



# Pathways to scale finance for renewable energy



# Executive Summary

Considerable acceleration in deployment of renewable energy is needed in order to decarbonize the power sector and achieve the International Energy Agency (IEA) 2°C scenario. Although wind and solar photovoltaic (PV) are increasingly competitive technologies, and demand for renewable assets is rising, business as usual investment will not deliver the required volume (and cost) of capital needed. In terms of volume, approximately 40% increase above business as usual investment is required and challenges to achieve this remain – particularly in terms of ensuring bankability of renewable projects and improving access to finance for renewable deployment.

Through the *REscale* business solution, a group of leading international companies are working together on solutions to overcome these barriers and accelerate the deployment of renewables and the transition to a low-carbon electricity system. The ambition is to scale renewable deployment in line with the IEA 2°C scenario - this equates to an additional 1.5 TW deployed by 2025. To this end, four action plans have been developed – focusing on increasing corporate procurement of renewable energy, scaling finance for renewable energy projects, accelerating the deployment of low-carbon microgrids and improving integration of renewables into electricity markets.

This report summarises the outputs of the REscale activities in 2016 across these four work streams, focusing on the renewable finance activities. Five key themes were identified in the discussions on finance throughout the year: first, it is widely recognised that the growing range of investor types and financing vehicles is very promising, though ongoing engagement and two-way education is essential to build investor confidence in the sector. Second, green bonds have been identified as a key

opportunity to scale finance for renewables, with promising recent growth and strong demand from investors. Third, while green bonds hold significant promise, there is a need to explore aggregation tools and financing options for smaller projects and portfolios also. Fourth, regional variations in investment priorities and investor types is crucial, and developing and financing projects in emerging markets has a unique set of challenges (and indeed opportunities) to be addressed. Lastly, there appears to be a disconnect between perception of capital availability and project availability: the investment community indicates a lack of suitable pipeline of projects in which to invest, while project developers cite strong project pipelines but a lack of capital availability.

In addition to the finance outcomes described in detail in this report, separate publications on corporate renewable procurement and low-carbon microgrids have been published, with their key messages summarised herein.



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# 1. Introduction

The REscale business solution is part of the *Low Carbon Technology Partnerships initiative* (LCTPi), which has brought together almost 100 global businesses with nearly 50 partners to work collaboratively on solutions to the climate challenge. The objective of the LCTPi is to catalyse actions to accelerate low-carbon technology development and scale up the deployment of business solutions, to a level and speed that are consistent with the objective of limiting global warming to below 2°C compared to pre-industrial levels.

Under the REscale initiative, leading companies worked during 2015 to develop a vision for renewable energy. The group shares the ambition that renewable energy is reliable

and increasingly competitive and that 1.5 TW of additional capacity can be deployed before 2025. REscale works to scale up deployment by improving renewable integration and removing barriers to finance. The number and range of companies in the group grew throughout 2016 and now includes global leaders across energy generation, technology and corporate procurement in the renewables sector.

The 1.5 TW figure is based on the International Energy Agency (IEA) 2°C scenario which states that renewable energy capacity must grow from 1.94 TW in 2015 to 3.49 TW in 2025 and 4.53 TW in 2030, as illustrated in Figure 1-1.

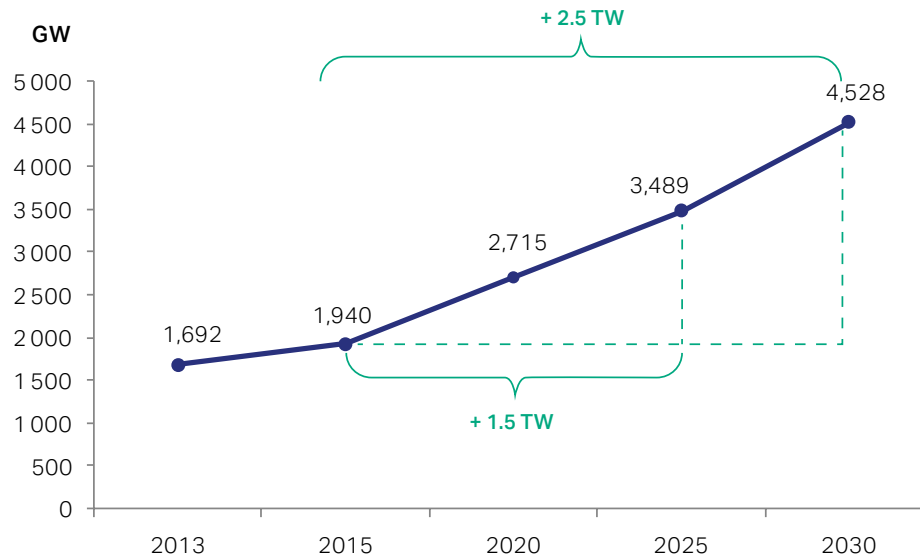


Figure 1-1. Renewable energy deployment required under IEA 2°C scenario<sup>1</sup>

1. IEA, 2015, 'Medium-term RE Market Report 2014' & ETP 2015. 2020 figure has been estimated with a linear growth rate between 2015 and 2025 IEA projections.

## REscale members:

ABB  
Acciona S.A.  
BT  
CLP Power Hong Kong Limited  
CPFL Energia  
DNV GL  
DSM N.V.  
EDF  
EDP  
Enel  
Eskom  
First Solar  
Iberdrola  
Nestlé S.A.  
NRG Energy  
Schneider Electric  
State Grid Corporation of China  
Unilever

## Contributors:

Ernst & Young LLP  
Norton Rose Fulbright LLP

## Partners:

RE100  
International Finance Corporation  
Climate Bond Initiative  
International Energy Agency  
Clean Energy Ministerial

The main challenges identified to scale up renewable deployment are access to finance, ensuring bankability of projects, improving integration of growing levels of renewables into electricity markets as well as delivering clean, affordable energy for billions of people that currently lack access. Four action plans have been developed to address these key barriers:

1. Facilitating the significant scaling up of finance for renewables by exploring new investment vehicles, de-risking project pipelines and engaging directly with investors;
2. Working with corporate renewable energy buyers to scale renewable energy procurement via Power Purchase Agreements (PPAs) to substitute demand towards renewable energy and improve bankability of projects;
3. Facilitating efficient, reliable, effective and commercially viable integration of renewable energy into electricity markets;
4. Promoting sustainable electrification of remote areas via accelerated deployment of low-carbon microgrids.

