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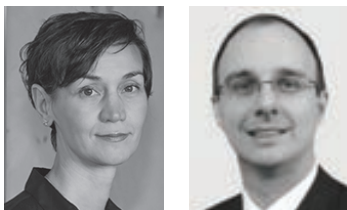
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EDITORIAL WELCOME

Mar Beltran and Karl Nietvelt welcome you to this quarter's edition of *Infrastructure Finance Outlook* by looking at what lies ahead for energy and transportation infrastructure in 2018

“After a dynamic 2017, infrastructure investors will likely keep focused on geopolitical tensions, tech disruption and global trade issues.”

First, we would like to welcome you to this quarter's edition of *Outlook*. In this edition, we delve into the most critical credit drivers and developments in the global infrastructure space, from technological disruption to the regulatory developments that are taking place in the market. In addition, political disruptive forces are never far away when analysing utilities and infrastructure companies. Finally, the drive for green finance and going beyond credit is becoming an established and increasing area of focus for investors.

In many industries we are seeing how technological advancements could drastically alter infrastructure operators' business models today. Think of the future developments for energy storage and the energy transition – with the unabated rise for renewables globally – which itself should continue to transform the power markets in many regions. Think, too, about how the advent of electric cars and closely linked therewith, autonomous vehicles, but also changes in behaviour (such as ride sharing) could have pervasive ramifications for many sectors over the long-term – toll roads and car parks being the most obvious.

Utilities' credit quality is stabilizing, amid ongoing industry transformation

For a time, North America's regulated utilities and merchant power generators were navigating a market of “known unknowns”. Chief among them was the uncertainty surrounding President Trump's tax reform, which has now begun to be addressed. While most of corporate America is bullish about the new tax regime, the effect on creditworthiness of regulated utilities and their holding companies could be negative (see U.S. Tax Reform: For Utilities' Credit Quality, Challenges Abound, published January 24, 2018). Overall, the outlook for regulated utilities remains mostly stable – supported by robust regulatory oversight.

As for independent power producers, management teams are still pondering the extent to which energy efficiency and disruptive technology advancements, with the advancing of batteries and distributed generation, will necessitate strategic modification – a challenge that Aneesh Prabhu highlights in his article on page 3. Simultaneously, energy margins are under pressure as wind and solar generation – which has been increasingly deployed over the past three years – has shaved off peak price formation. These reasons explain why merchant power rating outlooks had a negative bias (45% negative; 55% stable).

The outlook for Latin America's energy sector is also generally stable, underpinned by single-digit growth in GDP and electricity demand. In Argentina, the implementation of an Integral Tariff Review, along with the central government's US\$36 billion energy investment plan, bode well for sector-wide growth, particularly in non-conventional renewables. Key issues to watch are the upcoming presidential elections in Mexico, and later in the year in Brazil.

Across the pond, the bulk of European integrated utilities have stabilized their business models and cash flows, after recovering from the 2016 commodity induced market downturn, with a steady rise in power prices and improved macro-economic outlook. In the short term, most at risk is the UK's regulated water sector as it navigates the 2019 price review (PR19), which outlines the next regulatory period from 2020 (see page 6). In addition, we observe a trend towards merchant renewable projects in Europe, as cost have fallen and governments are keen to reduce subsidies.

Conversely, rated utility companies in South and Southeast Asia (SSEA) are bouncing back, thanks to economic growth, government-led infrastructure development, and higher commodity prices. They should see moderate revenue growth, reaching around 4% from 2018-2020. The Indian government, for

example, plans to tender nearly 100 gigawatts (GW) of renewables investments by 2022, worth about US\$100 billion. And this should continue the country's rapid growth in renewables.

Sound performance is set to continue for infrastructure transport companies

Meanwhile, sound operating and financial performance should continue for airports, ports and roads. In the medium term, operational profitability in these sectors will increasingly depend on how companies and other key stakeholders, such as regulators, effectively face these new challenges. We see transportation companies having to place some strategic bets in the next couple of years.

Airports, for instance, continue to offer the highest returns on capital of the transportation sector, but even though passenger volumes are on the up, our airports portfolio globally showed flat revenues in 2017. Among the factors prompting this trend are flier's evolving habits. This includes the modes of transport they use to travel to airports and the amount they spend in travel and duty free. Airports need to rethink their business models, which have been factoring in real increases in retail revenues per passenger and discounting aeronautical charges.

Similarly, the major opportunity for ports is increasing connectivity. The fostering of inter-port competition, not only between national seaports but also with ports of neighbouring countries, has allowed trade opportunities to grow. Equally important to easing inter-port competition is efficient regional trucking markets, inland waterways, rail and road infrastructure, as well as transit regimes.

Last, our global roads portfolio enjoys a stable outlook, which reflects our view of GDP growth-linked earnings generation performance in the sector. So, where are the opportunities? Improving tolling mechanisms will be driven by growing investment in digitalization, GPS, tracking devices, and applications for big data. In turn, we expect to see operators like Transurban leading the development in mature markets including America and Australia.

Last but not least, M&A activity is promising. Lured by the opportunity to increase companies' leverage and extract returns, investors are continuing to find attractive opportunities in the transportation sector.

The verdict

So, what's next for investment in key infrastructure projects? After a dynamic 2017, infrastructure investors will likely keep focused on geopolitical tensions, tech disruption and, indirectly, on global trade issues and its impacts on the global economy. We can also expect a small improvement in the privately financed pipeline in 2018. While policy paralysis could mean the funding gap continues to widen, there is a light on the horizon. For instance, we believe the recent agreement on the European Fund for Strategic Investments (EFSI 2.0) in Europe, and Australia's asset recycling program will continue to ease new private-public partnerships (P3s). In China, P3s are gaining more attention because of rising government debt and as a way to diversify funding for infrastructure. Transportation will likely remain the focus of P3s in the U.S. with potential new initiatives from President Trump's infrastructure plan.

AMERICA'S BATTERY MARKET: WHAT'S IN STORE?

After renewables, battery storage could be among the next most disruptive new technologies for power markets. Aneesh Prabhu and Mike Ferguson explain how batteries could upend America's power model, once their economic rationale becomes even more evident



It's becoming increasingly clear that the accelerating pace of change of various technologies is disrupting the energy markets. Battery storage is potentially one of the most transformative technologies that the power markets have seen in the past few decades. While the battery storage industry remains in its nascent stages, with less than 1 gigawatt (GW) of installed U.S. capacity to date, a number of factors are converging to prime it for significant growth.

To date, the impact of battery storage has been, at best, muted. We still expect that battery storage technology would need to see substantial cost reductions before it can become a viable part of the grid with a widespread economic rationale. That being said, S&P Global Ratings believes batteries could have the potential to upend the existing power model in the U.S. over the long term – and also the power markets generally, given that energy storage can affect supply patterns and pricing. As we outline in this article, peak shifting (or shaving) applications are already economical, while residential PV solar and battery combinations may still require a further downward trend in costs, even more so for PV systems than batteries.

The case of California: gas-fired peakers under pressure

Battery cost curves continue to trend down. Since we have the highest visibility of lithium-ion economics, we'll take that as an example. First, when we think in terms of capital costs for batteries, units are in kilowatt-hours (kWh) of operation. That is to say, we price in US\$/kWh because we expect batteries to be duration products for peak shifting (or peak shaving) solutions.

Utility scale battery economics are currently at about US\$250-275/kWh price point, or \$1,000/kWh for a battery peaker plant that provides a four-hour peak shift. Costs for the balance of system are about US\$400-US\$500/kilowatt (kW) for equipment like inverter/rectifier, transformers and power control equipment, and safety equipment. So, a utility scale battery would currently cost around US\$1,400-US\$1,500/kW (US\$250-275 multiplied by four plus US\$400). We believe that these costs are comparable to the cost of building a natural gas-fired peaker plant in California.

This should be a concern for independent power producers (IPPs) that operate in that state because these cost economics imply that there will be no gas-fired peaker plant additions in California. The whole point of batteries is that they take electricity directly from the grid and do not draw electricity from wind turbines or solar panels. As a result, batteries allow combine cycle gas turbines (CCGTs) to operate as combustion turbines in peaker plants. This means that a 54%-56% thermal efficiency power plant is going to be able to provide peaking power attached to batteries, instead of the ISO calling upon 30%-32% efficiency combustion turbine. This, in itself, results in substantial carbon reductions and fuel cost savings. In fact, by turning all CCGTs into flexible peaker plants, in addition to being base load plants, batteries allow much more renewable penetration within the grid.

Batteries attract commercial and industrial users

Our analysis indicates that storage is already economical enough for many commercial customers to reduce their peak consumption levels. The structure of a commercial and industrial (C&I) customer's electricity bill is primarily composed of three parts: a fixed charge, a demand charge (based on the maximum intensity of demand), and a variable energy charge based on volumetric consumption.

By being able to store power, and shift energy within a day, a C&I customer can benefit in two ways. First, the customer can smooth out its load profile in order to decrease the maximum demand intensity in the month, thereby lowering

the demand charge portion of the bill. The demand charge represents a "capacity" payment to the utility based on the highest average kilowatts measured over a 15-minute interval over the month. We note that the demand charges make up to 40%-50% of a C&I customer's bill. By shaving, or shifting, peak usage, storage can offer a C&I customer significant savings. Second, storage takes advantage of the intraday variation in electricity prices (rate arbitrage) by purchasing and storing power when grid rates are cheaper (like at night) and drawing on the batteries when prices are higher (during peak load hours). The reduction in demand charges that these customers pay to the utility could then be used to recover their investments in battery systems.

Residential PV plus batteries: costs have room for deductions

To be clear, even for a large 25 kW residential solar energy battery pack, the cost economics are currently much more than US\$250/kWh. We estimate that conventional PV battery systems (that we can buy for our residences) still sell for upwards of US\$500/kWh. However, the cost trend is downwards. Market reports indicate that Tesla Inc. is paying Panasonic Corp. about US\$180/kWh for the batteries that it purchases for its cars.

