



GREEN INFRASTRUCTURE INVESTMENT OPPORTUNITIES INDONESIA



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Developed in partnership with Pembiayaan Investasi Non-Anggaran Pemerintah (PINA), a project of the National Development Planning Agency (BAPPENAS), and PT. EBA Indonesia.

Green Infrastructure Investment Opportunities, Indonesia

Contents

- 3 Executive summary
- 4 Indonesia's green infrastructure: an opportunity for change
- 5 Enabling infrastructure investments will boost growth
- 7 Opportunities in global green finance
- 13 Green infrastructure investment opportunities
 - 14 Transport
 - 17 Energy
 - 21 Water and waste management
 - 24 Built environment
- 28 Green investment opportunities are growing
- 29 Annexes
- 30 References

This report highlights green infrastructure investment opportunities in Indonesia

This report has been prepared to support Indonesia's mission to develop low-carbon and climate-resilient infrastructure. It highlights green infrastructure investment opportunities, with the aim of facilitating engagement on this topic between project owners and developers, and investors.

The report is intended for a wide range of stakeholders in Indonesia and abroad, including domestic and international investors, companies and developers, and relevant Indonesian Government ministries (Finance, Planning, Energy, Transport, Environment).

Green infrastructure investment opportunities are explored sector-by-sector and sample projects, which are aligned with international definitions of

"green", are presented in a pipeline of opportunities for investment in 2018-2019. Priorities for investment beyond 2019 are also covered.

The report is part of a research series which will investigate green infrastructure investment opportunities in ASEAN (Association of Southeast Asian Nations) member countries.

In developing this report the Climate Bonds Initiative consulted the Indonesian Government and key partners, in particular Pembiayaan Investasi Non-Anggaran Pemerintah (PINAN) and PT. EBA Indonesia. We would like to thank these partners and the Asian Development Bank (ADB), the Global Green Growth Institute and EDGE Buildings for their contributions.

Climate Bonds Taxonomy

The Climate Bonds Taxonomy provides broad guidance for prospective green bond and climate bond issuers and investors.

The aim is to encourage common definitions across global markets, in a way that supports the growth of a global green bond market.



ENERGY	TRANSPORT	WATER	LOW CARBON BUILDINGS	INFORMATION TECHNOLOGY & COMMUNICATIONS	WASTE & POLLUTION CONTROL	NATURE BASED ASSETS	INDUSTRY & ENERGY-INTENSIVE COMMERCIAL
Solar	Rail	Built (grey) infrastructure	Residential	Power management	Recycling	Agricultural land	Manufacturing
Wind	Vehicles	Green and hybrid infrastructure	Commercial	Broadband	Other Recovery	Forests (managed and unmanaged)	Energy efficiency processes
Geothermal	Mass transit		Retrofit	Resource efficiency	Disposal	Wetlands	Energy efficiency products
Marine	Bus rapid transport		Products for building carbon efficiency	Teleconferencing	Reuse	Degraded Lands	Retail and wholesale
Hydropower	Water-bourne transport				Pollution Control	Other land uses (managed and unmanaged)	Data centres
Bioenergy	Alternative fuel Infrastructure				Prevention	Fisheries and aquaculture	Process & fugitive emissions
Energy distribution & management						Coastal infrastructure	Energy efficient appliances
Dedicated transmission						Land Remediation	Combined heat & power

- Certification Criteria approved
- Criteria under development
- Due to commence

Executive summary

Green infrastructure for growth

Indonesia is the fourth most populous country in the world and one of the fastest growing emerging markets. It has experienced rapid growth in recent years. This has improved living standards but has also seen environmental degradation and increased vulnerability to the impacts of climate change.

Indonesia now plans to expand its green infrastructure to achieve positive environmental and economic benefits.

Green infrastructure will create prosperity by increasing competitiveness, productivity and employment opportunities; extending the reach, reliability, and efficiency of the national electricity grid, without creating air pollution; broadening the economic base; creating new markets; and providing inclusion and connectivity across the nation's vast archipelago.

Green infrastructure is low-carbon and less polluting, as well as climate-resilient. It allows Indonesia to position itself as a leader and a standard-bearer for climate compatible growth among neighbouring and emerging economies.

This report aims to support Indonesia's mission to develop low-carbon and climate-resilient infrastructure, by highlighting green infrastructure investment opportunities for the world's growing collection of green investors.

Green finance for sustainable development

The administration of President Joko Widodo has positioned infrastructure development as one of Indonesia's highest national priorities. With a focus on inclusive and sustainable growth, it aims to deliver USD400bn worth of new public-works projects in the transportation, energy, water and waste sectors over five years. The state budget will cover 63% of these costs, with investments from development partners and the capital markets expected to provide the remainder.¹

Indonesia's strong macroeconomic outlook has delivered investment-grade sovereign ratings from major international credit rating agencies. This more positive investment environment has been supported by government reforms that aim to encourage foreign investment as well as the provision of sovereign guarantees.

Furthermore, the government's *Roadmap for Sustainable Finance in Indonesia 2015-2019* provides guidance on green finance, including the use of green bonds.²

International investors are looking for green

Since the signing of the Paris Agreement there has been an increasing demand from institutional investors, particularly from OECD nations and China, for investment opportunities that address environmental challenges and support sustainable development.

This growing interest has resulted in the development and growth of dedicated green financial products.

The global green bond market, for example, has seen exponential growth, reaching USD160.8bn issuance in 2017 up 85% from the year before.³ Investor demand remains strong.

Indonesia's own experience is proof of this investor demand. The government issued the world's first sovereign green sukuk earlier in 2018. Initial guidance was for an

amount of USD500m-1bn and a coupon of 4.05%.⁴ The deal was hugely oversubscribed. Ultimately, it was upsized to USD1.25bn and priced very favourably at 3.75%. HSBC acted as green structuring advisor. Abu Dhabi Islamic Bank, CIMB, Citigroup, Dubai Islamic Bank and HSBC were joint bookrunners.

The proceeds raised from the placement will go to multiple projects from eligible categories such as renewable energy, public transport, low-carbon buildings, water and waste management, and green tourism. See page 12 for details.

Alignment of Indonesia's low-carbon and climate-resilient infrastructure with international definitions of "green" can help attract private overseas capital.

The green investment pipeline

A selection of Indonesia's infrastructure assets and projects that align with international definitions of "green" have been collated in this report. 38 of these projects are showcased in a green infrastructure pipeline for 2018-2019. Priority investments beyond 2019 are also covered.

Green infrastructure investment opportunities range from a USD15m distributed solar project to a USD6bn light rail development, offering investors a wide range of options. The largest share of these opportunities relates to low-carbon transport, with a focus on rail and Bus Rapid Transit, and renewable energy, with a focus on geothermal and hydropower.

The types of green infrastructure investment opportunities, by sector, include:



Transport - rail (e.g. urban, inter-city, high-speed rail) and Bus Rapid Transit projects



Energy - geothermal, hydropower, solar, wind, tidal and bio-energy facilities



Water and waste management - water supply and treatment facilities; waste recycling and waste-to-energy facilities



Built environment - certified buildings and low-carbon street lighting

There is potential for additional opportunities to become available in the future: for instance, the development of electric vehicles and more solar and wind energy generation facilities. Further investment opportunities relate to resilient water infrastructure and more efficient recycling infrastructure. Finally, as the practice of seeking certification for buildings becomes more mainstream, there will be more green financing opportunities in the property sector and the built environment.