A key part of the REscale work is to increase awareness and knowledge of new business models and financing vehicles available today that make a strong business case for investment and deployment of renewables. As such, the organisation of several topical workshops and webinars formed an important part of the activities in 2016 and provided an independent space to share experiences and advance on key barriers. Discussions in San Francisco and London in June and Chennai in October allowed the spread of knowledge and best practice in local and dynamic settings which have been captured in the series of reports detailed further below. During 2016 we have seen a steady increase of interest in renewables with 8 new companies joining REscale, thus totaling 20 members, across the renewable value chain (generators, technology providers, consumers, legal advisors, financiers, etc.). An important element of the action plans this year was

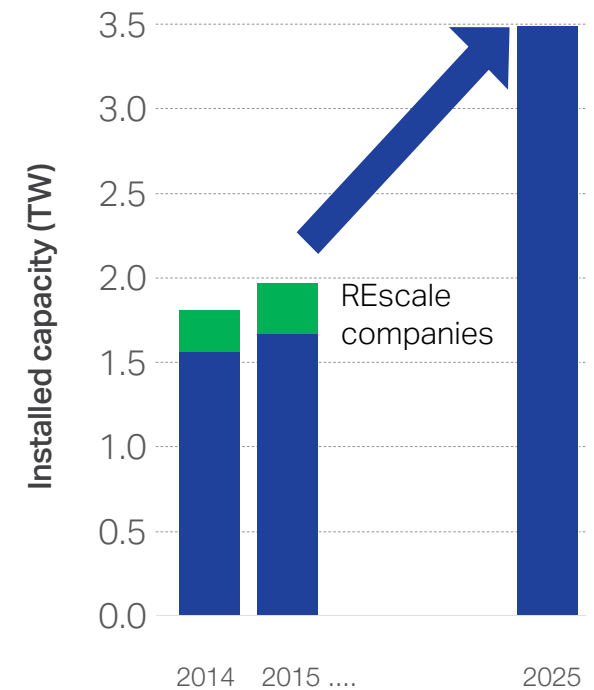
bridging the gap between investors and producers of renewables, as well as producers and procurers of renewables, and the dialogues held have brought together these crucial stakeholders to directly discuss solutions to key barriers.

REscale has achieved impact by improving the understanding of opportunities that renewable energy offers to stakeholders along the supply chain. Moreover, REscale provides concrete solutions on how different parties can overcome challenges they are facing - ranging from the use of new financing vehicles, to guidance while negotiating PPAs and key success factors in building and operating renewable-based microgrids. The initiative is significantly expanding the available knowledge on how to turn opportunities into action through the various multi-stakeholder workshops as well as the launch of three reports. These reports directly address crucial barriers to fully unlock the potential for renewables, specifically:

- This report on 'Pathways to scale finance for renewable energy' focuses on opportunities and challenges associated with scaling finance for renewables to achieve the investment volumes required and how deploying new financing vehicles and engaging a broader range of investors can facilitate this;
- The report on '*Corporate Renewable Power Purchase Agreements – Scaling up globally*' highlights the benefits of the corporate renewable PPA business model and presents recommendations to overcome challenges faced by buyers and developers;
- The '*Business Case for Low-Carbon Microgrids*' report establishes microgrids as a viable business opportunity and demonstrates that standardized and affordable solutions to individual private customer needs can be provided by the private sector.

The impact of initiatives like REscale is evident in the data. A significant increase in installed renewable capacity (9%) has been experienced worldwide between 2014 and 2015 confirming the positive trend of the previous years. The companies involved in REscale contributed to 1/3 of this capacity increase. Installed renewable capacity of REscale member companies increased by 22% from 2014 to 2015 - a rate more than double the global renewable capacity rise over the same time.

**Required renewable capacity growth**



## 2. Scaling deployment of renewable energy

Currently, there is a clear trend towards business models and financing approaches for renewables outside of the traditional models. These new approaches have great potential to facilitate the scale up of renewables and continue driving cost reductions. Four key trends are evident, aligned with the four action areas of the REscale initiative:

First, the growing diversity of investor type as well as financing vehicles shows great promise, both in terms of widening the pool of available capital, and leveraging the benefits of new financing instruments to deliver reductions in cost of capital. The diversity of instruments available is increasingly appropriate for the projects to be financed: from large utility scale projects, to distributed embedded generation and microgrids in remote areas.

Second, corporate procurement of renewable energy is on the rise and presents a substantial opportunity to substitute demand towards renewable energy and to improve bankability of projects.

Third, with the maturity of some technologies, regulators across a wide range of markets have or are changing their support structures away from Feed-in Tariff models towards variable top-up payments. These new structures will enable a more efficient and effective generation from renewables reacting to market signals.

Fourth, technical solutions for low-carbon microgrids are available and bankable, and progress has been made in developing effective business models for deployment of these systems.

Finance is a critical consideration both in the microgrid sector as well as for corporate renewable PPAs. Access to efficient and cost effective finance is crucial in facilitating the deployment of low-carbon microgrids particularly given high upfront capital costs when compared with alternatives (such as diesel) and relatively high transaction costs of smaller deals. Meanwhile, corporate PPAs are a key opportunity to enhance the bankability of renewable energy projects by providing a wider pool of creditworthy off-takers, facilitating access to finance and potentially reducing financing costs. Therefore, the key messages of these reports are summarized below, followed by a detailed discussion of the outcomes of the scaling renewable finance work in Section 3.



## Corporate Renewable PPAs – Scaling up globally

After being adopted and growing very rapidly in the US, corporate procurement of renewable energy is on the rise globally as large corporations are increasingly turning to renewables to power their operations for both economic and reputational reasons. Direct renewable procurement allows corporate buyers to lock in price certainty and ensure long term electricity affordability, while enhancing the sustainability and resilience of operations.




A number of large corporate buyers have committed to procure renewable energy and momentum is gathering rapidly as costs of renewable energy continue to decline: initiatives such as RE100 are well underway with over 80 major international companies committed to procuring 100% renewable energy<sup>2</sup>. The role that renewable energy plays for a company's energy strategy is increasingly elevated from an operational and technical exercise to a strategic and commercial priority.