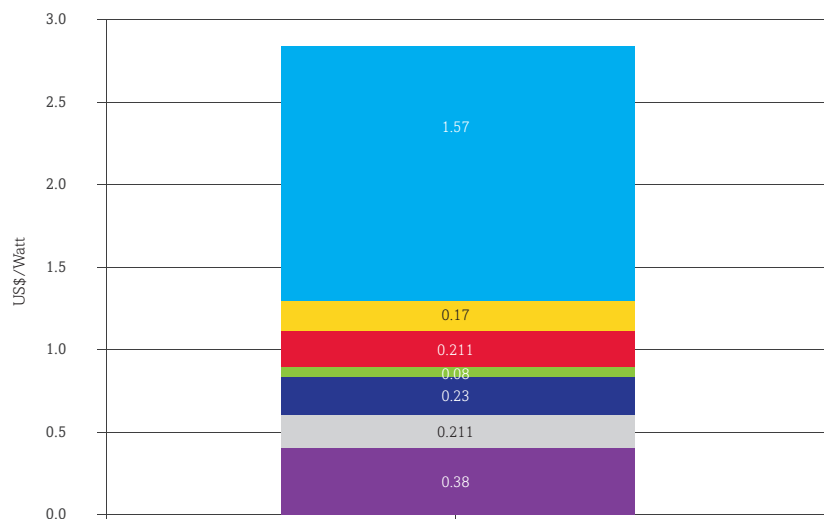
Specifically, at current costs (US\$2,850/kW-DC ~ US\$3/watt PV solar system; US\$500/kWh battery), solar plus storage is not economical in any US state except Hawaii (regardless of net metering). These dynamics do not improve materially even if battery costs decline to US\$250/kWh. However, at US\$2/watt-DC for the PV solar system, solar plus storage becomes competitive – with the levelized cost of energy (LCOE) declining to 16 cents to 17 cents/kWh from 25 cents to 26 cents – in a number of states, like New York, Massachusetts, and Connecticut with high residential retail costs. Yet, the economics seem to work only if both retail electricity rates are high and solar plus storage costs decline by 50%. For states where retail rates are low, having a stand-alone system appears to make less sense because

"S&P Global Ratings believes batteries could have the potential to upend the existing power model in the U.S. over the long term."

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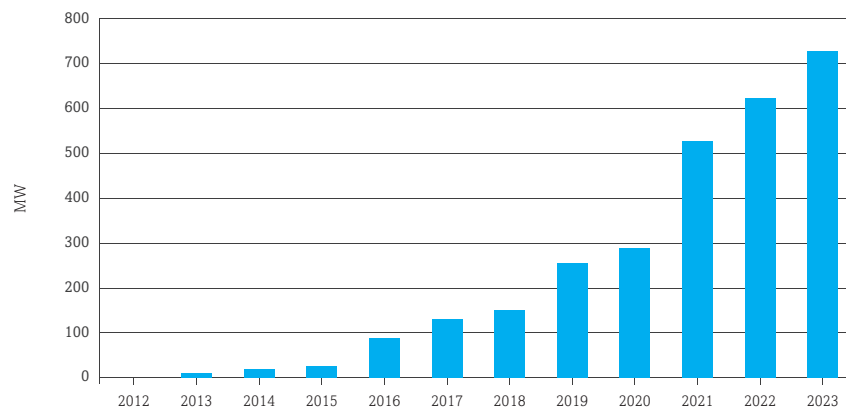
CHART 1: RESIDENTIAL PV SOLAR SYSTEM COSTS (US\$/W)

Supply chain, overhead margin Engineering and PII Direct labor
Structured BoS Electric BoS Inverter PV module



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CHART 2: CALIFORNIA'S BATTERY INSTALLATION PLANS



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“We expect to see greater technological advances during the next three or four years due to the incentives that California has put in place.”

the annual savings provided by batteries are not substantial enough to justify the additional hardware and equipment costs. We note, however, that there are prospects of the cost of solar power systems declining further, because almost 65% of overall residential solar PV costs are still soft costs (see chart 1, page 3).

Regulatory push for renewables and thus batteries to continue

Despite the repeal of the Clean Power Plan and the U.S.' withdrawal from the Paris Agreement by the Trump Administration, many states are pursuing their own climate change policies. Even amid court battles on carbon reduction regulation during the latter stages of the Obama Administration, environmental progress (more specifically, decarbonization) did not halt; in fact, it accelerated. We anticipate such progress to continue, with battery storage playing an increasingly important role. Of course, for the moment, the economics of battery storage are not propelling it forward. It is the state regulators that are aiming to reduce carbon emissions and also stimulate industries that are taking the lead.

The California market is likely to be among the most

heavily disrupted states from influx of battery storage (see chart 2). We expect to see greater technological advances during the next three or four years due to the incentives that the state has put in place. Currently, the Golden State leads the country. It has more than 4 GW of storage capacity in development (spread across about 149 projects). In September 2016, Governor Jerry Brown upped the ante, signing AB 1637 and tacking a requirement for an incremental 500 MW of storage onto an existing mandate of 1.325 GW for the state's large investor-owned utilities.

What next?

Eventually the combining of solar and storage could make economic sense throughout the country. At the earliest, this could be a matter of five-to-seven years – if not decades. But, as disruptive forces loom, utilities and IPPs are recognizing that they must adapt or, indeed, risk being disrupted themselves.

Further information is available on the Capital IQ portal in the research pieces entitled “Going with the Flow: How Battery Storage Economics Are Changing Power Consumption” and “How Battery Storage Will Likely Affect U.S. Power Producers”



SPAIN GOES SUBSIDY-FREE: A NEW ERA FOR EUROPEAN RENEWABLES?

In Spain, remuneration for new renewable sources is changing dramatically. Government subsidies have ended, thereby exposing the sector to market pricing. Gonzalo Cantabrana Fernandez analyzes the developments



It was previously the case that renewable power plants were not financially feasible if the utilities' remuneration was only limited to standard power prices. To increase the market coverage of renewables, government subsidies were therefore required. But today both the decline in production costs across the entire supply chain and the rising production scale of renewable technologies have prompted a new way of thinking: some governments are starting to believe that renewables are now competitive without subsidies.

The Spanish government is among them. The 8.7 gigawatts (GW) of renewables projects successfully awarded in 2016 and 2017 may not receive any subsidy from the central government. Following these auctions, bankers and advisers are scratching their heads, trying to ascertain the best approach to financing projects through what they consider to be a new era for renewables. In our view, the shift from a subsidy-based remuneration model to one more exposed to market dynamics may represent a sign that the industry is maturing. What remains is the challenge of balancing the market's potential risks with optimizing returns.

Correcting regulatory missteps

How did Spain arrive at this point? Thanks to a generous endorsement program, investment in renewable power has burgeoned on the Iberian Peninsula for the past two decades – well beyond the central government's expectations. As a result, renewable subsidies drove increasingly high regulated costs that could not be matched by the corresponding increase in fees paid by energy consumers.

The consequence has been a large tariff deficit, which has crushed the sustainability of the electricity system. In response, from 2008 until 2012, the central government made a series of retroactive changes to the renewable remunerations. But because these measures were not enough to contain the growing electricity tariff deficit, the government announced further revisions in July 2013. A standardized regulated asset-based (RAB) system replaced the incumbent feed-in-tariff system. The retroactive feed-in tariff cuts very negatively affected the profitability of renewables, especially for solar photovoltaic (PV) facilities – and had a significant effect on investor appetite. However, thanks to these cuts Spain's power sector posted its first electricity tariff surplus in 14 years at the end of 2015.

It took until 2016 before new renewable power auctions were held. These were in the form of inverse auctions, where developers bid at a discount over the recognized RAB. This implies an implicit floor price guaranteed by the government and which is expected to change on an ongoing basis for all of the plants, and hence it is valid only under certain scenarios. In January 2016, the government awarded 0.5 GW to wind projects, based on a regulated asset-based (RAB) discount of 100%. The discount on the RAB was 63.4% on the second auction. On the third, it offered discounts of 87.1% for wind projects and 69.9% for PV projects. Based on today's rate of reasonable return (RRR), we estimate this translates in a pool price floor slightly below €40/MWh for the second auction and €28-€32/MWh for the third auction, depending on the project, thus implying significant exposure to pool prices.

A new era?

We see the proposed remuneration mechanism for the new renewables as much weaker than what we observed so far in Europe. In our view these new renewable projects are mostly merchant projects exposed to pool prices, and

hence their cash flow profile is less predictable and relies on each market participant's long-term view of power prices. Project financing may be more challenging to structure, due to the implied volatility of earnings and the limited leverage potential, unless projects manage to sign solid and long-term power purchase agreements (PPAs) with third parties.

The move towards having little or no subsidy for renewables projects is not exclusive to Spain. In April 2017, results of a 1.55 GW auction by EnBW and Ørsted showed bids at zero – meaning no subsidies. In September 2017, the U.K. auction saw a drop in offered tariff prices of 50% on average since the last competitive auction, which took place two years previously. In the Netherlands the bids are to be awarded free of subsidies. Spain, on the other hand, is the first European country that may test this financing on a bigger scale.

The new Spanish power plants must be operational before January 2020. Failure to meet this deadline could allow the government to trigger the guarantees provided on the auction, which we understand could be around €496 million across the three auctions. This is especially challenging for sponsors who have yet to acquire the land to begin construction. Indeed, even at the bidding phase, some bidders did not own the land required to accommodate the projects. Overall, we think bidders will need both a strong balance sheet and experience to meet the deadline.

That being said, the transition by Spain's renewables industry to one exposed to market dynamics could be a sign of maturity where costs of production decrease as technology matures and gains scale. This is true both in wind (offshore and onshore) as well as in solar. We believe the stronger confidence and experience in the technology leads to increased risk appetite from investors. Although managing market risk exposure today appears to be a major shift for the asset class, more conventional generation technologies have managed and financed this risk before. Combined with budgetary constraints that could start limiting governmental subsidies for green generation across Europe, this may be the sign of a new era for European renewables. Ultimately, the challenge will be finding the right balance between risk and return for all stakeholders.