Looking ahead, other green investment opportunities should aim to include projects from sectors such as forestry and agriculture, information and communications technology (ICT), industry, adaptation technology and measures. Ideally, these projects will have already been tagged as "green" by the government and made publicly available in a centralised location and in multiple languages - so that overseas investors understand what investment opportunities are on the horizon.

Indonesia's green infrastructure: an opportunity for change

Green infrastructure can help build Indonesia's sustainable future

One of Indonesia's highest priorities is the development of modern and efficient infrastructure that serves the entire population, promotes prosperity and creates resilience to the impacts of climate change.

Faced with increasing growth rates and rapid urbanisation, developing the country's sustainable future is high on President Joko Widodo's agenda.

Indonesia is particularly vulnerable to the impacts of climate change, due to its location and exposure to natural disasters, including earthquakes, volcanic eruptions, tsunamis, floods and drought. These phenomena are intensifying and increasing in frequency. Rising temperatures and sea levels, for example, will put the 42 million people who live in areas less than 10 meters above sea level at great risk⁵, and disrupt the economy and key sectors such as water, fisheries, health, agriculture and forestry.

To reduce risk and ensure continued growth, Indonesia needs to act now.

USD400bn worth of infrastructure to be built by 2019

The government's ambitions for a more sustainable Indonesia involve significant infrastructure development: approximately USD400bn worth between 2015 and 2019⁶.

The government's budget will cover only 63% of these costs, with development partners and the capital markets expected to provide the rest⁷.

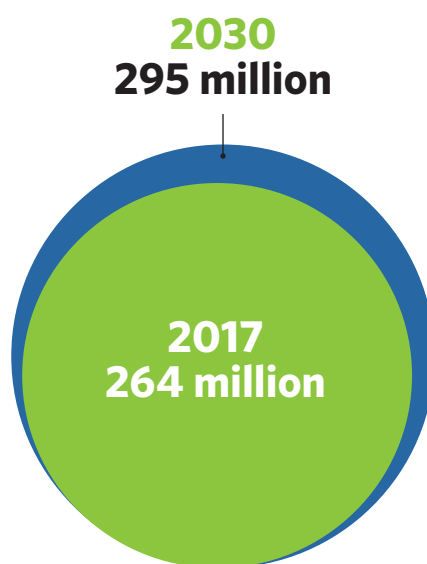
The government is actively seeking an estimated USD150bn in investments to fund their ambitious agenda. Accordingly, it is undertaking reforms to support investments in infrastructure, including the development of green financial tools to attract capital looking for sustainable investments.

Indonesia's issuance of the world's first sovereign green sukuk earlier this year is a promising step in this direction.

*"Infrastructure improvement and development, both connectivity and energy availability, play a key role in the efforts to achieve an equitable distribution of the economy."*⁸

President **Joko Widodo**

Figure 1. Indonesia's projected population growth



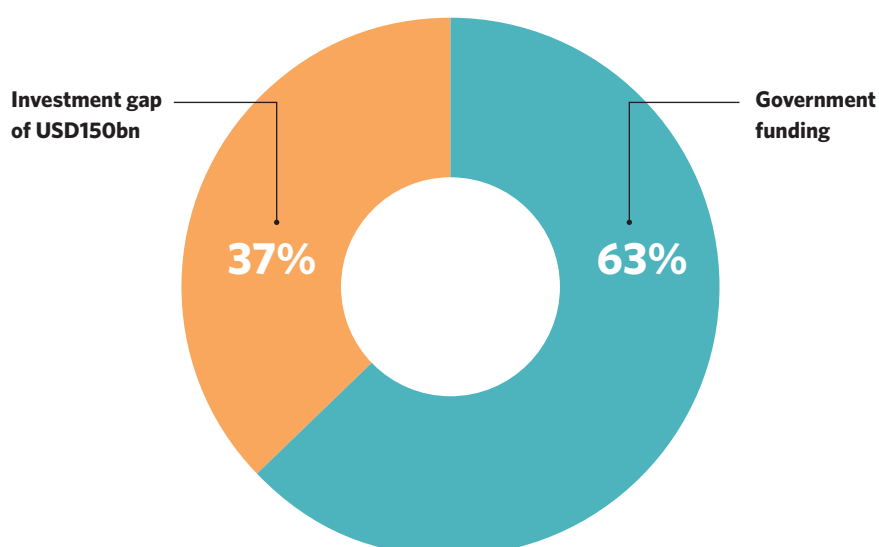
Country facts:

- 16th largest economy globally
- Largest economy in ASEAN
- 4th most populous country
- 58% of the population lives in Java
- 10.2m live in Jakarta, 30m in the greater Jakarta area
- 55.2% of people live in cities
- Urbanisation is increasing at a rate of 2.3% p.a.

"If we are to create sustainable economic growth in Indonesia and address the nation's climate change goals and objectives, we need vast green infrastructure projects. This will require capital from overseas investors as well as domestic finance. This partnership is about getting capital moving into multiple green investments."

Sean Kidney, CEO, Climate Bonds Initiative

Figure 2. Funding of 2015-2019 development strategy



Enabling infrastructure investments will boost growth

The macroeconomic outlook for Indonesia is improving

Gross domestic product (GDP) growth is expected to rise from 5.1% in 2017 to 5.4% in 2018, and up to 5.5% in 2019. These projections reflect the robust economic outcomes of 2017, including elevated foreign-exchange reserves (at USD126bn, covering seven months of current account payments) and the largest net inflow of foreign direct investment in over seven years (rising 8.5% to USD31.6bn from USD29.1bn in 2016). Growth is set to continue, aided by the investment-grade sovereign rating upgrade from the major international credit rating agencies.

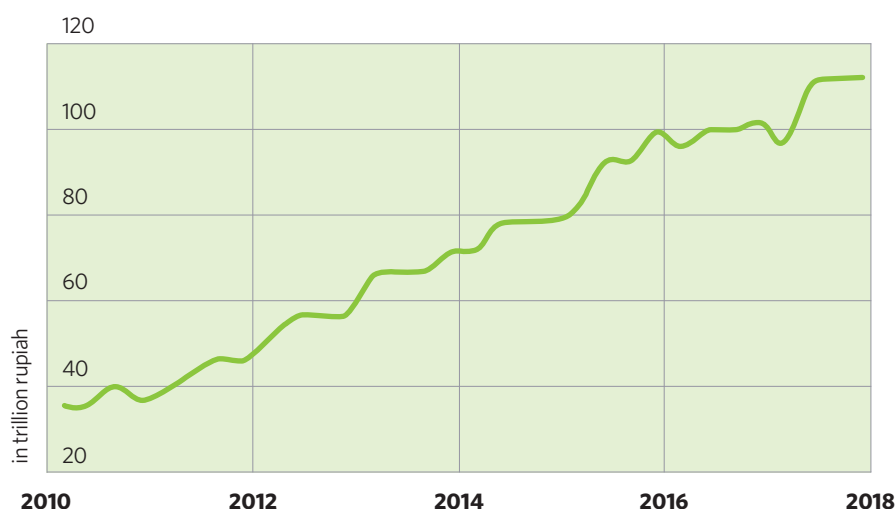
While interest rates in Indonesia have fluctuated in the past, they have trended downwards for the last 10 years to a record low of 4.25% in 2017. The government expects that inflation will also remain within the target corridor of 4±1%, as it has done for the past three years. Indonesia's healthy fiscal environment, credit rating upgrades and decreased interest rates present the ideal conditions for the government and private sector to lock in better debt conditions through refinancing outstanding loans.