While renewable energy procurement strategies include directly investing in renewable energy capacity both onsite and offsite, procurement via PPAs is proving to be the more popular model as upfront investment is not required and energy procurement remains an operational expense. Meanwhile, corporate PPAs are a suitable instrument to address off-take risk as securing a long term contract with a creditworthy counterparty enhances bankability of a project and reduces financing costs as well as widens the pool of capital available for renewable energy projects.

As such, both the corporate buyers and renewable energy producers enjoy benefits from this business model. In particular, the drivers for corporate buyers in procuring renewable energy are:

-  Economics – long term cost affordability and improved price visibility;
-  Sustainability – reductions in carbon emissions and progress towards renewables targets;
-  Brand and leadership – recognition for renewable electricity achievements and climate leadership.

Meanwhile, developers benefit in three key areas:

-  Risk mitigation – management of off-take risk and diversification of revenue streams;
-  Bankability – predictable and long term income streams unlock finance and ease bankability with financial institutions;
-  Business development – additional demand creation and development of standard terms and conditions (through establishing partnerships).

Despite mutual benefits, barriers and challenges remain. Pricing and credit support remain key and bankability issues associated with lender requirements may arise. Similarly, the need to commit to relatively longer term contracts may be a challenge for some corporate buyers, while accounting treatment of PPAs can also present barriers in some jurisdictions. The report provides guidance on these key considerations ranging from more practical issues such as investment timeframes and resources or securing internal approvals, to financial and regulatory matters such as understanding pricing, accounting and competition law issues.

Key learnings from the report include:

- Companies from any sector can buy power from renewable sources – it is a smart business decision and valuable risk management tool.
- Corporate renewable PPAs are an attractive way to do this: they reduce exposure to future electricity price volatility and provide companies with improved cost visibility for zero upfront cost.
- There are usually strategies and solutions that can be put in place in order to achieve a favorable PPA structure for corporate buyers and developers alike.

Through documenting the benefits of the corporate renewable PPA business model and providing guidance for corporate buyers who wish to engage, the report and associated REscale activities are a critical component to improve bankability and faster deployment rates of renewables globally.

2. The Climate Group, 2016, 'RE100 Companies', <http://there100.org/companies>

## The Business Case for Low-Carbon Microgrids

The success in limiting climate change and achieving a 2°C pathway will also depend on the solutions deployed to electrify remote areas around the world. Addressing the lack of clean, reliable and affordable energy for billions of people and industries alike in places remote from a reliable power grid is one of the world's most critical development challenges.

The majority of existing, remote electricity supply is based on diesel. Continuing this business-as-usual for remote electrification will cause a significant increase in greenhouse gas (GHG) emissions, besides aggravating local pollution. As such, viable alternatives must be deployed that establish renewable energies as the primary energy source for electrification of remote areas across the world.

Low-carbon microgrids are a key solution to this challenge. The required technologies for low-carbon microgrids have been commercially proven and many customer profiles can be economically served with those technology options today. The cost of key technology components, such as solar PV and battery storage, will continue to decline as a result of economies of global scale and innovations in materials and manufacturing. Renewable energy is, in many cases, the most economical solution for electrification, with the cost of electricity generated lower than that of fossil fuel alternatives.

Crucially, renewable-based microgrids compete in many cases with diesel – a low CAPEX, high OPEX option that is often subsidized by governments. Due to the relative capital-intensity of renewable microgrid projects, cost of energy is significantly influenced by cost of finance, and therefore securing access to cost effective financing is critical in facilitating the scale up of these solutions. These themes are explored further in Section 3 below.

Businesses are critical actors in building and operating domestic and industrial microgrids offering innovative technologies and services, management and technical capabilities and financial resources. The participating companies of REscale are ready now to scale up deployment of sustainable low-carbon microgrids to provide standardized and affordable solutions to individual customer needs. The report demonstrates the viability of low-carbon microgrids using real project examples to raise awareness and promote market growth of renewables in decentralized systems, and therefore contributes directly to the ambitions of the REscale initiative.





# 3. Pathways to scale finance for renewable energy

The Scaling Renewables Finance action plan brought together the renewable energy industry and the investment community in several meetings throughout 2016 to discuss and develop solutions to scale finance for renewable energy to achieve the deployment required for the IEA 2°C scenario.

Fundamentally, business as usual investment will not deliver the required volume (and cost) of capital needed to achieve the IEA 2°C scenario and a substantial scaling up of investment is needed. In order to achieve this, not only must typical constraints to infrastructure finance be overcome, but also significant investment must be redirected from conventional to renewable generation and a wider range of investors must be engaged. There is a need to continue to develop and deploy new financing approaches; broadening the range of investment vehicles through which investors can gain exposure to wind and solar PV assets will serve to substantially increase the range of investors participating, which will in turn increase significantly the pool of available capital, particularly if institutional investors such as pension and insurance funds participate.

The Bloomberg New Energy Finance (BNEF) New Energy Outlook (NEO) has forecast the finance requirement to achieve a 2°C scenario in which the power sector contributes its share of CO<sub>2</sub> reductions. This scenario requires USD 14.6 trillion in investment by 2040 – a gap of USD 5.4 trillion (or 40%) over business as usual. Within this, there is a funding gap of USD 2.6 trillion in 'new' renewable energy - the vast majority of which will be in wind and solar PV power. Wind is expected to account for almost half of

new build investment in the first decade before shifting closer to one-third by 2036-2040 as the role of solar PV grows from 40% of new build investment 2016-2025 to over 60% by 2036-2040. These changes in market penetration levels are due to anticipated cost shifts, as well as the potential for distributed solar to be highly cost-competitive as it offsets power consumed at the retail level.

These investment volumes are relatively minor when considering other major asset markets globally and the capacity of global financial markets means this kind of capital flow can be easily absorbed. For example, under the NEO 2°C scenario, up to USD 582 billion per year will be required for investment in new renewable power generation; as a basis for comparison, annual originations for US auto loans and US mortgages are USD 454 billion and USD 1,704 billion respectively. Indeed, according to BNEF, discussions with financial experts suggest that in no case is the projected growth in any specific new renewable finance subsector so large that it appears likely to disrupt normal commercial investment flows<sup>3</sup>. Policy and regulation remain critical however, as governments must ensure stable policy and regulatory environments to facilitate investor confidence and unlock the capital flows required.

