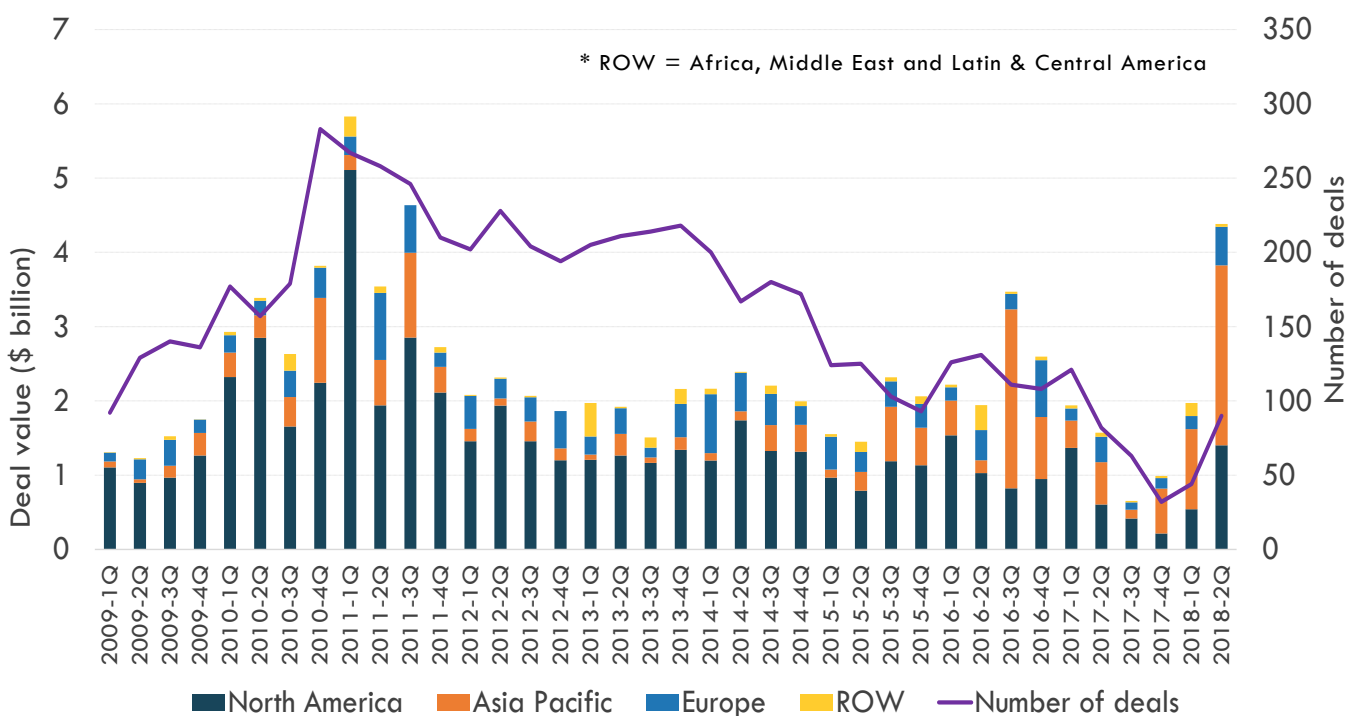
The amount of capital invested into solar and wind technology remained relatively on par over the course H1 2018.

Global solar companies attracted \$1.1 billion, while the corresponding wind sector secured just over \$1 billion worth of VC/PE investment.

Solar and wind technologies continue to represent the bulk of overall clean energy VC/PE activity.

VC/PE investment in energy efficiency companies totalled \$659 million and \$414 million for energy storage companies.

GLOBAL CLEAN ENERGY VENTURE CAPITAL & PRIVATE EQUITY Q1.2009 TO Q2.2018



Public market activity in H1 2018 halved year-on-year

Volatility and political uncertainty in 2018 played a huge factor in the fall of global public market activity.

Investors and clean energy companies are instead turning to different avenues in order to raise capital for their operations.

Global public market activity in H1 2018 was valued at almost half that of H1 2017, where \$5.5 billion was raised in comparison to the \$2.8 billion of deals that were reported up to the end of June this year.