Foreign investor interest has increased over the last decade, as political risks have decreased and Indonesia's score in the Corruption Perceptions Index⁹ has gradually improved. The Government has worked to reduce corruption by creating tools and policies that increase transparency and decentralise power. An example is moving government services online to avoid bribery.

Government interventions, like the peace and unification accord in 2002¹⁰, and the increase of religious plurality, have also reduced the risk of ethnic and religious conflicts. Increasing foreign investor confidence in the Indonesian market can be seen in the record high capital inflow (in 2017 foreign investment accounted for some 32% of the GDP) and the increase in the total outstanding government bonds held by foreign investors (at the end of January 2018, rose to 41.3%¹¹).

Indonesia's financial resilience is improving, it is a G20 member and is moving closer to becoming an upper middle-income economy. However, it is still faced with the fundamental development challenges of poverty and inequality. The government plans to overcome these challenges by continuing to drive economic growth and by prioritising infrastructure development, both of which are key to improving productivity and quality of life in Indonesia.

Figure 3. Foreign direct investment Indonesia, 2010-2017



Source: Trading Economics, 2018

Figure 4. Interest rates Indonesia, 2007-2017



Source: Trading Economics, 2018(b)

Green infrastructure is part of the development strategy

The government's key development strategy, the *National Medium-Term Development Plan* (2015–2019), aims to develop billions of dollars of new public-works projects in transportation, energy, water, waste and information and communications technology over the five years¹². While not all of these projects would be considered green, the plan specifies that infrastructure should aim to be environmentally sustainable.

The development of new energy generation facilities should promote the *National Energy Policy 2014* targets: renewable energy should comprise at least 23% of the energy mix in 2025 and 31% in 2050, with corresponding reductions in the use of oil, coal and natural gas in power generation¹³. Infrastructure planning must also consider Indonesia's *National Action Plan for Climate Change Adaptation*¹⁴ and their 2015

Indonesia's GHG emissions reduction pledge:

A minimum of 29% emission reductions by 2030, and up to 41% with international support.

Nationally Determined Contribution (NDC) - detailing their climate pledges to reduce, unconditionally, 29% of its greenhouse gas (GHG) emissions against the Business as Usual scenario by the year of 2030 (or a 41% reduction conditional to the availability of international assistance with finance, technology transfer, and capacity building¹⁵).

Overall, approximately USD400bn worth of infrastructure is needed for the *National Medium-Term Development Plan* (2015–2019) to be realised¹⁶ - with the 2018 budget allocating 409tn rupiah (approximately USD29.7bn) to infrastructure development,

including green infrastructure such as 639km of railway lines (representing almost one third of the total annual budget and the highest ever allocation in an Indonesian government budget)¹⁷. State-owned enterprises (SOEs) in Indonesia also plan to spend additional money on infrastructure to support the nation's ambitious infrastructure goals, with one quarter of SOE spending coming from the state power company, Perusahaan Listrik Negara (PLN), some of which will fund new renewable energy facilities. Despite these significant commitments, not all infrastructure development needs will be covered by the budget, with about one third of the total infrastructure costs outstanding.

*"Indonesia shares the same infrastructure challenges as many other nations in ensuring all new infrastructure is green and matching investors to the many opportunities that exist."*¹⁸

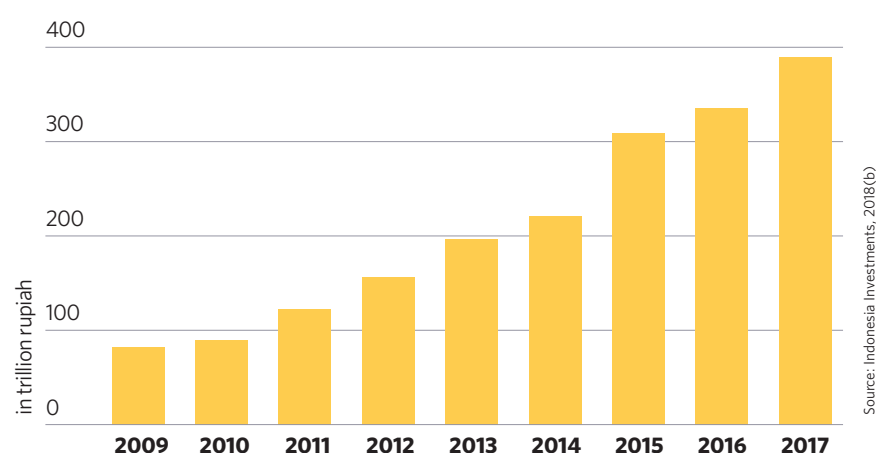
Yudhi Ismail, President Director, PT.EBA Indonesia

Simplified regulation and fiscal incentives are enabling investments

To cover outstanding costs, the government has undertaken significant reforms to make investing in Indonesia more attractive. Changes include streamlining approval and procurement procedures for infrastructure projects; removing the withholding tax on interest payments in foreign-currency denominated government bonds; opening up direct lending from multilateral organizations to SOEs; as well as the creation of the Investment Coordinating Board of Indonesia (BKPM), a centralised service, responsible for issuing more simplified foreign investment licences, and the government's non-budget financing scheme (PINA), a scheme that encourages private involvement in infrastructure development.

Further, the government has developed a policy framework that promotes leverage financing to support more participation from the private sector, with an increased focus on green finance. This has included improvements to the government's public-private partnership (PPP) regulations for infrastructure, the provision of subsidies for PPPs¹⁹, and credit enhancement for PPPs and SOEs in the form of sovereign guarantees, gap viability funding, and availability payments. To avoid exposing the national budget to undue fiscal burden, the government also

Figure 5. Indonesian Government Annual Budget Allocations to Infrastructure Spending



developed the Indonesian Internal Credit Rating scorecard system and the Indonesia Infrastructure Guarantee Fund (IIGF) for administering sovereign guarantees.