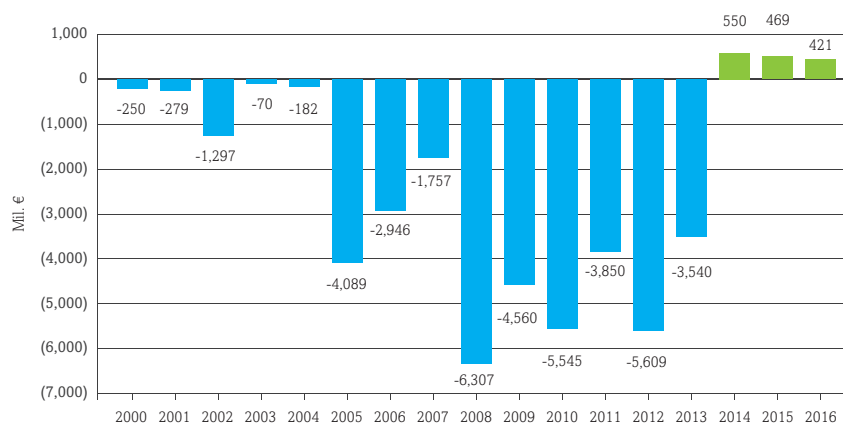
Further information is available on the Capital IQ portal in the research piece entitled: "The End To Subsidies: The Beginning Of a New Era for Spanish Renewables?"

"With budgetary constraints limiting the role of governments' subsidies for green projects – not only in Spain but Europe more generally – the continent may be entering its next phase."

THE REGULATED ASSET-BASED SCHEME

The regulatory framework governing Spanish renewables is based on a regulated asset-based (RAB) scheme. Under the scheme, each plant is remunerated by the government to ensure a "reasonable rate of return". This rate is the 10-year government bond yield plus a spread and is reviewed every six years. It is currently 300 bps for the first regulatory period, implying a 7.5% financial remuneration. Operating assumptions are defined by the government and based on the standard asset (assets with the same type of technology and year of construction).

TARIFF DEFICIT FOR THE SPANISH ELECTRIC SECTOR



Source: CNMC

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OFWAT'S PRICE REVIEW: WATER UTILITIES REMAIN ON THEIR TOES

Water utilities in England and Wales may face pressure from the regulator Ofwat's upcoming price review. Pierre Georges explains

“Water companies still have some flexibility to mitigate any negative effects, by modifying their financial policies and by implementing efficiency measures.”

In December 2017, the Water Services Regulation Authority (Ofwat), the water utilities regulator for England and Wales, published its final methodology for the 2019 price review (PR19). Based on this methodology, water companies devise their business plans for the next regulatory period, which runs from April 2020 to March 2025.

What does it mean? In our view, rated water companies across England and Wales may find aspects of the new pricing methodology challenging. It may hit credit metrics to the extent that we could take negative rating actions. That said, PR19 remains in its nascent stages. Water companies still have some flexibility to mitigate any negative effects, by modifying their financial policies and by implementing efficiency measures.

Getting to grips with PR19

Rated water companies in England and Wales benefit from one of the best regulatory frameworks in Europe, which affords them a strong regulatory advantage. They've enjoyed a long and stable track-record of independent regulation that allows for the full recovery of operating, capital, and financing costs, alongside strong ring-fencing conditions.

But what might water companies find challenging in the upcoming methodology? Here we can point to three items:

Reduction in water companies' allowed cost of capital

Ofwat has adjusted its guidance for allowed cost of capital from the current 3.6% to 2.8%. This new figure represents an average between the 2.3% retail price index weighted-average cost of capital (WACC) and the CPIH, a measure of inflation that also considers rises in owner-occupiers housing costs and council tax rates.

Ofwat's revised guidance reflects a few things: the lower market cost of debt; the shift in equity market conditions (costs of equity now range between 3.8% and 4.5%, compared with 5.6% for PR14); and a signaling of the regulator's steer toward affordable bills. The decision to index the cost of

new debt by reference to the market benchmark is rating-supportive, in our view. It largely protects water companies from the risk that accompanies an increase in the cost of debt – important given that interest rates could be set to rise.

Introduction of efficient cost baseline mechanism

Under the methodology for PR19, Ofwat introduces a new cost-sharing mechanism. Cost allowance for each company will no longer be directly based only on their own historical cost performance (known as the menu approach). To establish an efficient cost baseline, the next regulatory period will instead use econometric models that benchmark cost performance among companies both within and outside the industry. In order to gain rewards, companies will therefore need to outperform their own historical costs and the costs of their peers.

Wider indicative RoRE range for ODI

PR19's methodology also sets an indicative return on regulated equity (RoRE) range for outcome delivery incentives (ODI). Ofwat is increasing the range for penalties and rewards (previously at $\pm 1\%$ to $\pm 2\%$) and removes the cap and collar previously set at $\pm 2\%$. While the new approach by Ofwat provides the operators greater prospects to earn additional returns, it exacerbates the downside for weaker operators given the risk for higher penalties. Because this measure is less manageable than the above, it goes some way to undermining our favorable assessment of this market's regulatory advantage. The measure also reduces the stability and predictability of cash flows and exposes some companies to unlimited penalties – and, therefore, losses.

On their toes

During the past few years, S&P Global Ratings has continuously monitored the political scrutiny on Ofwat's regulatory decisions. We recognize that overt political pressure could depress our view of the regulator's independence.

However, the implementation of PR19 – a structured and transparent price control process – does also reinforce, to an extent, our assessment of the strong regulatory advantage that the jurisdiction enjoys. And given that environmental, social, and governance (ESG) risks become an important consideration in our own methodology and analytics, we positively note the increased focus in Ofwat's PR19 methodology on contemporary topics such as environmental challenges and innovation.

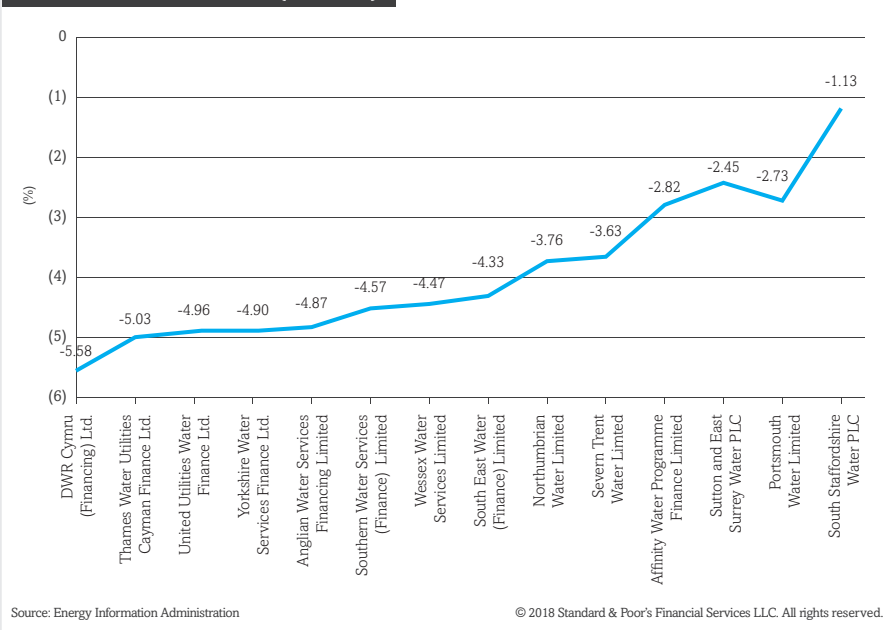
PR19 is still in an early phase: the new regulatory period will only begin in April 2020. Water companies maintain some flexibility to mitigate the expected negative impact. It therefore remains plausible that companies could achieve strong performance – despite the incoming methodology's stretching requirements.

So, what next? We identify innovation and new technologies as important drivers for cost reduction and cost optimization. We also believe that there is some level of flexibility for companies to manage their cash flows as they consider the methodology for cost recovery.

We expect to be in a better position to determine the credit impact on each company individually once they finalize and submit their business plans to Ofwat by September 2018 – and particularly once the regulator provides its initial assessment of the business plan in January 2019.

Further information is available on the Capital IQ portal in the research piece entitled: "New Ofwat Regulations Will Keep U.K. Water Utilities On Their Toes"

FORECAST DECLINE IN REVENUES (2020-2025)



range of asset classes, such as airports, passenger rail, ports and waterways, flood control, water supply and drinking water, hydropower, waste and storm water, and brownfield and Superfund sites.

Q: What will the private sector's involvement entail?

The private sector will doubtless play its role. Because governments and other infrastructure providers might need to consider user pay models to reach the funding levels required to access the incentives program, they could be more open to participating in P3s.

More broadly, the role of private capital could be significant under the plan. Private investment in public infrastructure is not a new concept worldwide (it has particularly thrived in Canada, Europe, the U.K., and Australia), but it has had a slow start in the U.S. Although there is no single section of the plan devoted to programs using private capital, it clearly intends to stimulate P3s and potentially encourage outright privatization through legislative changes.

Some specific areas of support include efforts to: expand the use of tax-exempt private activity bonds, which are attractive forms of debt financing for P3s; offering the ability to toll on federal interstates; removing some of the constraints around using P3s for public transit projects; and streamline passenger facility charge changes in small and non-hub airports (which could stimulate the number of airport modernization programs that use a P3 structure). Tempering these opportunities is the lack of alignment

between Republicans and Democrats over the use of private capital to stimulate infrastructure investment, and this administration's plan will ultimately need bipartisan support to advance an infrastructure bill.

Q: Are there any lesser-known initiatives and projects, which may also benefit?

Yes, some relatively obscure but successful federal programs would receive increased funding.

The Transportation Infrastructure Finance and Innovation Act of 1998, known as TIFIA, has been providing credit assistance, mostly in the form of direct loans to critical surface transportation projects. The more recent Water Infrastructure Finance and Innovation Act, or WIFIA, began in 2014 and provides similar federal credit to water and wastewater infrastructure. Both programs, along with the Railroad Rehabilitation and Improvement Financing, which helps finance railroad infrastructure, will receive a funding increase in the region of US\$14 billion.