In order to identify opportunities and challenges – and to develop the required solutions – the dialogues between the REscale member companies, the broader renewable energy industry and the financial services and investment community were held. This section outlines the key themes that emerged throughout these discussions to date,

summarizing current status, challenges and opportunities, and pathways to scale finance for renewables going forward.

The five key themes identified are summarised in Figure 3-1 and explored further in the following sections.

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3. All data sourced from BNEF/CERES, 2016, 'Mapping the Gap: Financing the Path to a 2°C Future', Presentation in London, June 2016.



Picture courtesy of Acciona

Significant opportunity is available given the growing range of investors and new financing vehicles in the renewable energy sector

The growth and potential of the green bond market to scale finance for renewable energy projects is particularly promising



Picture courtesy of Iberdrola



Picture courtesy of ABB

However, there are particular challenges faced in financing smaller distributed generation projects

Regional variations are critical, both in terms of investor characteristics and in market conditions, with unique challenges and opportunities in emerging markets



Picture courtesy of EDP

There seems to be a disconnect between the industry and the investment community in terms of perceptions about capital supply and project supply

## New investors and new financing vehicles

Investor behaviour is changing and there is a growing range of investors active in renewable energy markets globally. Institutional investors (such as pension and insurance funds) are particularly important; with USD 90 trillion of assets under management, these investors often have social and environmental mandates and seek particular risk-return profiles that are well suited to renewable energy assets (which provide a long term, stable and inflation-linked revenue stream). The workshop discussions clearly show increasing interest and participation from this investor group, and this is expected to continue to increase broadly across the investment industry. Indeed, a survey in 2013 found over 30% of large institutional investors are planning to increase investment in such assets into 2020<sup>4</sup>. In addition, evidence suggests that sustainability credentials are becoming more important in investment decisions more broadly, with a recent survey indicating that “75% of senior executives in investment firms see a company’s sustainability performance as materially important to their investment decisions - and nearly half would not invest in a company with a poor sustainability track record”<sup>5</sup>.

Alongside this growing interest and participation from a wider range of investors comes an increasing diversity in financing vehicles and business models. This diversity is already evident with growing green bond issuance, a number of asset backed securitisation deals in solar PV as well as a number of yield cos established in US and Europe, and is expected to increase going forward. BNEF’s analysis of the potential pathways to the 2°C scenario clearly indicates a growing diversity in the types of financing vehicles deployed to fund renewable energy projects, both on the debt and equity side.

4. EY, 2013, 'Institutional investor survey results: Pension and insurance fund attitudes toward investment in renewable energy infrastructure', [http://www.ey.com/Publication/vwLUAssets/EY\\_-\\_Cleantech\\_institutional\\_investor\\_survey/\\$FILE/EY-Institutional-investor-survey-results.pdf](http://www.ey.com/Publication/vwLUAssets/EY_-_Cleantech_institutional_investor_survey/$FILE/EY-Institutional-investor-survey-results.pdf)  
5. BCG Perspectives, 2016, 'Investors Care More About Sustainability Than Many Executives Believe', <https://www.bcgperspectives.com/content/articles/sustainability-strategy-investors-care-more-about-sustainability-than-many-executives-believe/>

Figure 3-1. Summary of key themes raised in renewable financing discussions

Traditional forms of financing – notably bank debt from typical project finance lenders – will represent a smaller portion of funding while ‘new’ mechanisms such as green bonds (discussed further below), yield cost<sup>6</sup> and asset backed securities<sup>7</sup> are expected to grow significantly (see Figure 3-2 below). Of note, both debt and direct ownership from institutional investors are projected to increase and become a significant source of capital for projects. In addition, direct project equity is expected to rise (particularly in OECD countries) as capital costs continue to decline.

This diversification of instruments is essential to continue to attract a broader range of investors to the renewable market. While some funds might be invested directly

into acquiring projects, much will probably target bonds and other liquid instruments<sup>9</sup>: providing direct access to renewable energy projects for such investors via liquid and tradable instruments with which they are familiar (and have a mandate to invest in) will facilitate access to this much wider pool of capital.

Early trends in the deployment of these models are promising, but further growth is needed to achieve the scale of investment required. While the diversification of investor types and financing vehicles brings considerable potential, two primary considerations arise. Firstly, new investors to the sector may not be so familiar with the technologies and risk profiles of renewable projects, and therefore there is a need for mutual education – both in

terms of investors understanding of renewable project risk profiles, as well as industry understanding of investors requirements and risk appetite. Secondly, while a number of financing options are available and becoming widely deployed (including green bonds, yield cos, asset rotation, asset backed securitisation), each is variously suited to different companies, project sizes and risk appetites and as such there is no ‘one size fits all’ approach. Ongoing and structured dialogues bringing together the industry and investment community to address key issues are further valuable.

Regardless of investment vehicle, the underlying risk profile of the projects is key. Careful management of risks (including development risk, construction risk, offtake risk

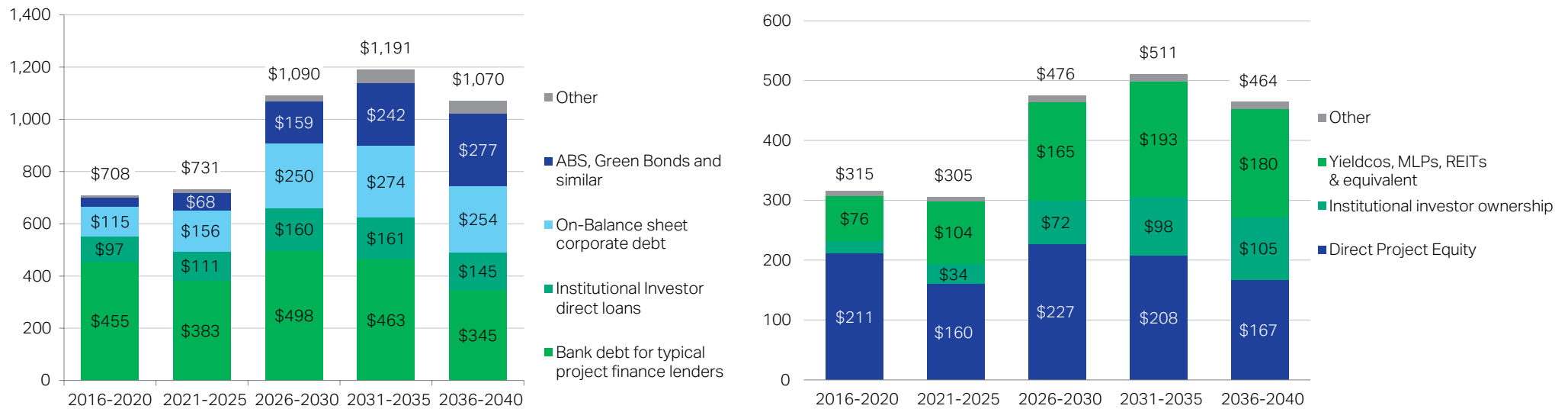


Figure 3-2. Debt (right) and equity (left) pathways to 2°C<sup>8</sup>

6. A yield co is a dividend growth-oriented company that bundles long term contracted operating assets into a portfolio in order to generate predictable cash flows and issues shares in that portfolio. Yield cos make distributions to shareholders in the form of dividends.