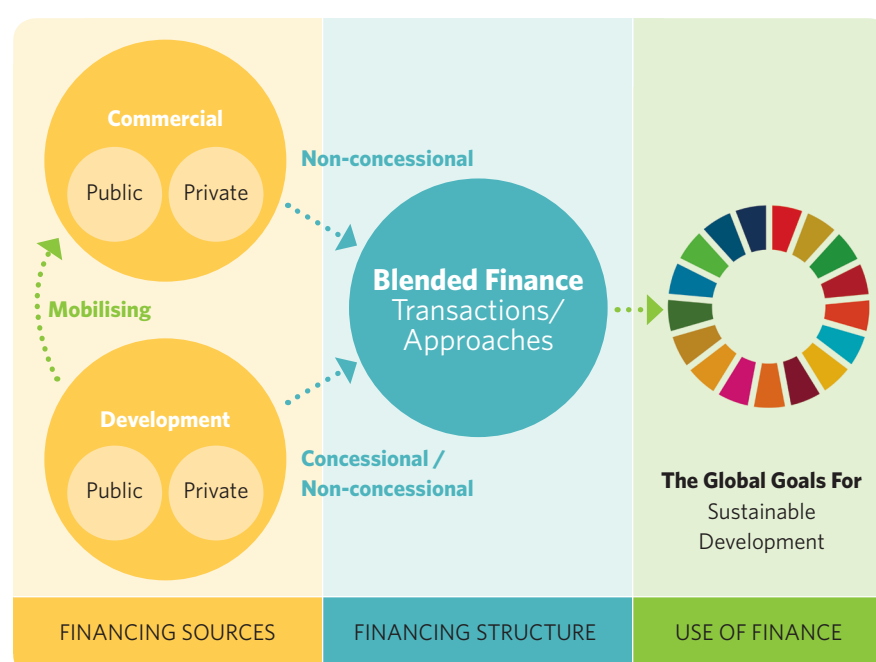
Development Finance Institutions can support infrastructure investment through blended finance

Where the government is not able to bear the risks associated with large infrastructure projects, Development Finance Institutions (DFIs) can support infrastructure investment by providing blended finance instruments and other credit enhancement mechanisms, like non-sovereign partial credit guarantees, partial risk guarantees and viability gap funding, as

well as first-loss provisions, contingent loans, and A/B loans or grants (see Annex 1).

In Indonesia, this type of support can be provided directly to governments, SOEs and investors but is also available via funds like the IIGF, ASEAN Credit Guarantee Investment Facility, ASEAN Infrastructure Fund or the Leading Asia's Private Sector Infrastructure Fund (see Annex 2). To make the most of DFI support, the government of Indonesia is creating a regulation to accommodate blended financing. This regulation will apply to financing for Sustainable Development Goals (SDGs)²⁰ themed projects, in line with the OJK's new paradigm of sustainable development for economic growth²¹.

Figure 6. Blended finance and the SDGs



Blended finance is the strategic use of development finance for the mobilization of additional finance towards sustainable development in developing countries.¹⁷

Opportunities in global green finance

Demand for sustainable investments is increasing

Over the past few years, there has been an increasing demand from Institutional investors, particularly from OECD countries and China, for investment opportunities that mitigate the risks arising from climate change, deliver social impact and support sustainable development.

This extreme level of interest has resulted in the development and growth of innovative financial products including green loans; green, social and sustainable bonds; green infrastructure investment trusts; and, green index products. Green bonds are currently the most developed segment of thematic bonds, carrying a great recognition from the investor base and are the most advanced in terms of definitions. The 'green' label is a discovery mechanism that enables bond issuers, governments, investors and the financial markets to prioritise investments, which genuinely contribute to addressing climate change.

The global green bond market is witnessing exponential growth, benefitting both issuers and investors

Green bonds are debt instruments that raise capital exclusively to finance or re-finance projects and assets with environmental benefits²². They fund assets and activities that deliver climate change mitigation and/or adaptation impacts, as well as environmental benefits such as preserving biodiversity; conservation of natural resources; and, air, water and soil pollution control.

Green bonds and green sukuk²³ can deliver several benefits for both issuers and investors. The main benefits reported by issuers have been an enlargement of the investor base and reputational benefits. There is preliminary evidence of pricing benefits as well for some issuers, driven by strong investor demand and limited supply²⁴.

The green bond market has seen exponential growth. It reached USD160.8bn of issuance in 2017, up from USD87bn in 2016 and USD42bn in 2015. The expanding issuer base has been accompanied by ever greater diversification in issuer type, geography and projects. Bond investments meet the needs of institutional investors as they offer relatively stable and predictable returns. Long-dated bonds are best aligned with institutional investors' liabilities.

Benefits for investors

- Produce comparable financial returns with the addition of environmental benefits.
- Satisfy Environmental, Social and Governance (ESG) requirements for sustainable investment mandates.
- Enable direct investment in the 'greening' of brown sectors.
- Increase transparency and accountability on the use and management of proceeds.

Benefits for issuers

- Provide an additional source of green financing.
- Can match maturity with project life and/or investment cycle.
- Improve investor diversification and attract buy-and-hold investors.
- Enhance issuer reputation.
- Attract strong investor demand, which may lead to high oversubscription and pricing benefits.

Key global sustainable finance initiatives:

- **The Principles for Responsible Investment:** nearly 1600 signatories from 30 countries, representing over 50%, or over USD68tn, of global assets under management (AUM).
- **The Principles for Sustainable Insurance:** adopted by insurers representing over 20% of the global insurance market by premium volume and USD14tn in AUM.
- **The Equator Principles:** commitment from 92 financial institutions in 37 countries, covering the majority of international project finance in developed and emerging markets.
- **The UN Environment Finance Initiative (UNEP FI):** 92% of the world's 25 largest banks are members.
- **The UNEP FI's Global Investor Statement on Climate Change:** over 250 investors, responsible for the management of funds the size of the United States' GDP, calling for policies to unlock low-carbon growth and avoid economic devastation.

"It is the role of banks today to make sure we can enable sustainable and impactful projects everywhere."

*"[Green bond issuance] is proof that financial institutions can generate socially beneficial outcomes when we really work hard [&] our institutional investor clients have the appetite to invest in projects and companies that combine commercial and financial performance with clear environmental and social purpose and impact."*²⁵

Eric Raynaud, CEO, Asia Pacific and Member of Group Executive Committee at BNP Paribas.

- DFIs (e.g. World Bank, ADB, Asian Infrastructure Investment Bank); and
- Retail investors (e.g. World Bank green bonds offered to retail investors through Merrill Lynch Wealth Managers and Morgan Stanley Wealth Managers).