Because these programs are matched with other debt and equity contributions, we estimate that as much as US\$50 billion in additional projects could be supported. Since January 2017, for example, TIFIA underwrote a little less than US\$5 billion in 15 project loans for a total of US\$20 billion in projects. P3s can also tap these lending sources, too. In turn, the expansion of both TIFIA and WIFIA, in particular, may present opportunities for private capital.

Also given special focus are rural areas. The infrastructure plan makes special provisions for areas where delivering infrastructure with scale becomes challenging. Further, low levels of population and weaker demographics can challenge a user-pay approach. The biggest opportunity to jumpstart rural infrastructure may come with considering the bundling of assets.

Governments could combine smaller individual projects to attract private capital and harness scale along with building critical mass around the expertise needed to manage them. For instance, the Penn Bridges project, a P3, will develop, design, construct, and maintain 558 geographically dispersed, structurally deficient bridges across the Commonwealth of Pennsylvania. After repair and construction is completed (expected by December 2018), the project will maintain the bridges under a 25-year availability concession with Pennsylvania Department of Transportation.

Q: What next? Is America ready to pay to use its public assets?

The problem for U.S. infrastructure has never been a shortage of private capital, but rather how it is paid for. Even if policymakers reject the overall plan and its role for private capital, S&P Global Ratings sees an inevitable need for Americans to accept paying more to use the nation's infrastructure. At its very essence, the plan forces into the political debate a conversation about who will support new infrastructure because massive federal funding is no longer on the table. And if the gap cannot be bridged by local and state governments alone or through additional direct federal spending or programs, the private sector will inevitably have to be involved in the solution.

Further information is available on the Capital IQ portal in the research piece entitled: "President Trump's Infrastructure Plan: A Substantive Shift To Private Sector Funding"

“Even if policymakers reject the overall plan and its role for private capital, S&P Global Ratings sees an inevitable need for Americans to accept paying more to use the nation's infrastructure.”



EXPLAINING CARILLION'S COLLAPSE

Following the news of Carillion's compulsory liquidation, Mar Beltran explores what's at stake for the U.K.'s private finance initiatives (PFI) projects



The liquidation of Carillion (not rated), until recently the second-biggest facilities management (FM) and construction services company in the U.K. with £4 billion in turnover, has disrupted the construction and FM market and has resurfaced the old debate about the country's private finance initiatives (PFI) scheme. The string of announcements is also raising new concerns about the construction and outsourcing industry in the U.K. and the stability of public services.

Here, we delve into why Carillion got into financial trouble and what it means for the PFI market in the U.K. We believe that among the main culprits were aggressive shareholder-focused (dividends growth) and poor risk management policies, which lead to major construction project impairments and a decrease in operating margins. The extensive use of the U.K. government's supply chain finance (SCF) scheme as a source of financing and lack of related disclosure kept Carillion's fragile financial situation hidden for longer. We believe that a great deal more needs to be done by audit committees, auditors, and regulators to ensure that companies clearly disclose their use of SCF (reverse factoring).

The PFI scheme shouldn't be blamed

The PFI scheme regularly comes under review, and issues such as poor procurement practices (awarding contracts to the cheapest option) or inability to deliver the cost benefits (higher administration or financing costs) are covered in such reviews. What's more, during the past 20 years of PFIs, at times some contract managers have indicated that their facilities management (FM) contracts (or elements of them) were not profitable or that the contract had not been profitable at some point in the past. This suggests that FM contracts may have routinely been mispriced.

Due to the structure of public-private partnership (PPP) projects, low profits for the operator should not immediately affect individual projects. Certain market players may be willing to support unprofitable contracts rather than jeopardize their market position. In addition, mispriced soft FM contracts (typically labor-based services) may often be corrected by market testing or benchmarking. No such mechanism is usually available for hard FM services (including also reactive and planned maintenance), however, which as a result face significant medium-term to long-term exposure on these costs. Consequently, the project company too will find mispricing a significant issue if it must replace a hard FM contractor.

A noticeable trend during the first 20 years of PPP has been the reduction in absolute and relative levels of long lifecycle funds (which in addition maintenance, require major works such as major equipment replacement), with early budgets often significantly higher than at present. The marked decline, in our view, does not reflect any advance in lifecycle methodology, but rather an aggressive costing approach. Given that lifecycle expenditure is largely incurred only later in the concessions, increased risk may have been building from the outset.

Despite some weaknesses, the PFI scheme should not be blamed for Carillion's liquidation and the string of troubling news in the U.K. construction and outsourcing sector this year.

According to the Commons Briefing, the cause of Carillion's financial difficulties is, for the most part, not connected with its government contracts but rather with

other parts of its business. According to Carillion's annual report, only £106 million in revenues (approximately 5% of total Government Contract revenues) were expected in 2018 and 2019 from PFI contracts.

What drove Carillion into a ditch?

In mid-2017, Carillion reported significant construction project impairments totaling as much as £845 million. This was not solely exclusive to the U.K. While £427 million related to U.K.-based projects, £104 million related to Canada-based projects and £314 million to the Middle East. In our opinion, this reflects poor decisions in the years leading up to the collapse, including aggressive pursuit of growth and shareholder focused financial policies (dividend distributions), combined with weak risk management. According to the Commons Briefing, the board did not exercise proper governance oversight.

Though we do not rate Carillion, we believe it likely that contracts were mispriced and that management likely used debt for dividend distributions, despite Carillion's substantial underfunded pension liabilities. Carillion reported only a modest increase in working capital in 2012-2016, which however obscured significant working capital outflows and negative operating cash flow when adjusted for reverse factoring, which we would treat as debt. Carillion's adjusted debt would have suggested aggressive leverage when including sizable pension liabilities and estimated reverse factoring.

Further information is available on the Capital IQ portal in the research piece entitled: "Carillion's Demise: What's At Stake?"

"Despite some weaknesses, the PFI scheme should not be blamed for Carillion's liquidation and the string of troubling news in the U.K. construction and outsourcing sector this year."





STEPPING UP: SOUTH AND SOUTHEAST ASIA'S INFRASTRUCTURE PIPELINE

Abhishek Dangra assesses the ambitious plans currently underway to regenerate South and Southeast Asia's infrastructure

“The Asian Development Bank (ADB) estimates that the SSEA will spend a total of US\$9.5 trillion on infrastructure between 2016 and 2030. This requires enormous sums of capital.”

Many of the world's most intensive infrastructure projects are underway in South and Southeast Asia (SSEA). Among them are electrification projects to remove power deficits, while developing countries in the region are improving their airports, ports and highway networks. Such ambition comes at a price, however: the Asian Development Bank (ADB) estimates that the SSEA will spend a total of US\$9.5 trillion on infrastructure between 2016 and 2030. This requires enormous sums of capital. With the region entering a critical period in its infrastructure development, we receive many questions such as: “What is the credit outlook for SSEA's infrastructure players?”

Despite a varied regulatory landscape between jurisdictions and sectors, the SSEA has enjoyed relative regulatory steadiness. This informs a stable outlook for most of the 24 S&P-rated infrastructure companies in SSEA. Infrastructure companies based in Singapore, Malaysia, Thailand and the Philippines could become the region's most robust.

The region's big spenders

With Asia's infrastructure market experiencing a flurry of spending, it is India and Indonesia leading the rest. Capital expenditure (capex) in India remains high as the country addresses its wide-ranging infrastructure deficits. Indonesia's infrastructure spending, meanwhile, is expected to increase by 47% for our rated companies between 2018 and 2020 (against the previous three-year period).

Driving capital investment in Indonesia are state-owned enterprises (SOEs), particularly for electricity, toll roads and ports. The likes of electricity generator, PT Perusahaan Listrik Negara, and toll road operator, PT Jasa Marga, are scaling up operations to meet the government's development and GDP growth targets. Yet, because these targets are highly ambitious, our ratings already factor in the potential financing challenges, as well as the complications that could arise in the execution – namely delayed cash flows, higher capex or negative regulatory interventions.

SOEs are also the main players in India's infrastructure upgrades, where transportation projects are most in demand. Previously, disputes and payment delays have partially muted private-sector involvement from toll road construction projects. To compensate, the central government has

significantly ramped up roads and railway expenditure. Further, high investment in renewable generation has increased (see also the Editorial Welcome), which has made it ripe for growth.

Following closely behind is Singapore, where the central government may also increase budgets for transportation infrastructure upgrades. The focus will be on regenerating the country's aging facilities, including the metro rail, and expanding the island state's airport and ports. One of the signature projects is a high-speed rail network connecting Singapore and Malaysia, which is still in its planning stages. There are plans for improving the power grid to meet future load requirements, too.

Malaysia and the Philippines are following suit with respective commitments to upgrading their grids. However, beyond this the plans are considered poles apart: both have divergent regulatory and competitive trends. Malaysia recently retained its tariff schedule for utilities, which provides visibility over cash flows for the next two years. By contrast, regulatory uncertainty continues in the Philippines – with tariff review delays lasting nearly three years. In turn, a previously encouraged instrument, the public-private partnership (PPP), has been seldom used. It has been replaced by public investment. And capex in the Philippines may increase even further if the central government's plans to implement the US\$180 billion “Build, Build, Build” agenda, a spending plan equivalent to seven percent of national GDP, are successful.

Risk accompanies ambition

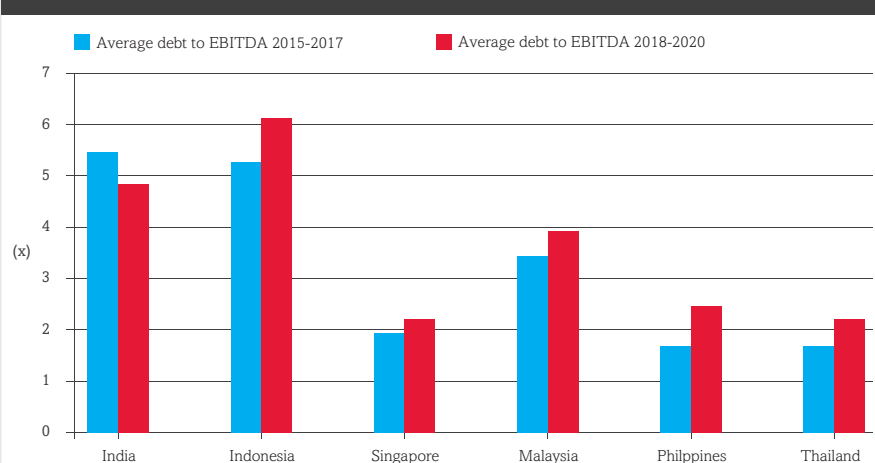
What's clear is that the pipeline is stepping up. And, with this, we expect average revenue growth for rated SSEA infrastructure and utilities to sit between four and six percent between 2018 and 2020. However, such capital intensive projects come with greater risk. For India and Indonesia, cumulative capex for rated companies will exceed US\$25 billion by year-end 2020.