7. Asset backed securitisation refers to the process of converting a pool of illiquid assets into tradable securities. In the case of solar PV systems, for example, a portfolio of residential and commercial scale rooftop systems can be pooled and asset backed securities issued based on the portfolio of underlying cash flows. Pooling assets in this way reduces credit risk as the securities are linked to the combined pool (rather than to the credit risk of a single investment), which in turn enables access to lower cost of debt.

8. BNEF/CERES, 2016, 'Mapping the Gap: Financing the Path to a 2°C Future', Presentation in London, June 2016.

9. EY, 2013, 'Pension and insurance fund attitudes toward investment in renewable energy infrastructure', [http://www.ey.com/Publication/vwLUAssets/EY\\_-\\_Cleantech\\_institutional\\_investor\\_survey/\\$FILE/EY-Institutional-investor-survey-results.pdf](http://www.ey.com/Publication/vwLUAssets/EY_-_Cleantech_institutional_investor_survey/$FILE/EY-Institutional-investor-survey-results.pdf).

and macroeconomic risks) remains essential particularly as new investors enter the market and new business models are increasingly deployed. The importance of maintaining quality and reliability of products and projects has been emphasised and the importance of integrity, transparency and credibility cannot be underestimated. It is recognised that the industry must work in a cooperative manner to ensure this.

## Green Bonds: Opportunities and Challenges

Of all the 'new' financing mechanisms discussed, green bonds have generated the most discussion amongst the REscale members and investment industry participants. A number of members have issued green bonds to date, including EDF, CLP Power Hong Kong Limited, Iberdrola and NRG Energy.

Green bonds are relatively simple fixed income instruments: any type of bond instrument where the proceeds will be exclusively applied to finance or refinance new and/or existing eligible projects, such as renewable energy. Green bonds may be issued on the basis of investment in a portfolio of green infrastructure projects or for individual projects.

Early trends in the green bond market are promising, and strong growth continues in 2016. Issuance of green bonds has grown dramatically - globally, in 2015, USD 42 bn of labelled green bonds was issued, compared with USD 36 bn in 2014 and USD 11 bn in 2013 (see Figure 3-3 below). The Climate Bonds Initiative (CBI) estimates the labelled<sup>10</sup> green bond market could reach USD 100 bn in 2016, with almost USD 30 bn already issued by the end of May 2016<sup>11</sup>.

10. 'Labelled' green bonds refer to bonds whose proceeds have been specifically earmarked for green projects by issuers. 'Unlabelled' climate-aligned bonds refer to bonds that fund green/climate projects but have not been specifically labelled as such (this includes for example rail infrastructure projects). The unlabelled green bond market is estimated at USD 694 bn.

The past 3 years have also seen a significant increase in the diversity of green bond issuers and, in particular, a much higher proportion of corporate issuers. Supra-nationals such as the International Finance Corporation (IFC), European Investment Bank (EIB) and the World Bank dominated green bond issuance until 2013. Since then, bank and corporate issuance has grown strongly and Q1 2016 was the first period that corporate issuance exceeded that from supra-nationals (see Figure 3-3).

Geographic diversity of green bond issuance is also increasing. Until 2014, most bonds were issued by European or US entities. In 2015, India's Yes Bank issued

11. CBI, 2016, 'Bonds and Climate Change: State of the Market in 2016', <https://www.climatebonds.net/files/files/reports/cbi-hsbc-state-of-the-market-2016.pdf>

12. CBI, 2016, 'Bonds and Climate Change: State of the Market in 2016', <https://www.climatebonds.net/files/files/reports/cbi-hsbc-state-of-the-market-2016.pdf>

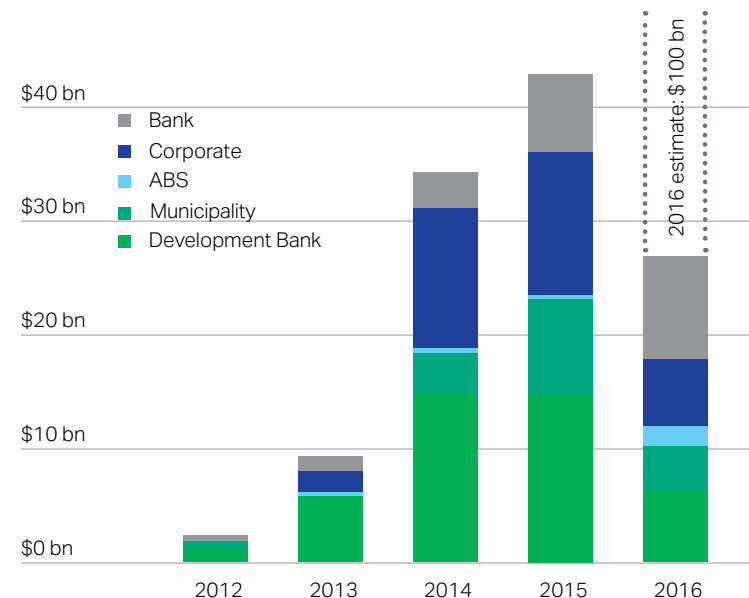


Figure 3 3. Green bond annual issuance and breakdown of issuer type: 2012-2016<sup>12</sup>

its first green bond (INR 500 Crores), Australian bank NAB issued the first certified climate bond from a bank (AUD 300 mn) and Chinese turbine manufacturer Goldwind undertook the first labelled issuance in China (USD 300 mn). Indeed, China is rapidly becoming one of the world's major green bond markets following the recent opening of the interbank market and the strong support of policymakers and regulators for green bonds. The significant number and size of issuances in the first half of 2016 have made China the leading country in terms of issuance in 2016 to date.