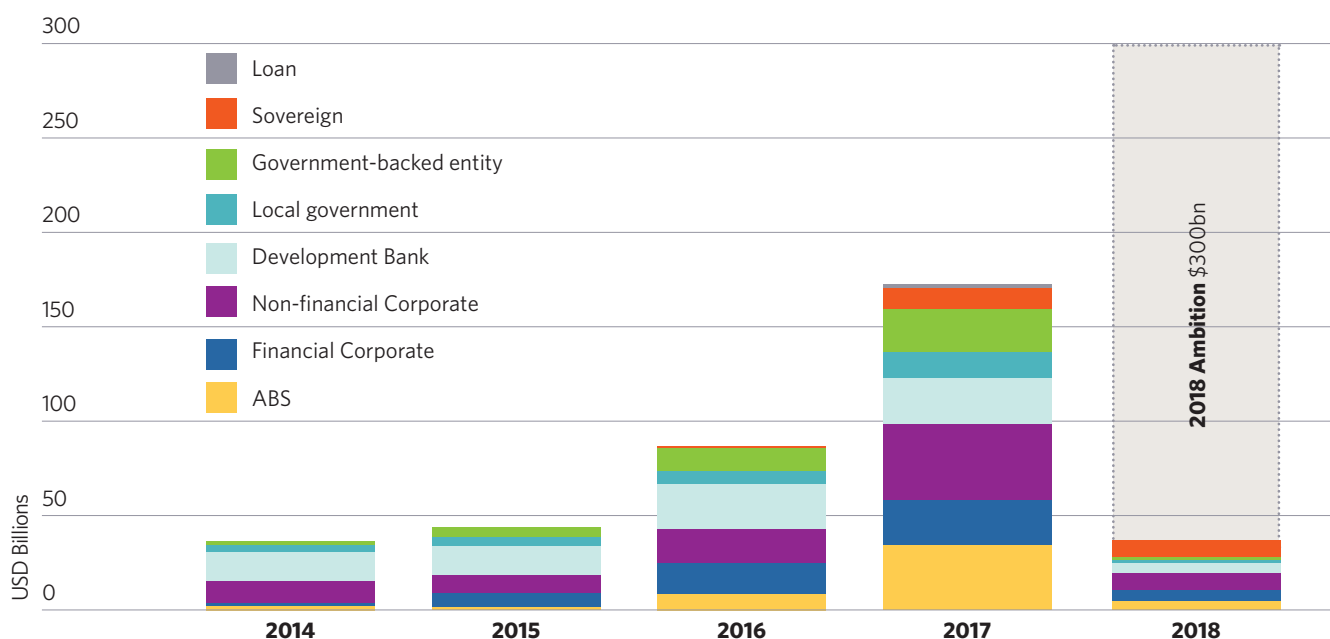
With investors increasingly looking for ways to address ESG and climate change in their investment processes, green bonds present a useful opportunity to meet environmental objectives as well as deliver on their fixed income mandates.

The popularity of green bonds is set to continue. A 2017 HSBC global survey of a thousand companies and institutional investors, showed that 68% of investors intend to *increase* their low-carbon related investments, with the greatest interest coming from Europe (97%), the Americas (85%) and Asia (68%)²⁶.

Demand for green bonds comes from:

- Mainstream asset managers (e.g. Aviva, BlackRock, State Street);
- Specialist ESG and green bond fund managers (e.g. Amundi, Natixis/Mirova);
- Sovereign and municipal governments (e.g. Chinese SOEs through their *Belt and Road Initiative*);

Figure 7. Growth of the green bond market (2014 - Q1 2018)



The Belt and Road Initiative

The *Belt and Road Initiative* (BRI), also known as *One Belt, One Road*, is a major strategy launched by the Chinese Government, involving infrastructure development along the Silk Road Economic Belt and the 21st Century Maritime Silk Road.

The intention is to promote economic co-operation among more than 60 countries along these routes. Indonesia is one of these countries and has been benefiting from this scheme since its inception in 2013, with USD5bn-6bn infrastructure investment in Jakarta and a USD4.5bn loan from the China Development Bank for Indonesia's first high-speed rail between Jakarta and Bandung.

China's President Xi Jinping has now called for the "greening" of the *Belt and Road*, with the aim of establishing an open and green world economy, working together with different countries to achieve ecological civilisation and the SDGs.²⁷

Both the China Development Bank and the world's largest bank, ICBC, have now issued Green Belt and Road Bonds, both certified under the Climate Bonds Standard.

International best practices and domestic guidelines have emerged

With the growth of the market, best practices have developed at the international level to guide issuers and deliver consistent markets to maintain investor confidence and avoid the risk of "greenwashing". At the international level, two main voluntary processes for green bond issuance have emerged:

- the **Green Bond Principles (GBPs)**, coordinated by the International Climate Markets Association (ICMA), provide process guidance around transparency on the use of proceeds, project selection process, management of proceeds and reporting^{28,29}.
- the **Climate Bonds Standard**, managed by the Climate Bonds Initiative and developed by a network of technicians, industry players and investors, incorporates the GBPs and adds green definitions, in line with the Paris Climate Agreement.

External reviews from independent verifiers to establish alignment with the GBPs and/or compliance with the Climate Bonds Standard have become common practice. The most common forms of external review are:

- 1. External review:** an analysis of the green bond issuance by an independent party. Assurance reports confirm compliance with the GBPs. Second party opinions (SPO) provide additional commentary - and in some cases, assessment - of eligible assets identified in the green bond framework of the issuer.

"To investors green bonds offer a stable, rated and liquid investment with long duration. To issuers, they could tap the USD100tn global institutional fixed income investor base."

Mark Carney, Governor of the Bank of England and FSB Chair.

- 2. Certification:** a third-party verification comprising an expert review of the issuer's Green Bond Framework against a publicly available green standard, such as the Climate Bonds Standard.

- 3. Green rating:** an evaluation of the green bond or related framework against a third-party rating methodology, which considers the environmental aspects of the investments. These include products developed by rating agencies.

Governments, regulators and stock exchanges have started developing guidelines and regulation. These generally include guidance for issuance and disclosure in line with the GBPs and are mostly aligned with the Climate Bonds Standard.

Indonesia's Financial Services Authority (OJK) has issued green bond regulations for domestic bond issuance³⁰. The ASEAN Capital Markets Forum has similarly provided green bond guidelines for adoption throughout the region; and financial services regulators in China and India have their own green bond regulations. All are broadly consistent with international standards.

ASEAN green bond issuance is growing rapidly

An analysis of green bond issuance shows a large increase in the Asia-Pacific region, with exponential growth in 2016 when China entered the green bond market. The region reached a record USD36.3bn volume in 2017.

Within the Asia-Pacific region, deal volume from issuers domiciled in ASEAN member countries represents a small fraction of total issuance: 4% (by comparison, the largest issuer, China, represents 65%). But issuance is growing fast, and there have been several landmark deals, which have set a global precedent.

The world's first green sukuk was issued in Malaysia in June 2017, by Tadau Energy Sdn Bhd, a renewable energy and sustainable technology company. In line with the requirements of a sukuk, the use of proceeds will comply with Sharia principles and will fund a 50 MW solar project in the coastal city of Kudat, in the Sabah state.

There have been four further green sukuk deals in Southeast Asia, including the historic sovereign green sukuk by Indonesia.

These contributed to a total of twelve green bonds from the region, six of which were issued in 2018 alone. Three of the ASEAN deals were issued under the ASEAN Green Bond Standards released in late 2017.

Allocations to low-carbon buildings and renewable energy dominate. On a cumulative basis, the proceeds of ASEAN green bonds have been used for:

- Renewable energy (39.2%),
- Low carbon buildings (28.0%),
- Low carbon transport (6.5%),
- Water management (2.3%),
- Waste management (6.5%),
- Sustainable land use (6.8%), and
- Climate change adaptation projects (10.7%).