With this in mind, those companies able to withstand the higher spending requirements, and those overseen by strong regulatory controls, should see their credit profiles fare better than the rest. In this list we would expect companies based in Singapore, Malaysia, Thailand and the Philippines, while companies in Indonesia and Indian companies may have weaker credit profiles and higher leverages. Across the region, we believe infrastructure majors with ratios of debt to EBITDA in excess of 5.5x could face financial pressure. This could place some of Indonesia's infrastructure majors in troubling waters: the average ratio of debt to EBITDA could rise above 6.0x by the year-end of 2020 (see chart).

Other risks abound, too. As infrastructure gaps narrow, there is a risk that credit profiles could widen. Divergent regulations by jurisdiction and by sector may leave highly leveraged companies vulnerable to regulatory surprises – not to mention other stresses, such as rising interest rates and lower-than-expected revenues. And, as seen in many other regions, the medium- to long term may see the introduction of risks (but also opportunities) from industry disruption and technological advancements.

All things considered, the region's substantial infrastructure investments should support the SSEA's growth and development. Given the increasing involvement of SOEs in developing infrastructure, there is an unprecedented incentive for governments to ensure the strength of both supporting regulatory frameworks and the financial health of market participants. It follows, then, that strong regional infrastructure majors could emerge in the future.

AVERAGE LEVERAGE FOR OUR RATED INFRASTRUCTURE COMPANIES IN SOUTH AND SOUTHEAST ASIA



Source: Historical data and S&P Global Ratings forecasts

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Further information is available on the Capital IQ portal in the research piece entitled: “Bridging Infrastructure Gaps In India And ASEAN Could Create Divides”

FAQ: THE YEAR AHEAD FOR LATIN AMERICA'S UTILITIES AND TRANSPORTATION SECTORS

Julyana Yokota answers the market's most pressing questions concerning the outlook for the region's energy and transportation infrastructure industries



Q: Julyana, let's begin with the energy sector. How is the outlook looking for the region?

The outlook for Latin America's energy sector in 2018 is generally stable, underpinned by single-digit growth in GDP and electricity demand. Of our rated portfolio, 87% of outlooks are currently stable – the lion's share of those companies are Brazil-based entities. The recent stabilization of Brazil's sovereign rating has cascaded to issuers. As elections in Mexico will take place in July, we'll continue to monitor potential effects of a new administration on energy regulation here, too.

Q: What key developments are happening?

In Argentina, the implementation of the Integral Tariff Review eliminated rate freezes, which strengthened companies' cash flows and capital structures. The Review, alongside Argentina's US\$36 billion energy investment plan, bodes well for the sector-wide growth, particularly in non-conventional renewables. These energy sources are playing an increasingly vital role in energy sectors across Latin America, and have led to a decrease in price bids for solar and wind power in Chile and Mexico – which could be good news for consumers.

In Chile, electricity spot prices may drop as a result of the entrance of non-conventional renewables, alongside lower average demand growth. However, hydrology conditions still tend to influence spot prices, particularly in Brazil, Peru, and Colombia, where the energy matrix is exposed to an overabundance of rain or extended periods of drought.

More generally, non-conventional renewables across Latin America should grow. In the longer term, we predict lower energy prices in the renewables sector due to the aggressive bidding by new market participants in green energy.

What's more, the prevailing appetite for alternative clean energy sources has the potential to prompt insidious change. Merger and acquisition (M&A) activity in Brazil should continue, with particular interest from Chinese and European investors. Governments have also demonstrated a thirst for investment in diversified energy sources. They have also shown some desire to increase standards for distributors, which could lead directly to sector-wide performance gains.

Q: And what about the market risks?

Hydrological variation, and its impact on reservoir levels, remains a key risk across Latin America. This could continue to spur fluctuations in spot market prices. However, we expect rated energy companies to have enough flexibility to tolerate variations in hydrologic conditions. Lower prices in some markets are likely, which could both increase consumer demand and create room for competition. Further sovereign-related downgrades are unlikely, given that most sovereign outlooks in the region are now stable.

Q: Thanks, Julyana. Now let's move onto the transportation sector. What's the credit outlook?

Credit conditions in Latin America should remain on a favorable path in 2018. The region's largest economies are improving, which is a huge positive for transportation revenues. Of course, low interest rates and positive inflations are also boons, but currency exchange volatility remains a risk.

Q: I understand that the region's airports are a hive of activity. What's the outlook for airport infrastructure?

There's certainly a lot going on. Most of the region's major airports carried out expansion plans between 2007 and 2012. Also, Mexico's central government is constructing a new international airport in Mexico City, which will boost current

capacity fourfold – to 57 million passengers annually by 2020.

Passenger volumes continue to profit from worldwide wealth and population growth and the rise of low-cost carriers. More recently, a boom in international tourism and lower fuel prices are helping, too. In turn, we expect traffic demand for most of the Latin American market to show at least a 2x elasticity to GDP growth. That said, one consideration is that aeronautical and commercial growth on a per passenger basis at the region's airports could be negative.



Q: And what's the latest for Latin America's toll road projects?

Last year, we held a negative outlook for toll roads globally. This was linked to our negative outlook for Latin American countries, such as Mexico, Brazil, Colombia, and Chile. Since then, however, the sovereign ratings have stabilized, as mentioned earlier.

Similar to airports, toll roads continue to outperform GDP with 2x average elasticity. This is thanks to economic and inflation growth, which is helping to boost revenues. And we expect recovery in traffic volumes in Brazil following the end of its recession cycle.

This year, we expect to see large capital expenditure (capex) investments, which will be driven by road congestion, economic stimulus programs, or industry disruption, which may come in the form of electrification or car-sharing park facilities.

Large investment opportunities continue to be linked to the advance of the 4G Toll Roads program in Colombia – the largest in the region, with around US\$18 billion of investment in over 30 greenfield and brownfield roads.

Q: Which key developments should we look out for?

M&A activity is one consideration – and is likely to be the key rationale for rating actions. Depending on the nature and structure of such transactions, M&A may affect issuers' credit metrics, which are relatively weak in the sector. We expect the conclusion of Mubadala's offer to acquire a controlling stake in Brazilian Invepar to mark the entrance of Abu Dhabi in the region. We also expect opportunistic M&A activity of assets related to sponsors emerging from financial distress in Mexico, Brazil, Peru, and Colombia.

Further information is available on the Capital IQ portal in two research pieces entitled: "Industry Top Trends 2018 Transportation Infrastructure" and "Industry Top Trends 2018: Utilities – Latin America"

“The prevailing appetite for alternative clean energy sources has the potential to prompt insidious change.”



2018 U.S. MUNICIPAL GREEN BOND MARKET OUTLOOK AND RESILIENCY

Kurt Forsgren and Christina Marin compare the self-labeled municipal green bond market within the U.S. and global peers

The volume of debt that U.S. municipal issuers are labelling as “green” continues to increase: market estimates for 2018 suggest that issuance could top US\$15 billion. S&P Global Ratings expects to see issuers across a variety of sectors continue to use the green label, with bond proceeds for both mitigation (such as reducing carbon, water, and waste) and adaptation (such as building more resilient infrastructure) purposes.

The municipal issuers paving the way

Labeled municipal green bond issuances totalled 65 in 2017, reaching US\$10.4 billion. This represents about 25% of the US\$42.2 billion par total of U.S. green bond issuances that year from corporate and municipal issuers. While there is tremendous need and market demand for green bonds, federal tax reform – and its implications for municipalities – could reduce green bonds issued in 2018. Nevertheless, we estimate additional growth in 2018 as more issuers look to expand their investor base, meet sustainability objectives, and test the water for preferential pricing.

In particular, there have been a few states driving considerable growth. From 2013 to 2017, New York, California, and Massachusetts took the lion’s share of issuance. Combined, they generated 64% of all par value and

48% of transactions over that five-year span. These states have been leaders in the movement for environmentally-conscious investing. And, in our view, issuers in these states that have pursued the green label benefit from generally supportive management and governance structures.

In particular, the State of New York led the way in green bond issuance in 2017, with the Metropolitan Transportation Authority issuing US\$2.8 billion in green bonds to support projects. It was the sixth-largest green bond issuer globally during 2017.

Now it seems that other states are following suit. There has been notable growth in Connecticut, Colorado and the District of Columbia. The data indicate that, while the number of green issuers is increasing on opposite coasts and in states with higher concentrations of major cities and infrastructure, growth could continue in other regions of the country.

Applying our Green Evaluation benchmark

S&P Global Ratings’ green evaluation tool scores the quantifiable lifecycle environmental benefit or resilience impact of a specific project or group of projects relative to a regional baseline and compared with that of similar projects and technologies globally. It also provides a second-party opinion regarding governance and transparency framework associate with the financing aligned with the Green Bond Principles.

Under our Green Evaluation tool, the majority of global self-labeled green bonds scored E2 (on a scale of E1, highest, to E4, lowest). Our sample includes a high average mitigation score (78/100), largely thanks to the types of technologies financed by self-labeled vintage green bonds. Within the global self-labeled sample, examples of green bonds receiving an excellent score include a geothermal project in the Philippines and a hydroelectric generation project in Ohio. Notably, our analysis also reveals that – in applying our Green Evaluation methodology to a sample of 2017 self-labeled U.S. municipal green bonds – these scored on par with their international counterparts (see chart).