For issuers, green bonds have significant reputational as well as financial advantages. Green bonds are an effective aggregation and risk diversification tool, as projects can be pooled across a range of technologies and geographic locations. Raising debt via a green bond may be considerably cheaper than financing or refinancing through traditional project finance (the structure and credit profile are often quite different from traditional project finance). Price benefits relative to vanilla corporate bond issuance are also emerging: while the price premium is currently marginal, this is expected to increase as investors become more willing to pay a premium for these bonds which have inherently more 'value' that is currently not captured by conventional risk assessment and credit rating processes (as discussed further below). Moreover, there is a major benefit in that green bonds have the potential to bring new investors to the financing pool – a number of issuers have experienced that a significant portion of investors in the green bond were investors who did not previously invest in their corporate bonds.

Despite growth and progress to date, the green bond market is relatively young and best practices are still evolving. Throughout the discussions there emerged three key barriers to the scaling up of green bonds:

**1. Price:** The current premium for a green bond is minor at 2-3 basis points in the primary market (and a more significant 20 basis points in the secondary market). In order for the green bond market to grow at scale, the price must truly reflect environmental impact. Generally speaking, investors currently seem unwilling to pay more for a green bond, however trends in disclosure requirements and investor commitments indicate that pricing of green bonds will be favourable compared with vanilla bonds in the near future – particularly given that green bonds are inherently

'climate hedged'. Challenges remain, however, as discussed further below.

- 2. Culture:** Culture amongst investors has been identified as a key barrier. Investors have years of experience working with fossil fuel companies/assets, with extensive established networks, knowledge, relationships, etc. This will take time to shift to meaningfully change the direction of investment, and issues around investment lock-in in conventional assets remain. Ongoing and proactive engagement of the renewable industry with the investment community should address some of this challenge.
- 3. Issuer reluctance:** While demand for green bonds from investors is high, with issuances consistently and substantially oversubscribed, popularity amongst issuers appears to be lower. There is some work to be done to ensure issuers have a realistic perception of the additional requirements (in terms of assurance, certification and impact reporting), which are, in relation to the bond issuance, relatively minor.

As discussed above, pricing does not typically reflect the higher inherent 'value' of these instruments. Current credit and risk assessment practices present a barrier. Rating actions (in particular, downgrades) for climate and environmental risk do occur but are not a major component of ratings currently. There is a need for more systematic accounting and assessment of climate risk alongside credit risks, in addition to greater disclosure requirements. Indeed, a greater 'green premium' is likely to emerge as ongoing strength in investor demand, growing investor pledges on responsible investment and disclosure requirements such as the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) and the French Decree no. 2015-1850<sup>13</sup> are expected

to translate to price benefits in the near future: ultimately, investors will become more willing to pay a premium for these bonds which have more 'value' that is currently not captured by conventional risk assessment and credit rating processes.

Investors indicated throughout the discussions that labelled green bonds are particularly attractive as labelling gives greater accountability. There are a number of protocols and guidelines available for issuers to follow – such as the Green Bond Principals<sup>14</sup> and the Climate Bonds Standard<sup>15</sup> – which include guidance on disclosure on critical issues such as use and management of proceeds. However, anecdotal evidence suggests that up to half of green bond proceeds have not been appropriately managed, and this has the potential to damage the credibility of the green bond market. It is widely acknowledged that the integrity and credibility of the green bond market must be maintained in order to facilitate the growth going forward, and issuers must exercise a high level of governance, discipline and transparency to facilitate this.

## Challenges faced in financing smaller distributed generation

While it is widely acknowledged that green bonds are an interesting and promising mechanism, green bonds are not appropriate for all companies. In particular, issuances need to be of sufficient size (deals must be of significant size to be cost effective, and institutional investors typically have minimum deal size requirements), and issuers require expertise and capability to tap into the green bond market. Consequently, green bonds are appropriate for developers, Independent Power Producers and utilities of

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13. The Decree imposes a number of reporting requirements on institutional investors and financial asset managers headquartered or registered in France. It anticipates—but also goes further than—the EU-wide disclosure requirements due to take effect in 2017 under Directive 2014/95/EU, issued by the European Parliament and Council in October 2014. <http://blogs.law.columbia.edu/climatechange/2016/03/05/energy-transition-and-climate-risks-included-in-new-french-financial-disclosure-rules/>

14. <http://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/green-bonds/green-bond-principles/>

15. <https://www.climatebonds.net/standards>



particular scale, while smaller companies often face more significant capital availability issues. As such, mechanisms for aggregation and financing of smaller developers and smaller projects are of significant interest and there is a need to broaden the discussion.

There are particular challenges associated with financing portfolios of smaller projects, when compared with traditional project financing of large scale utility projects. Smaller developers or project portfolios are often financed on balance sheet, and then sold or refinanced to release capital for further investment. This makes scaling difficult. Of particular note is that the solar industry is very fragmented in many countries; smaller developers typically have less market power when negotiating with financiers and can be burdened by unfavourable or inflexible debt structures. Transaction costs for smaller projects are also a key barrier – requiring efficient and cost effective aggregation tools and standardisation. Sponsor risk for smaller players is a major consideration from both the financier and off-taker perspective (i.e. in the case of large corporate off-takers, who assess the creditworthiness of a renewable supplier).

Fundamentally, there is a need to develop cost-effective aggregation tools and processes to meaningfully scale up finance for distributed renewable projects given that the industry is considerably more fragmented than the traditional utility sector.

Identifying and developing more effective and efficient ways to aggregate and finance portfolios of smaller projects is essential for further market development. Asset backed securitisation, green loans<sup>16</sup> and mechanisms such as PACE loans in the US/ EUAs in Australia<sup>17</sup> are all promising in this regard. Further work is needed though in developing such financing tools and processes

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16. Green loans are loans dedicated to financing 'green' projects/assets  
17. Property assessed clean energy (PACE) loans: PACE loans are secured by the property itself and paid as an addition to the owners' property tax bills. PACE loans are debt of property, meaning the debt is tied to the property as opposed to the property owner(s), so the repayment obligation may transfer with property ownership <http://energy.gov/eere/sisc/property-assessed-clean-energy-programs>. Environmental Upgrade Agreements

and, crucially, in enabling scaling of such tools. Early experience suggests that projects can be effectively aggregated for securitisation provided that systems and processes are standardised for efficient project execution – standardisation of contracts, due diligence and other processes are critical to reduce costs under this type of business model.