Figure 8. Global green bond issuance by region

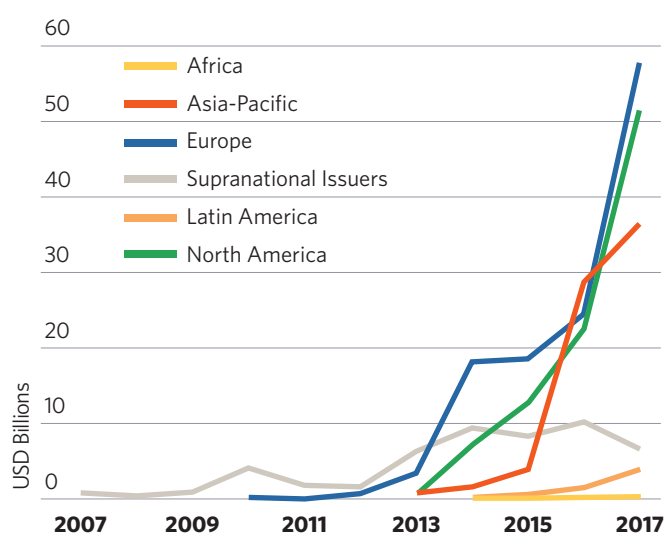


Figure 10. Use of proceeds per year (ASEAN) 2016 - April 2018

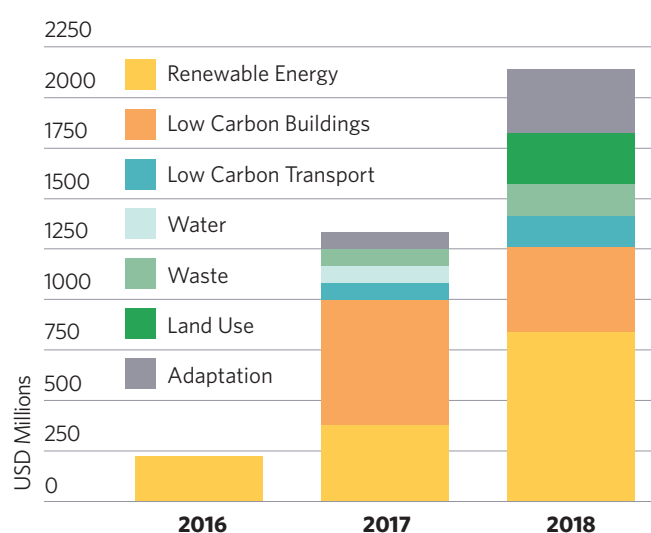


Figure 9. Cumulative Asia-Pacific issuance 2013 - April 2018

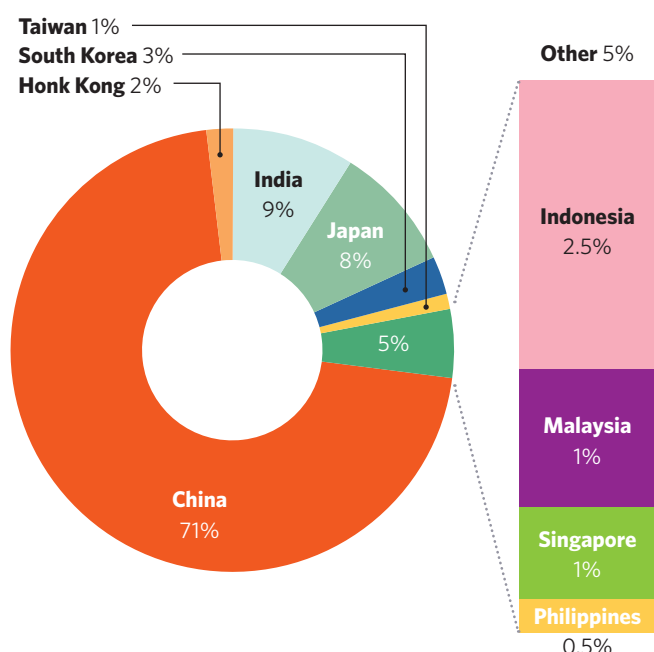


Table 1. ASEAN issuance 2016 - April 2018

Issuer's country	Amount Issued (USD)	Amount Outstanding (USD)	First green bond issue date	Issue count
Indonesia	1,925m	1,925m	23/02/18	3
Malaysia	922m	922m	27/07/17	5
Singapore	611m	611m	18/04/17	3
Philippines	226m	226m	29/02/16	1
ASEAN total	3,684m	3,684m		12

Major policy changes facilitate green bonds in the region

In November 2017, the ASEAN Capital Markets Forum – a forum comprising market regulators from the 10 ASEAN countries, including OJK – released the **ASEAN Green Bond Standards**, a set of voluntary guidelines based on the international GBPs, to create a green asset class for the ASEAN region.

In December 2017, Permodalan Nasional Berhad, a Malaysian government-backed investment company, became the first issuer to comply with both the GBPs and the ASEAN Green Bond Standards (AGBS). Its MYR1.87bn (USD461m) green sukuk financed the Merdeka PNB118 tower, which benefits from three building certifications.

In January 2018, Segi Astana, another Malaysian issuer, placed a MYR415m (USD104m) ASEAN Green MTN, which will finance the development of a LEED (Silver) certified building. Singaporean company Sindicatum Renewable Energy raised INR2.5bn (USD40m) through an ASEAN green bond, which benefits from a guarantee by GuarantCo (part of the multilateral Private Infrastructure Development Group).

The **ASEAN+3 Multi-Currency Bond Issuance Framework** was released by the ten members of the ASEAN together with the People's Republic of China, Japan and Republic of Korea in 2015. It encourages domestic and regional issuers to take advantage of streamlined issuance approval processes across the region and provides opportunities for bond or note issuance activity in markets other than the original adopters (Hong Kong, China; Japan; Malaysia; the Philippines; Singapore; and Thailand).

In pursuing more green finance, the region has the opportunity to surpass the low-performing, polluting, resource-inefficient technologies and practices of more developed countries³¹. This is because green finance, including green debt products, can encourage the growth of high-potential green industries, support job-creating technological innovation and open business opportunities for the financial industry through the creation of new instruments and services, while helping to access new markets.

ASEAN Green Bond Standards

The ASEAN Green Bond Standards are based on the GBPs and seeks to enhance transparency, consistency and uniformity to help reduce issuance and investment costs.

Key elements of the standards include:

- The issuer or issuance of the green bond must have a geographical or economic connection to the region;
- Fossil fuel power generation projects are explicitly excluded;
- Information on the process for project selection and on the use of proceeds allocation, as well as the external review report must be made publicly available on a designated website;
- Recommendation to obtain an external review for the green bond framework, and is particularly recommended for the management of proceeds and annual reports; and
- Recommendation for the external review providers must disclose their relevant credentials and expertise and the scope of the review conducted.

Green bonds from ASEAN

The following are examples of different types of issuers, instruments and sectors of green bonds that have been issued in ASEAN, including all green bonds issued by Indonesian entities.