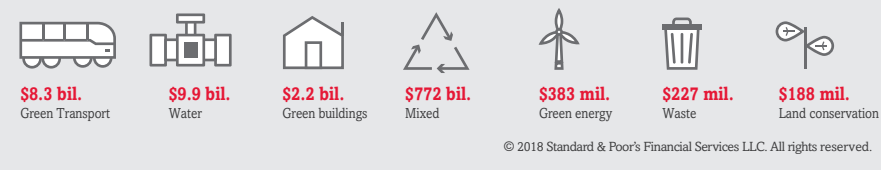
Analysis shows that water, green buildings and transportation projects are the primary beneficiaries of these green bonds. As such, the market for these bonds is growing and – given the interest in sustainable investment and the risks faced by governments from climate change – many municipalities may be keen to enter the green bond arena to finance both environmentally beneficial projects and more resilient infrastructure.

Moreover, we believe that the market for financing projects with environmental benefits is significantly larger than the self-labeled universe of municipal green bonds as evidenced by two transactions that received S&P Global Ratings Green Evaluations, which were not labeled “green” by their issuers.

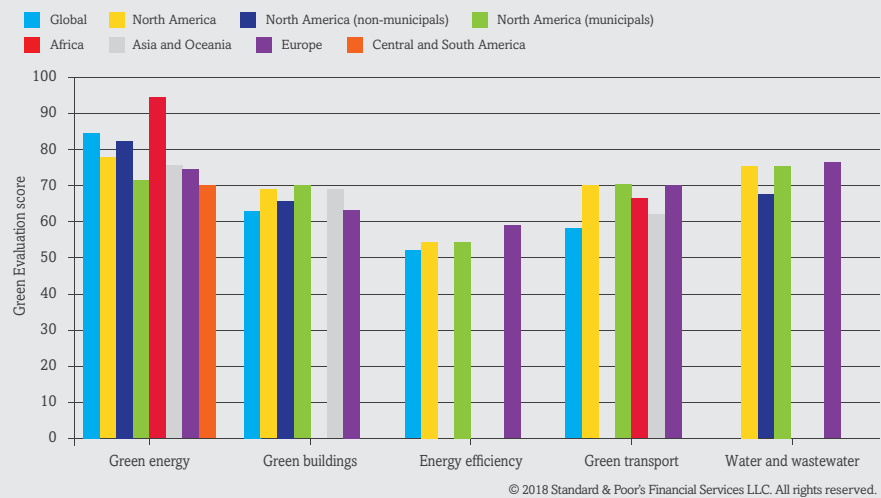
Further information is available on the Capital IQ portal in the research piece entitled: “U.S. Municipal Green Bond & Resiliency Outlook: Comparing The Self-Labeled Market With U.S. And Global Peers”

“We estimate additional growth in 2018 as more issuers look to expand their investor base, meet sustainability objectives, and test the water for preferential pricing.”

TOTAL U.S. MUNICIPAL GREEN BOND PAR BY SECTOR, 2015-2017



S&P GLOBAL RATINGS’ OVERALL GREEN EVALUATION SCORES - U.S. MUNICIPAL ISSUANCE VERSUS GLOBAL



U.S. GREEN FINANCE SEES A CLEARER (AND BRIGHTER) YEAR AHEAD

Michael Ferguson considers the positive developments being made in the American green finance market



The grass should be even greener in 2018 for green finance globally. Worldwide, labeled green bond issuance jumped to nearly US\$160 billion in 2017. The figure also grew significantly in the U.S. – despite political headwinds – due to a mixed group of municipalities, states, and large corporations aggressively pushing forward with decarbonization efforts.

In part, this is because of enormous infrastructure needs. Water, wastewater, and irrigation systems will require over US\$630 billion of investment through to 2033 to bring them up to modern standards, according to the U.S. Environmental Protection Agency. With such substantial funding requirements, we expect a variety of financial tools will be used to fund them.

Tax reform: no real hit to green energy?

The green finance market breathed a sigh of relief once it realized that renewable tax credits were spared the budget axe. As the debate over tax reform came to a head in late 2017, the fate of the production tax credit (supporting wind) and the investment tax credit (supporting solar) hung in the balance, with early versions of the bill excluding these critical credits altogether and later versions curbing it to a large degree. However, the final version of the bill continued the credits – a surprising outcome, given that the bill (now law) is thought to add substantially to the federal deficit. In a bill passed without a single Democratic vote, the continuation of the tax credit speaks to the enduring value of the credits as tools for spurring renewable development that transcends partisan politics.

Still, despite the critical credits being maintained for the moment, the revised tax code may have an indirect impact on the value of these credits. A lower corporate tax rate – with the marginal percentage down to 21% from 35% – could cause tax equity investment to be less valuable. With a limited number of tax equity investors as it is, the change to the tax code may affect how these projects are funded.

When the market suspected – ultimately incorrectly – that the production tax credit would be excluded from future budgets, installed wind capacity surged in 2015, especially for corporate power purchase agreements (PPAs). So the phase-out of the tax credit expected is avoided (at least for now). As such, we believe renewable financing – spurred by diminished costs – will continue to grow quickly, but we don't expect an immediate surge.

The greening of infrastructure

Now that the U.S. political agenda has moved on from tax reform, we expect that discussion will return to rebuilding the country's infrastructure. Having been underfunded for decades, America's aging infrastructure is in need of an overhaul.

The White House has recently proposed over a trillion dollars in infrastructure investments, in addition to the US\$200 billion in the 2018 budget. However, the Federal Government continues to acknowledge that much of the funding for these projects – about 75%, according to the Council on Foreign Relations – will have to continue to come from the state and municipal levels, as it has for much of the past century. Indeed, green bonds are more often than not issued on the local level in the U.S., because most green projects are financing renewable energy power plant and energy-efficient transportation.

A brighter future

We anticipate another impressive year for U.S. green bond issuance, driven by a mix of renewable-backed issuances, as well as those used to help repair and replace infrastructure projects with more efficient and modern equivalents. Additionally, U.S. energy efficiency initiatives, which reflect shifting consumer preferences and are leading to decarbonization of the U.S. power grid, are likely to be a focal point of green bond issuances, especially as corporate issuers look to reduce their footprints.

The revised U.S. tax code with its lower corporate tax rate could influence issuers' decision about whether to use tax-exempt municipal issuances or corporate debt, and, further, in the absence of a formal climate change policy at the federal level, determine what advances will be made at the state level that could drive green issuance.

Furthermore, without the Clean Power Plan and amid diminishing installed costs for renewable capacity, we continue to expect that a number of states will pursue either new or heightened renewable portfolio standards. These standards have driven investment and green bond issuance in the past, and will continue to do so in the years ahead. And while estimates on green bond issuance vary wildly and can hinge on a bevy of market and political conditions, the decarbonization of the world economy continues unabated.

Further information is available on the Capital IQ portal in the research piece entitled: "U.S. Green Finance Sees A Clearer (And Brighter) Year Ahead"

“The continuation of the production tax credit (supporting wind) and the investment tax credit (supporting solar) speaks to their enduring value as tools for spurring renewable development in the U.S.”





GREEN BOND ISSUANCE IS EXPECTED TO SHOOT UP FURTHER

Noemie de la Gorce provides the green bond market outlook for 2018, highlighting three key trends: green securitization, sovereign issuance, and resilience investments

“We expect emerging markets to maintain their involvement in the green bond market, led by China, India, and Mexico.”

S&P Global Ratings expects strengthening green bond market fundamentals to fuel about a 30% increase in self-labeled instruments globally – pushing issuance to around US\$200 billion in 2018.

Green bond issuance skyrocketed last year to US\$155 billion, up from US\$13 billion in 2013, according to the Climate Bonds Initiative (CBI). This represents annual market growth of 80% over the past five years, demonstrating the rapid development of new green markets, combined with the continuous global political push to address climate change. While we expect this growth will slow down in 2018, we believe solid market fundamentals may drive the expansion of the green bond market to new types of issuers, geographies, and financing types.

Expanding green bond frontiers

While Europe remained the primary region for green bond issuance in 2017, North America is rapidly bridging the gap. In the U.S., the self-labeled green bond market more than doubled in 2017, driven largely by states, municipalities, and corporates, despite volatile federal climate policies. Emerging markets are also likely to maintain their involvement in the market, led by China, India, and Mexico. The contribution of those three countries to global labeled green bond issuance rose significantly over the last two years, to 20% in 2017 from 7% in 2015.

Sovereign issuance swells

Moreover, we expect political support for green bond issuance to further ramp up in 2018, through new sovereign and sub-sovereign issuance, as well as via increasing regulatory support for private issuance.

Since Poland’s inaugural sovereign green bond in 2016, sovereign and sub-sovereign issuance has increased substantially, to US\$11 billion in 2017 from US\$0.8 million in 2016. Belgium and Indonesia joined the group of sovereign green bond issuers in the first months of 2018, following France, Fiji, and Nigeria last year. Morocco, and possibly Sweden, could follow suit this year.

New green financings instruments

The development of green financial products reflects, in our view, how the market is approaching new business opportunities arising within the green space. Among these

products, both green lending and green securitization have been on the rise over the last two years: issuance reached a record-high of nearly US\$36 billion in 2017.

These new products constitute an answer to the increasing retail demand for green investments while leveraging the return potential of often diverse and small-scale low-carbon projects such as energy efficiency initiatives.

We expect the U.S. to lead the green securitization market in 2018, supported by existing state and government programs as well as positive momentum in collateralized loan obligations and mortgage-backed securities (MBS) issuance. Despite this geographic concentration, we nonetheless see growth potential for green lending across a broader range of geographies, including emerging and developing markets.

Adaptation financing

2017 was a year of multiple extreme weather events, underlying the vulnerability of many countries to changing weather patterns. As such, we expect that the amount allocated to adaptation projects may gradually increase. Development banks, local authorities, and water companies are likely to continue to be the main issuers of such bonds.

The key challenge for growth in adaptation is the difficulty of monetizing the benefit of adaptation projects, absent a clear cashflow stream, unlike for mitigation projects. Most of the benefits of adaptation projects make society and business more resilient to unfavorable weather events. However, it is often hard to quantify the financial benefit of reduced damages or increased revenues had the adaptation project not been carried out. The consequence is that public resources or development banks finance most adaptation projects.