While there is a reputational benefit for lenders and investors in providing financing products such as green loans, this is often a new market for lenders and again there may be a lack of familiarity with these assets and risk profiles – structured and ongoing engagement and mutual education is needed.

Moreover, while direct interaction between the capital providers and the project developers will be valuable, intermediate aggregators need to be developed at national or regional levels. Besides providing scale, these aggregators will possess crucial and specialised risk management capabilities under prevailing local market characteristics and will therefore serve as a critical bridge attracting cheap international capital.

## Regional variations and emerging markets

Regional variations are highly important – both in terms of investor profiles, and market conditions.

Regarding regional differences in investor profiles, the geographic diversity of the companies in REscale presents interesting perspectives. Within Asia, for example, there is considerable variation both in investor appetite for, as well as familiarity with, renewable assets and technologies: investors in Japan, Singapore and Hong Kong are more familiar with renewable energy projects and have strong

(EUAs) have a similar structure in that it is secured and tied to the property rather than an owner. This allows capital to be accessed at a competitive rate and for a longer term. [https://www.cleanenergyfinancecorp.com.au/media/76243/cefc-factsheet-nab-cefc-ef\\_eua\\_lr.pdf](https://www.cleanenergyfinancecorp.com.au/media/76243/cefc-factsheet-nab-cefc-ef_eua_lr.pdf)

internal responsible investment protocols to be met, with reputational considerations of high importance. As such, there is a strong appetite for green projects in particular from this group. Meanwhile, investors in mainland China are less familiar with new financing instruments and are very much focused on yield, with 'greenness' currently not such an important decision factor. However, there is a transition underway whereby investors increasingly consider the green credentials of an investment both from a risk (e.g. climate risk, risk of stranded assets, etc.) and reputational perspective, particularly as the green finance market is growing in the region.

Meanwhile, differences in the investment climate between regions has been a major topic of discussion amongst REscale members. Currently, renewable energy investment is approximately evenly split between OECD and non-OECD countries. However, the proportion of investment occurring in non-OECD countries is expected to steadily increase; by 2021-25 most of the capital deployed will be in emerging markets and by 2036-2040 non-OECD countries are expected to account for over 70% of investment<sup>18</sup>. Challenges may arise for non-OECD countries to unlock this capital requirement. As BNEF highlights, while total global capital availability for new renewables is unlikely to pose significant barriers, investment appetite for exposure in many of these more recently developing markets may lag demand.

The role of multi-lateral development banks (MDBs) and development institutions - such as the International Finance Corporation (IFC), Asian Development Bank (ADB) and Inter-American Development Bank (IADB) - as well as dedicated funds (such as the Green Climate Fund and EIBs Global Energy Efficiency and Renewable Energy Fund) - as a capital and risk intermediary cannot be understated here. Greater mobilization of local capital resources to support

new renewable development will also play a significant role, as local capital providers are typically more knowledgeable and comfortable on local risks.

Currency risk can be a major barrier when financing projects in emerging markets. Depending on the market, revenue streams in local currencies can be cost prohibitive to hedge and currency risk can deter green bond investors. Furthermore, local banks in less mature markets can be less familiar with renewable technologies and risk profiles and there is often a need for support to local lenders in this regard; the role of multilateral development banks is again critical here.

'Smart' use of public spending through institutions such as MDBs and dedicated funds can leverage considerable private sector investment and facilitate de-risking in higher risk markets. It is clear from the discussions that companies wish to engage further with these institutions to understand ways in which they can work together to de-risk projects in emerging markets.

Examples of ways to work with such institutions have been noted to date. MDBs such as the IFC can support activity in emerging markets through acting as anchor investor, such as for a green bond issuance. For example, the proceeds of the IFC's Masala green bond, issued in 2015, were used to invest in Yes Bank's green bond, which is in turn to be used for renewable energy and energy efficiency projects. Multilateral institutions can also act as advisor for green bond transactions (as well as for other financing approaches), leveraging track record and best practices (including in environmental impact reporting) developed through experience working in these markets.

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18. BNEF/CERES, 2016, 'Mapping the Gap: Financing the Path to a 2°C Future', Presentation in London, June 2016



## A disconnect between project supply and capital supply?

Discussions between investors and industry indicates that there seems to be a disconnect between the respective perceptions of capital and project availability. In particular:

- There is a general argument from the investor side that capital is available and projects are lacking;
- Meanwhile industry argues that projects are available, but a funding gap remains.

From the investor side, a number of key points have been raised by investors with Environmental, Social and Governance (ESG) mandates, as well as less specialised investors. The majority of investors with ESG mandates are looking for return as a base objective but also consider externalities of investments – that is, once investment meets IRR requirements, the environmental and social performance (and overall quality/risk profile of the business or projects) is considered in investment decision making. From some investors, there is the perception that the renewable sector has not delivered the risk return profile needed for the market to date. Deal size and tenure are also critical, particularly for instruments such as green bonds (as discussed above), and for larger institutional investors who have minimum transaction sizes and maximum holding periods.

While this lack of project supply – either in terms of project size, or suitable risk profile - has been cited as an issue amongst investors, project developers indicate project pipelines are ready and perceive that a lack of capital supply is the problem (which investors acknowledge in view of stricter liquidity and capital requirements). Projects have been de-risked and capital structures tailored to ensure favourable risk-return profiles, and yet questions of bankability and risk-adjusted returns continue to arise.

Part of this disconnect relates to the relative availability of capital for different markets – as discussed above – as well as for different phases of projects – in particular, construction versus operational phases. There has traditionally been (and to a large extent remains) a reluctance from institutional investors to take construction risk – and therefore a much smaller pool of capital is available for construction of projects compared with operational assets. While there are indeed investors that are more comfortable with these earlier stage risks and will invest in a project in the development phase, this is not the norm, and is generally confined to mature markets.