Another sign of how far public market activity has fallen off in 2018 can be seen by the overall lack of initial public offerings.

Chinese EV market keeps PM activity afloat

Initial public offerings were accountable for \$1.9 billion of the \$2.8 billion of public market financing transactions in H1 2018, or roughly 64%.

However, the valuation of IPOs during a first six-month period has never fallen as low since H1 2009.

However, the spike in IPO activity from the first to second quarter could potentially continue into the remainder of the year.

Secondary offering deals were valued at \$830 million, while there no convertible share offerings that took place in the period.

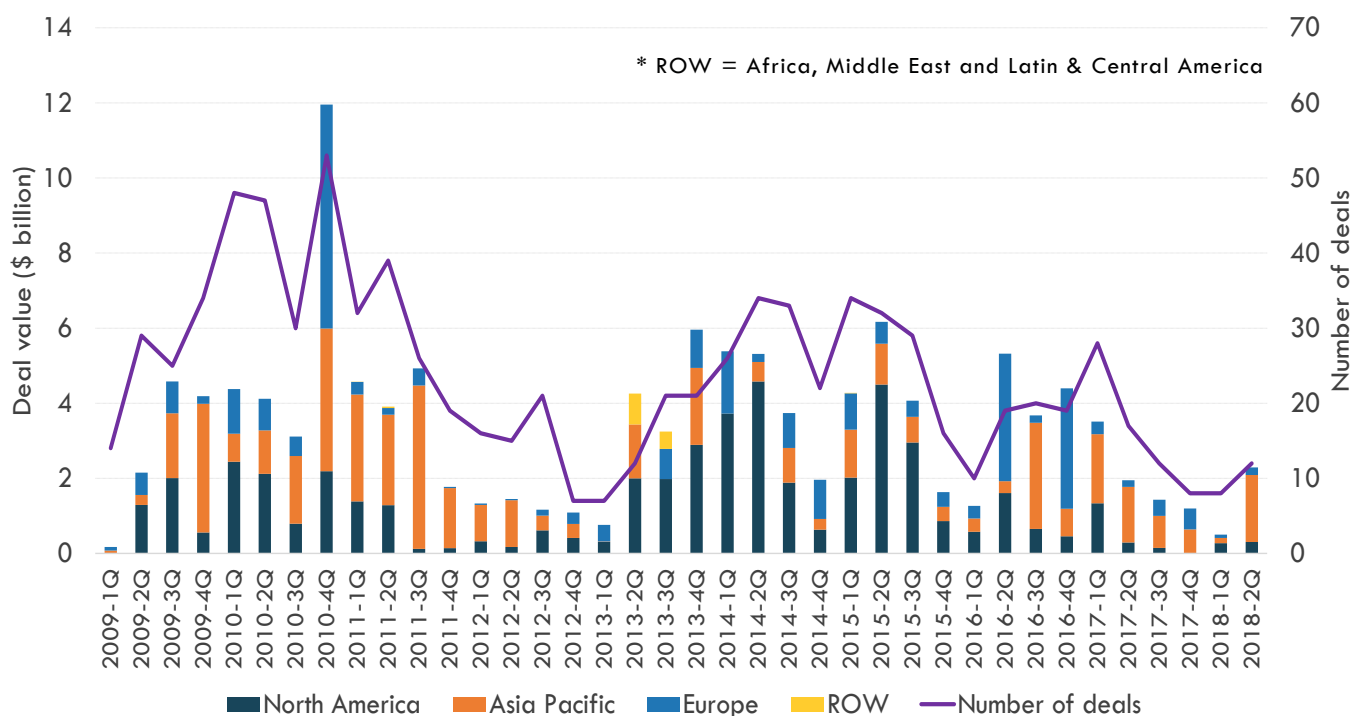
On a regional basis, H1 2018 public market activity fell across Asia Pacific (\$1.9 billion/ -40%), North America (\$580m/ -64%), and Europe (\$290m/ -43%).

According to Clean Energy Pipeline, 11 out of the 20 public market transactions were in China, and a large proportion of these were driven by China's push to electrify its transportation market.