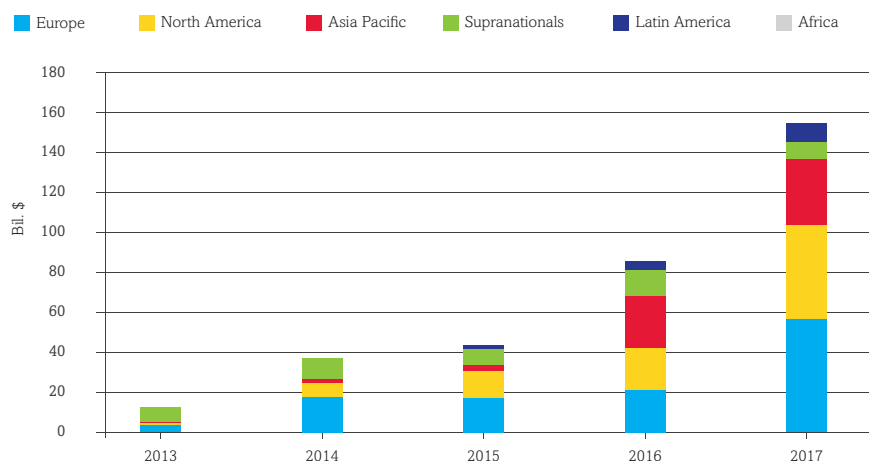
Nevertheless, we believe the recent increase in material damage to economies from extreme climatic events may focus the attention of public authorities on the need for adaptation investments. This may accelerate the growth of green bonds for adaptation projects in the medium term.

Climate finance is heating up

Green capital market instruments – especially green bonds – have been an efficient tool to channel investments into climate finance so far. We expect the market to maintain steady growth in 2018, supported by further technological, financial, and regulatory intervention. We also expect the increasing focus on the impact of climate change to further drive political and business mobilization, as well as stimulate additional investment in mitigation and adaptation financing. With 2017 being the hottest year on record globally, green finance is unlikely to cool down.

Further information is available on the Capital IQ portal in the research piece entitled: “Green Bond Issuance Is Expected To Shoot Up Further”

GREEN BOND ISSUANCE BY REGION



Source: Climate Bond Initiative

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THE NORDICS CONTINUE TO BLAZE THE TRAIL FOR GREEN BONDS

Andrea Croner considers the important, global role that the Nordic public sector has played in the development and expansion of the green bond market



Since the very first green bond issuance in 2007, the market has expanded massively: we estimate a record US\$200 billion of issuance in 2018. As of October 2017, around US\$2.1 billion of total outstanding issuance originated in Nordic countries (Denmark, Finland, Iceland, Norway and Sweden). It is these nations that have been driving innovation in the green bond market, notably through public-sector issuance.

What's more, we see the Nordic countries leading the way for transparency of impact reporting. Nordic public-sector entities have become sought-after specialists in this area and have contributed to creating guidance for impact reporting. Partly as a result of their efforts, investing in green bonds has become more transparent – and therefore more attractive to investors worldwide.

Green bonds have Nordic roots

Since the inception of the green bond market, the Nordic countries have played an important role in its development and expansion. The World Bank made the first green bond available to the public in 2007 in collaboration with Swedish bank SEB and a group of Swedish investors.

Governments and other public-sector entities aiming to facilitate engagement in the green bond market include the four Nordic public-sector funding agencies (PSFAs), together with six Swedish local and regional governments (LRGs). In October 2017, these entities together published a positioning paper outlining a joint approach to impact reporting for green bonds. The proceeds from Nordic issuances are primarily invested in renewable energy and sustainable housing – but also in public transportation, water and waste management, energy efficiency, forestry, and pollution reduction. To facilitate comparability, there are now specific green bond indices, which make it easier for investors to track performance and compare returns and volatility. In our view, this has resulted in greater transparency for green bonds.

Moreover, the Nordic green bond market continues to expand rapidly, driven by high demand from investors. The public sector represents a large proportion of the market, responsible for well over 50% of new issuances in most of the past six years, putting it at the forefront of the green bond market in the region. And over the next few years, we expect both the number of issuers and the issuance volumes to increase.

Increased funding diversification

Public-sector funding agencies (PSFAs) are the largest Nordic borrowers of green bonds due to their history of large issuances in general, followed by multilateral lending institutions (MLIs), government-owned companies (GREs), and finally local and regional government (LRGs). Today, eight LRGs, three GREs, four PSFAs, and one MLI have issued green bonds in the Nordics (see chart).

The high credit quality of Nordic GREs and LRGs – mostly in the 'AAA' and 'AA' categories – attracts investors with a low risk appetite. Moreover, there is an increasing awareness of environmental issues among investors and issuers, not least in the Nordics. This – combined with the fact that green bonds have allocation to environmentally responsible assets, which traditional bonds do not necessarily

have – means that we expect the demand for public-sector green bonds in the region to increase further.

The Nordic LRGs have a strong commitment to sustainable new housing, renewable energy, pollution reduction, and green public transport as well as eco-friendly water and waste management, which are all clear candidates for green financing. As a result, investors are showing strong appetite for the still relatively scarce green bonds issued by the Nordic public sector.

The appeal of green bonds is broader than for traditional bonds as it attracts a wider and more diverse range of investors. We therefore believe green bonds give the Nordic public sector access to a more diverse global funding base with potentially longer maturities in financing. With strong investor interest, evidence of differences in pricing and maturities between green and normal bonds is emerging in the Nordic capital market. Municipality Finance's first green bond issuance in 2016 attracted almost 50 investors, including many that had never invested in the entity before. Green bond issuance is often oversubscribed and investors keep pointing to a scarcity of green bond supply. To this end, we expect the green bond market to experience strong growth in the coming years.

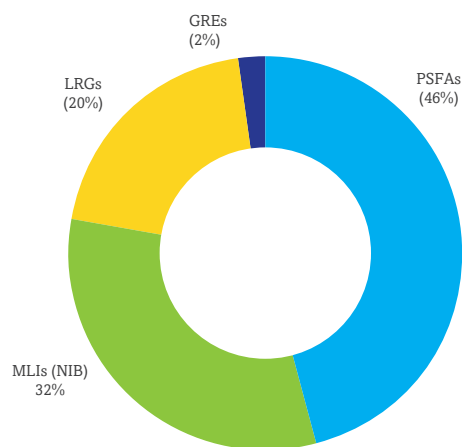
Further information is available on the Capital IQ portal in the research piece entitled: "The Nordics Continue To Blaze The Trail For Green Bonds"

“Nordic nations have been driving innovation in the green bond market, notably through public-sector issuance.”

CITY OF GOTHENBURG S&P GLOBAL RATINGS GREEN EVALUATION

The City of Gothenburg's Swedish krona (SEK) 1 billion 2016 bond issuance received a Green Evaluation score of 67/E2. This reflected an average score in transaction Transparency (56/100) and a very strong score in Governance (94/100). The proceeds are solely dedicated to financing green projects, as defined within the city's environmental framework, with projects in renewable energy, energy efficiency, public transportation, waste management water treatment, and sustainable housing.

NORDIC GREEN BOND ISSUANCE PER SECTOR (%)



Source: Climate Bonds Initiative (CBI)
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PLNG

PERU LNG S.R.L. ASSIGNED 'BBB-' CORPORATE CREDIT AND ISSUE-LEVEL RATINGS; OUTLOOK STABLE

On March 8, 2018, S&P Global Ratings assigned its 'BBB-' corporate credit and issue-level ratings to Peru-based natural gas liquefaction company Peru LNG S.R.L. (PLNG). Our 'BBB-' ratings on PLNG incorporate the company's solid competitive position in Peru, which is protected by the significant barriers to entry for potential competitors, as well as its adequate contract profile that ensures strong predictability of volumes delivered. In addition, PLNG's liquefaction plant has a history of adequate operating performance evidenced by high utilization levels, and doesn't require significant maintenance capital spending to ensure good records. On the other hand, we identify three factors that partially counterbalance these strengths: PLNG's exposure to natural gas prices; its lack of geographic diversification; and its off-taker concentration.

"PLNG is protected by the significant barriers to entry for potential competitors, as well as its adequate contract profile that ensures strong predictability of volumes delivered."

PLNG operates a 4.45 million metric tons per annum liquefaction plant, a marine terminal, and a 408-kilometer pipeline that transports natural gas from Camisea, one of the most important natural gas reserves in Latin America. PLNG is a strategic asset for Peru, not only because it consumes around 50% of the gas produced in Camisea – the royalties of which are important for the national economy – but also because it supports gas consumption in the country.

PLNG has secured a volume flow that averages 218 trillion British Thermal Units (BTU) per annum and that has demonstrated stability during different economic and commodity price cycles through a take or pay agreement with Shell International Trading Middle East (SITME), a wholly-owned subsidiary of Royal Dutch Shell PLC. The agreement matures in 2028, and, in our view, the company won't face issues with renewal after its maturity. PLNG's gas supply is fully guaranteed until 2028 by separate agreements signed with the Block 56 and Block 88 of the Camisea consortium.

The stable outlook on PLNG reflects our expectation that the company's net debt to EBITDA will converge to 4.0x by the end of 2019 and that its free operating cash flow (FOCF) to net debt will remain higher than 15% within that period. Given PLNG's volatile cash flows, which are due to exposure to the natural gas price, we expect that the company would lower its dividend distributions if required in order to maintain its leverage under the mentioned levels.

Further information is available on the Capital IQ portal in the research piece entitled: "Peru LNG S.R.L. Assigned 'BBB-' Corporate Credit And Issue-Level Ratings; Outlook Stable"

CHINA'S RENEWABLE ENERGY-QUOTA SYSTEM

Wind And Solar Generators Stand To Gain The Most From China's Renewable Energy Quota System

China's long-awaited rollout of its renewable energy-quota system will force grid companies to purchase and transmit more non-fossil fuel sources of power

China's renewable energy quota system will be more effective in boosting renewables use than before – and wind and solar are at the top of the pecking order under the framework.