Indonesia

Instrument: Green bond

Sector: Geothermal Energy

Issuer: Star Energy Geothermal (Wayang Windu)

Issuer type: Non-Financial Corporate

Amount: 580m

Currency: USD

Date issued: 24 April 2018

Maturity: 24 April 2033

External review: SPO by Carbon Trust

Use of proceeds: Geothermal power plant



Indonesia

Instrument: Green bond

Sector: Land use / agriculture

Issuer: Tropical Landscapes Finance Facility

Issuer type: Non-Financial Corporate

Amount: 95m

Currency: USD

Date issued: 23 February 2018

Maturity: 23 April 2033

External review: SPO by Vigeo Eris

Use of proceeds: Sustainable natural rubber plantation and small-scale farming on degraded land



Indonesia

Instrument: Green sukuk

Sector: Energy, Buildings, Transport, Water and Waste Management, Land Use, Adaptation

Issuer: Republic of Indonesia

Issuer type: Sovereign

Amount: 1,250m

Currency: USD

Issue date: 1 March 2018

Maturity: 1 March 2023

External review: SPO by CICERO

Use of proceeds: Specific projects to be determined from eligible categories - please see box on page 12 for more details



Malaysia

Instrument: Green sukuk

Sector: Energy solar

Issuer: Tadau Energy Sdn Bhd / Tadau Energy (Edra Power)

Issuer type: non-financial corporate

Amount: 250m

Currency: MYR

Issue date: 27 June 2017

Maturity: 27 July 2033

External review: SPO by CICERO and rating from RAM Rating Services Bhd

Use of proceeds: 50 MW solar project



Philippines

Instrument: Green bond

Sector: Energy Geothermal

Issuer: AP Renewables

Issuer type: Non-Financial Corporate

Amount: 10,700m

Currency: PHP

Date issued: 29 February 2016

Maturity: 28 February 2026

External review: Certified Climate Bond, certified under the criteria for Geothermal, verification by DNV GL

Use of proceeds: Tiwi-Mak Ban geothermal power plant



Singapore

Instrument: Green bond

Sector: Buildings

Issuer: CDL Properties (City Developments Limited)

Issuer type: Non-Financial Corporate

Amount: 100m

Currency: SGD

Date issued: 18 April 2017

Maturity: 18 April 2019

External review: Certified Climate Bond, certified under the criteria for Buildings (Upgrades), verification by KPMG

Use of proceeds: Energy efficiency upgrades

Indonesia's green finance public sector leadership

Within ASEAN, Indonesia has been a leader in green finance.

In 2015, the OJK launched the *Roadmap for Sustainable Finance in Indonesia 2015-2019*, with the aim of achieving sustainable development through the comprehensive support of the financial service industry.

This includes the adoption of green finance, i.e. investments that provide environmental benefits in the broader context of sustainable development³², which Indonesia is already doing, through:

- **Providing strategic policy signals and frameworks** – via the regulation on Sustainable Finance in 2017 for banking, capital markets and nonbank financial institutions and the voluntary financing guidelines for renewable energy, energy efficiency, green buildings, organic farming and palm oil.
- **Expanding learning networks for capacity building** – through the Bali Centre for Sustainable Finance, launched by OJK and the Udayana University in July 2017.
- **Encouraging and facilitating knowledge sharing on environmental and financial risk** – by hosting the 2016 International Sustainable Finance Forum.
- **Supporting the development of the local green bond market** – by requiring domestic green bonds to comply with ASEAN Green Bonds Standards and the OJK developing new regulations for green bonds in December 2017.
- **Establishing a Green Bond and Green Sukuk Framework for sovereign bonds³³ and issuing the first sovereign green sukuk** – the first debt instrument with a green label in Indonesia and the first green sovereign sukuk worldwide

Indonesia green bond issuance emerging

In 2016, the total outstanding balance of tradable government bonds and corporate bonds was USD155.2bn³⁴.

In 2017, Indonesia's global sukuk experienced an oversubscription of 3.6 times.

The Indonesian Government, the largest issuer of bonds in the country, predicts that 2018 bond issuance will be higher than in previous years, with President Joko Widodo aiming to raise approximately USD14.1bn (including green bonds) in the first quarter alone.

Aside from the issuance of the world's first green sovereign sukuk, a 'sustainability' bond³⁵ financing green assets was also issued by the Tropical Landscapes Finance Facility, in February 2018. This bond was the first of its kind in Asia – providing USD95m in funding for a sustainable natural rubber plantation on heavily degraded land in two provinces in Indonesia.

In April 2018, Star Energy Geothermal (Wayang Windu) issued a labelled green bond under a Green Bond Framework³⁶, having previously issued vanilla bonds to finance the Wayang Windu Geothermal Plant. US and British investors subscribed to over half the amount of the 15-year, USD580m green bond³⁷.

In addition to sovereign and corporate issuance, the Indonesian green bond market will likely include municipal green bonds

in 2018, with the government updating existing regulations to relax administrative requirements and provide more options for provincial governments to finance their infrastructure projects³⁸.

Even though green bond financing is in its infancy in Indonesia, these policy changes, the release of the green bond and green sukuk guidelines and the issuance of the above-mentioned bonds demonstrate an increasing understanding and commitment to green finance, and green debt securities in particular.

These tools provide a critical finance channel for infrastructure development stakeholders, diversify risks and create more options for investors – ultimately, helping to fund Indonesia's substantial infrastructure agenda and help the nation transition to a low-carbon economy.

The Republic of Indonesia Green Bond and Green Sukuk Framework

Use of proceeds

Eligible projects are those which promote the transition to a low-emission economy and climate-resilient growth, including climate mitigation, adaptation, and biodiversity. These will fall into the following sectors: renewable energy, energy efficiency, resilience to climate change/disaster risk reduction, sustainable transport, waste-to-energy and waste management, sustainable management of natural resources, green tourism, green buildings and sustainable agriculture.

Eligible green projects exclude fossil fuel-based electric power generation, large scale (>30MW capacity) hydropower plants and nuclear assets.

Project evaluation and selection

The Ministry of Finance will select projects tagged by individual ministries as delivering climate change benefits. These have to be validated by the Ministry of Environment and Forestry to be consistent with Indonesia's NDC and endorsed by the Ministry of Finance for budget allocation.

The tagged projects will fall under one or more eligible sectors and their development will be consistent with the tenor of the green bond or green sukuk.

Management of proceeds

A green bond and green sukuk allocation register will be established to record the allocation of each green bond or green sukuk proceeds. The proceeds will be managed within the government's general account and unallocated proceeds will be held in cash.

Reporting

The Ministry of Finance will prepare and publish an annual report containing a list and brief description of projects financed with the green bond/green sukuk proceeds, the amount allocated to each project and an estimation of the beneficial impacts of the projects such as GHG emissions reductions.

Pre-issuance external review

The framework was reviewed by CICERO and received an overall shade of Medium Green. CICERO's second party opinion includes an assessment of the proposed projects under each eligible category, with supporting commentary. The broad range of categories were assessed from light to dark green by CICERO.³⁹

Information source: GOI, 2018

Green infrastructure investment opportunities

Methodology

The following section provides an overview of green infrastructure investment opportunities in Indonesia for 2018-2019 and into the future. International science-based definitions of “green”, that align with the Climate Bonds Standard, have been used to identify eligible green projects. These projects have been drawn from government plans, consultation with key stakeholders in Indonesia as well as through extensive research of each sector. Only projects where sufficient information was available are included.

These projects have been classified into five key sectors in accordance with the Climate Bonds Taxonomy and represent the sectors with the most progress and potential for growth in Indonesia. The projects listed are not exhaustive and cover all possible sectors of green growth. Nature based assets are not included in the scope of this report as they do not fall within the report’s theme of infrastructure.

As the potential for the expansion of Indonesia’s scope for green infrastructure is so great, future investment priorities have also been listed to guide development

(based on international best-practice and local potential for growth). This is accompanied by example projects that would promote these priorities, chosen from existing government priorities and reflecting the types of projects available.

Internationally aligned green definitions

The “green” definitions used for selecting the projects in this report, and which align with the Climate Bonds Standard and the Climate Bonds Taxonomy are as follows.