Contemporary Amperex Technology Co. Ltd., a Chinese lithium ion battery manufacturer for the EV and storage sectors, completed the largest public market deal through an IPO valued at \$850 million.

Nanjing Yuebo Power System Co. Ltd. and Shinry Technologies Co., two other Chinese companies involved in the EV sector, also raised \$289 million and \$208 million, respectively in IPOs.

GLOBAL CLEAN ENERGY PUBLIC MARKETS BY REGION
Q1.2009 TO Q2.2018





CLEAN ENERGY MONTHLY REVIEWS IN Q2.2018

Since the beginning of 2018, Clean Energy Pipeline's Monthly Reviews have provided a selection of exclusive interviews and features that were published on www.cleanenergypipeline.com during the month. Bespoke graphs and analytics based on deals tracked by our in-house data team at the end of the publications are available for citation.



June 2018

Anesco to Build Five More UK Subsidy-Free Plants

Lily Coles, Commercial Operations Director, Anesco

Crédit Agricole to Invest €100 Billion in Green Bonds by 2020

Eric Campos, Head of Corporate Social Responsibility, Crédit Agricole

innogy May Sell Stake in Triton Knoll Offshore Wind Farm

Sarah Knauber, Spokeswoman, innogy

EV8 to Capitalise on EV Opportunities

Tom Harper, CEO, EV8

[See other interviews](#)

Foresight Group Pushes for £500 Million First Close on New Fund

Dan Wells, Foresight Group, Partner

CIP Targets 15 Investments from Third Infrastructure Fund

Steen Lønberg Jørgensen, Copenhagen Infrastructure Partners, Partner

Building the UK's Largest Solar Park (Without Government Support)

Mark Hogan, WIRSOL Energy, Co-Founder and Managing Director

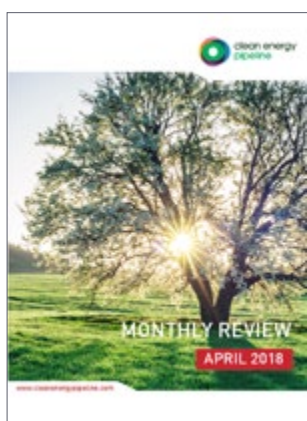
Nordea Bank to Relocate Pension Equities 'Sustainability' over 100 Days

Sasja Beslik, Nordea Bank, Head of Group Sustainable Finance

[See other interviews](#)



May 2018



April 2018

Earth Capital Partners Targets over \$700 Million Global Fundraise

Gordon Power, Earth Capital Partners, CIO and CEO

US Solar Company Slams US-China Trade War

James May II, REC Silicon, CFO

Turning Non-Recyclable Plastics into Fuel

Luca Dal Fabbro, GRT Group, CEO

MUFG Head Explains Logic Behind Offshore Wind Agenda

Carol Gould, Head of MUFG Power and Renewables EMEA

[See other interviews](#)

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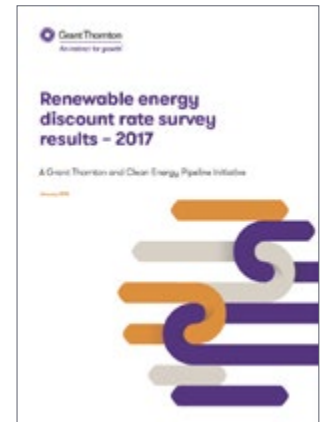
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Investment Trends
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The Smart Power
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Brazil Clean Energy
Investment Guide



Renewable Energy
Discount Rate Survey
Results - 2017



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Clean Energy Pipeline understands the global renewable energy investment landscape and delivers real-time news, transaction data and analytics on this increasingly complex sector. Our in-house team identifies the latest investment, M&A, project finance, fund and regulatory announcements. In addition, we deliver proprietary content including interviews, analysis, insight reports and events.

Find out how we can support delivering on your business objectives by contacting:

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DRIVING GREEN INVESTMENT

Clean Energy Pipeline understands the global renewable energy investment landscape and delivers real-time news, transaction data and analytics on this increasingly complex sector. Our in-house team identifies the latest investment, M&A, project finance, fund and regulatory announcements. In addition, we deliver proprietary content including interviews, analysis, insight reports and events.

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