The new system sets quotas for renewable energy consumption, whereas renewables targets were previously based on generation. The rules were issued on March 23, 2018, with the aim to go into effect this year after industry consultation. Generation-focused quotas have contributed to a rush of renewables investments by major power generation groups. This in turn aggravated curtailment, or cases when the energy was produced but not dispatched. And because there was not enough demand for local consumption, excess renewables supply in the northern and southwest regions sat idle, unable to be transmitted outside the region.

Indeed, high curtailment rates have been a major bottleneck for China's renewables sector in recent years. That said, curtailment started to trend down from 2017, after local governments were required to stringently observe a minimum-utilization hour policy on renewable energy generation facilities. Under the new framework, provincial grid companies and power purchasers will be obliged to meet the renewable energy consumption quotas set for each province by the end of 2018 and 2020 respectively. If they do not meet targets, they can be penalized.

Beijing plans to raise non-fossil fuels to 15% of energy consumption by 2020 – from 13.3% in 2016 – and to 20% by 2030. However, a great deal of abandoned wind and solar power in the northern China and hydro-power in southwest China has become a deterrent for the nation's development of renewable energy.

We believe that the new quota system will push the provincial government and the grid companies to take effective measures to increase renewables consumption in order to avoid punitive economic and political consequences for missing the quota. As part of the quota system, China will

"The new system sets quotas for renewable energy consumption, whereas renewables targets were previously based on generation."

also issue renewable power certificates to power companies for every megawatt hour of generation.

The renewables generators will transfer the certificates to grid companies or power purchasers when they dispatch the power and receive payment. Importantly, the generators will still be entitled to government subsidies for renewable energy even after the certificate transfer.

The new rules were announced and will be monitored by China's economic planning body, the National Development and Reform Commission (NDRC). The NDRC will allocate renewable energy quotas to the provincial grid companies, other distribution and retail companies, large end-users in direct power purchase, and the captive genscos in the same province for 2018 and 2020.

Two sets of quota were introduced: first, total renewable energy (hydro and non-hydro); and, second, non-hydro renewable energy, including onshore and offshore wind, solar, biomass, and geothermal. Wind and power stand to benefit the most, because non-hydro quotas are increasing the most from 2018-2020. Partly due to its mature stage of development in China and long planning and construction period, the quota for hydropower is relatively flat from 2018-2020.

Further information is available on the Capital IQ portal in the research piece entitled: "Wind And Solar Generators Stand To Gain The Most From China's Renewable Energy Quota System"

FORTUM-UNIPER-E.ON

The Fortum-Uniper-E.ON Deal And Its Credit Consequences

Following the news of Fortum's potential takeover of Uniper SE, S&P Global Ratings lowered the long-term issuer credit rating on Fortum to 'BBB' from 'BBB+'

On February 7, 2018, Finnish power utility Fortum Oyj announced that the holders of 47.12% of German peer Uniper SE's shares had accepted Fortum's take-over offer of €22 per share for a total of €3.78 billion. Of this, 46.65% comes from German energy utility E.ON SE, which spun off Uniper in 2016. The transaction is still subject to regulatory approval, which we expect Fortum will obtain in mid-2018.

Following Fortum's initial announcement, S&P Global Ratings lowered the long-term issuer credit rating on Fortum to 'BBB' from 'BBB+'. The downgrade mainly reflected our anticipation that Fortum would have weakened credit metrics after completion of the acquisition. Our outlook on Fortum is negative. At the same time, we affirmed the 'BBB-' rating on Uniper and maintained the positive outlook. The ratings and outlook on E.ON remained unchanged.

Although E.ON's sale of its stake in Uniper will generate proceeds of about €3.78 billion, it has no immediate impact on our view of E.ON's credit quality. This is because we saw E.ON's stake in Uniper as a means of providing E.ON with

financial flexibility, and we already incorporated a potential disposal into our base case.

At the same time, we recognize that the materialization of the disposal in a relatively short timeframe provides additional headroom under the ratings. We continue to consider a ratio of FFO to debt in the 16%-18% range as commensurate with our rating on E.ON, and we believe the company will remain well within our threshold for the rating in 2018.

Further information is available on the Capital IQ portal in the research piece entitled: "The Fortum-Uniper-E.ON Deal And Its Credit Consequences"

"The downgrade mainly reflected our anticipation that Fortum would have weakened credit metrics after completion of the acquisition."

HOW DO BANKS' GREEN BONDS MEASURE UP?

A look at green issuance by the world's top banks, through the lens of the Green Evaluation

Miroslav Petkov undertakes a review of almost all of the green bonds issued by the world's top 200 banks and finds that they are likely to receive a Green Evaluation in the top two quartiles because they invest predominantly in renewable energy and green buildings

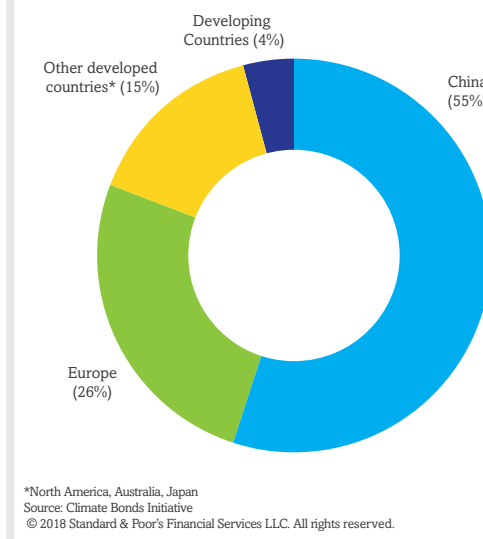
Even though green bonds represent a tiny proportion of bank borrowings (around 0.5%), we expect that share to rise. This is supported by the fact that banks, as key providers of funding, have a significant role to play in the transition to a low-carbon economy. Indeed, banks have already increased issuance of green bonds in the past few years: to US\$27 billion in 2017, from US\$1.5 billion in 2014. This is according to data from the Climate Bonds Initiative (CBI), which we have adjusted to include green bonds invested in large-scale hydro or clean coal projects.

Despite this, banks' green bond issuance remains significantly below the OECD estimates for meeting the Paris Agreement's targets. As such, we expect all banks to continue to grow their share of green bond issuance in the near future. And we think that the EU's Energy efficient Mortgages Action Plan (EeMAP) and opportunities offered by green securitization could provide further impetus to market growth.

Chinese banks have contributed significantly to the increase in bond issuance. Following the government's decision to build a green financial system in China, Chinese banks represent more than half of total green bond issuance by banks (see chart). However, the green bonds issued by Chinese banks differ from those issued outside China. Firstly, they work on different standards: beyond China, banks look to the voluntary recommendations of the Green Bond Principles (GBP), whereas Chinese issuers adhere to the compulsory green bond guidelines of the People's Bank of China. There were also differences in project allocation. For two-thirds of the banks we reviewed outside of China, renewable energy and green buildings represent more than 90% of the allocation of green bonds. In contrast, in China, pollution prevention and clean transportation represent the largest share.

Overall, banks' green bonds that are aligned with the GBP and whose proceeds are predominantly allocated to renewable energy assets are, under our analytical approach, more likely to receive a Green Evaluation in the upper quartile. For others

BREAKDOWN OF BANK GREEN BOND ISSUANCE BY REGION



with a material level of investments in other sectors high in the hierarchy (such as green buildings), the differentiation between the top and second quartile will likely depend on the carbon intensity of the grid where the green assets are located and on features of their impact reporting (for example, level of detail and external verification). The Green Evaluation score of Chinese green bonds could be lower if a material level of the proceeds is allocated to efficient coal technologies, which could be somewhat offset by the high carbon intensity of the grid in China.

Further information is available on the Capital IQ portal in the research piece entitled: "A Look At Banks' Green Bond Issuance Through The Lens Of Our Green Evaluation Tool?"

BIF III HOLTWOOD GREEN EVALUATION

US\$350 million senior secured notes, issued in February 2018 by BIF III Holtwood LLC, have received an S&P Global Ratings Green Evaluation score of E1/90.

The Green Evaluation looked at the whole issuance, 90% of which will be used to refinance existing indebtedness for a portfolio of two hydroelectric facilities. These facilities, Holtwood and Wallenpaupack, are located in Pennsylvania and have a combined installed capacity of 296MW. The remaining 10% of proceeds will be distributed to Brookfield Infrastructure Fund (BIF II) for capital expenditures on renewable assets – including wind, solar, and hydro renewable assets in America, Colombia and the U.K.

The Green Evaluation score E1/90 reflects the excellent Mitigation score of 95/100. This is supported by a focus on renewable energy generation contributing to systemic decarbonization and the fact that these projects are located in areas of moderate carbon intensity. The robust Transparency score, 83/100, reflects the intention of Brookfield Renewable to report on annual greenhouse gas (GHG) emissions reduced or avoided for the overall portfolio. Lastly, the strong Governance score (83/100) reflects the certainty of the uses of the funds, which support Brookfield Renewable's strategic commitment to renewable power, and the company's intention to track the proceeds via annual financial reporting.

Further information is available on the Capital IQ portal in the Green Evaluation entitled: "BIF III Holtwood LLC's \$350 Million Senior Secured Notes"

MODERN LAND (CHINA) GREEN EVALUATION

Modern Land (China) Co. Ltd.'s US\$350 million of green bonds have received an S&P Global Ratings Green Evaluation score of E1/84. The financing, issued by Modern Land (China) C. Ltd. will be used to finance the construction of existing, or refurbishment of new, environmentally certified green buildings in China – with the aim to improve their energy performance by 15% or 30% respectively.

The overall Green Evaluation score is a weighted aggregate of the Mitigation, Governance, and Transparency scores. This financing received a high Mitigation score of 92/100, because of the high level of expected avoided carbon emissions compared with the baseline scenario – due to the high carbon intensity of the coal-dominated grid. The solid Governance score of 76/100 reflects the strong framework governing the allocation and management of proceeds, as well as the detailed measurement of actual or expected environmental impacts for each eligible project.

Further information is available on the Capital IQ portal in the Green Evaluation entitled: "Modern Land (China) Co. Ltd. US\$350 Million Green Bond"



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