This apparent disconnect between capital availability and project supply requires further discussion between industry and the investment community to ensure that risk requirements are well understood by industry, and risk profiles are better understood by the investment community. Additionally, the need for greater disclosure and discussion of forthcoming project pipelines has been flagged by investors and investors have indicated they are looking for transparent and comparable reporting. Ongoing collaboration and two-way education is crucial to ensure credibility in the sector and to close the perceived gap between the capital and project supply from both sides.





# 4. Conclusions

Dramatic cost reductions and evolution of business models over the last 12 months comes alongside growing demand for renewable assets from investors. Innovative approaches to developing and financing renewables are driving much of recent deployment and cost reductions and the work undertaken in the REscale initiative throughout 2016 has identified significant opportunities across technologies, business models and financing approaches.

The potential to increase renewable finance via leveraging institutional investment, increasing access to capital and reducing financing costs through new financing vehicles is significant. Working together with multinational development banks to scale investment in emerging markets and for local/regional aggregators to facilitate cost effective finance for smaller projects will be essential to strengthen investment over the next years. Ongoing two-way education between the industry and investment community will be a key factor to ultimately achieve the required investments.

REscale's work in the renewable energy sector provides concrete solutions on how to overcome challenges faced throughout the industry and project lifecycle – including the use of new financing vehicles, issues associated with negotiating corporate renewable PPAs and key success factors in building and operating renewable-based microgrids. Its partnerships with other influential organisations in the sector contributes to the sharing of best practice and experiences for the benefits of the wider industry. The impact of the activities is clear, as the installed renewable capacity of REscale member

companies increased at a rate more than two times larger than the global renewable capacity rise over the same time. However, barriers remain and further work is needed to ensure solutions can be applied globally and scaled to the extent needed to achieve the 2°C scenario.

To this end, in 2017, the REscale initiative will continue to work in and across key action areas and look to impact in new regions, establish wider collaborations and move into new deep dives. REscale companies, partners and contributors will raise knowledge and understanding by bringing together key stakeholders to directly discuss opportunities and solutions for scaling and accelerating renewable deployment globally.



## Acknowledgements

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The REscale business solution currently consists of the following companies:



## Disclaimer

This publication is released in the name of the World Business Council for Sustainable Development (WBCSD). This document is the result of a collaborative effort between WBCSD and representatives from companies participating in the REscale business solution.

A wide range of REscale members reviewed the material, thereby ensuring that the document broadly represents the majority view of the REscale business solution. It does not mean, however, that every company within the working group agrees with every word.

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## About the World Business Council for Sustainable Development (WBCSD)

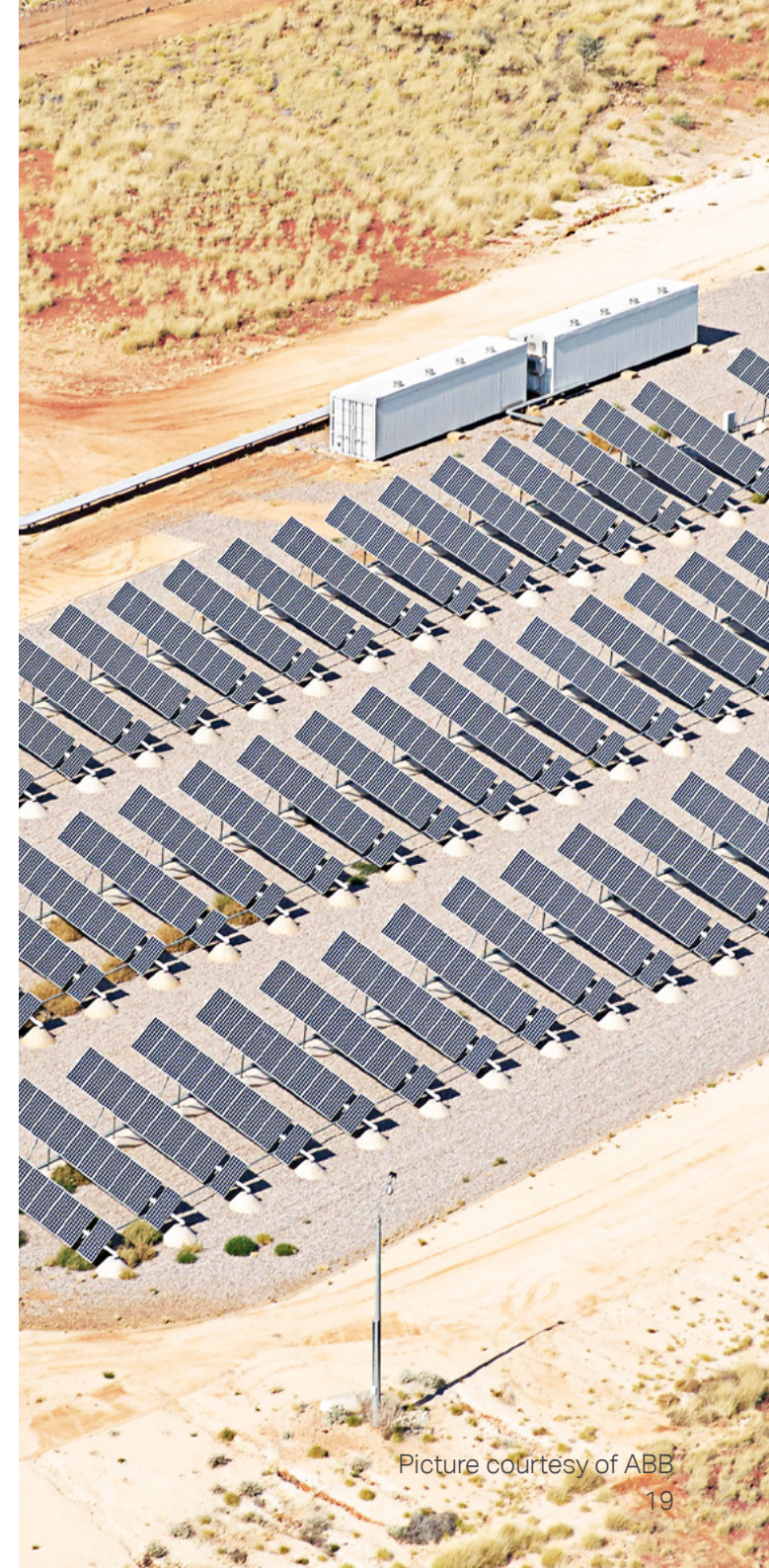
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