Renewable energy: energy generation, transmission or storage technology that has low- or no-carbon emissions. This can include solar energy, wind energy, bioenergy, hydropower, geothermal energy, marine energy or any other renewable energy source, as well as energy distribution and energy systems that support improved energy management and storage capacity.



Green buildings: commercial and residential buildings, developed or upgraded, with the aim of operating with low-carbon emissions and reduced the environmental footprint of construction. They are usually deemed green through a certification process, requiring developers to meet certain standards regarding energy and water efficiency, indoor air quality and waste management, sustainable building materials and the implementation of construction projects and operational management. Applying similar principles to the built environment is also important, using design and technology to reduce emissions and the environment footprint of a city.



Sustainable waste management: efficient use of resources to cut down on waste production, coupled with collection and disposal systems that promote reuse and recycle, thereby minimising residual waste going into waste-to-energy facilities. Where waste must go to land fill, there are gas capture systems installed to minimise emissions as well as measures to minimise run-off and other negative impacts on surrounding environments.



Low-carbon transport: transportation modes and ancillary infrastructure that produce low- or no-carbon emissions, as they are powered by renewable energy or fuel sources. This can include national and urban passenger rail and freight networks (where freight lines, rolling stock or related infrastructure is not fully dedicated to the transportation of coal, oil or other fossil fuels); Bus Rapid Transit (BRT) systems; electric vehicles; and, bicycle transport systems.



Sustainable water management: assets that do not increase greenhouse gas emissions or aim at emission reductions over the operational lifetime of the asset; address adaptation; and increase the resilience of surrounding environments. This could include the following assets and projects: water capture and collection, water storage, water treatment (with methane emissions treatment), flood defence, drought defence, stormwater management, and ecological restoration/management as well as grey, or built water infrastructure and nature-based water infrastructure.

Transport

Overview

Existing green transport in Indonesia includes public passenger transport in the form of Mass Rapid Transit (MRT), Light Rail Transit (LRT), commuter rail, inter-city rail and regional rail services as well as extensive freight rail networks.

In addition to rail, the Bus Rapid Transit (BRT) system in Jakarta qualifies as green. However, all other BRT systems across the country do not qualify, as they do not have fully dedicated lanes for their busway corridors. In Indonesia, the asset owner for this sector is generally the government, although there are some private companies involved.

In the near future, with so much development underway, the share of green transport in Indonesia is set to increase. Improving connectivity is a critical priority

for President Widodo, who has set some ambitious targets for the future. This includes building 3,200km of train tracks throughout the islands of Sumatra, Java, Kalimantan, and Sulawesi. This would result in a fully connected national railway line, improving access for more people in more places, reducing congestion and air pollution, and driving trade and economic growth - without contributing to the nation's total GHG emissions.

In line with these targets, the future of green transport in Indonesia will include the expansion of the existing rail network. This will include the addition of high-speed rail routes and upgrades to the rail rolling stock from diesel to electric.

There will also be an expansion and upgrade of the BRT systems, more interconnectivity with other modes of public transport, and more hybrid buses in


the fleet. All of this will require additional investment in the next couple of years.


In Indonesia, several of the SOEs responsible for rail have already issued bonds for transport works. Future issuances from these organisations could be tagged as "green" in advance to raise their profile as potential sustainable investments.

Investment opportunities (2018-19)


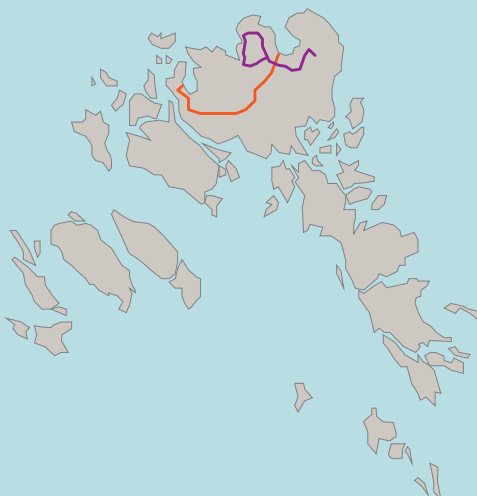
Transport investment opportunities in Indonesia, available in 2018-2019, include rail and BRT related projects that are planned for development and would benefit from project finance, or are under construction and would benefit from refinancing under Indonesia's improved macroeconomic conditions. These projects are listed below, accompanied by two detailed reference case studies.

Table 2. Low-carbon transport assets and projects for investment in 2018-2019

Subsector	Name and location	Status	Description
 Rail	Medan urban railway, North Sumatra	Planned	A 19.2km railway line stretching from southwest to northwest Medan, allowing for LRT and BRT integration. <i>Asset owner/Authority: Local Development Planning Authority, City of Medan</i>
	Batam Island Railway, Riau Islands	Planned	A public mass transportation system with a railway segment of 27,55 km to serve a demand of 16,986 passenger/hour/route. <i>Asset owner/Authority: Batam Indonesia Free Zone Authority</i>
	Jakarta MRT, Phase II, Jakarta	Planned	The next phase of the Jakarta MRT development. The total network is expected to stretch across over 108km, including 21.7km for the North-South Line (from Lebak Bulus to Kampung Bandan) and 87km for East-West Line (from Balaraja to Cikarang). Phase I is 15.7km long from Lebak Bulus to Bundaran HI and is under construction, opening in 2019. <i>Asset owner/Authority: Government of Jakarta</i>
	Jakarta LRT, Phase II, Jakarta	Planned	Further development of the LRT system with 3 to 7 lines connecting Jakarta city centre with suburbs. Phase I cost USD903.6m. <i>Asset owner/Authority: DKI Provincial Government and Government of Indonesia</i>
	Airport rail link, the Railink, Phase II, Jakarta	Planned	The next phase of the Railink, with an extension to Halim Perdanakusuma Airport. The current Railink connects Jakarta city centre to the main international airport, Soekarno-Hatta, more than 30km to the west, which takes 55 minutes and has a capacity to carry up to 272 passengers, and with 82 trips every day. <i>Asset owner/Authority: State-owned PT Kereta Api, through subsidiary Railink</i>
	Local commuter rail services (Commuterline or KRL), Extension, Jakarta	Planned	The next phase/s of the commuter rail system in the Jakarta metropolitan area, at 418km, with 6 lines servicing over a million people at its peak. <i>Asset owner/Authority: PT Kereta Commuter Indonesia (KCI), a subsidiary of PT Kereta Api Indonesia (KAI)—Indonesian national railway company</i>
	Jakarta-Bandung High-Speed Rail, connecting Jakarta with Bandung	Under construction	High speed rail covering a distance of around 142km between Jakarta and Bandung, as part of the Chinese BRI project. The price has swelled to almost USD6bn, from USD5.2bn (partly covered by a USD4.5bn loan from the China Development Bank at the May BRI summit in Beijing). <i>Asset owner/Authority: Consortium of Indonesian SOEs</i>

Subsector	Name and location	Status	Description
	High-speed rail, connecting Jakarta with Surabaya	Planned	High speed rail between Jakarta and Surabaya, currently undergoing feasibility studies. <i>Asset owner/ Authority: Consortium of Indonesian SOEs</i>
BRT 	TransJakarta, BRT system, Extensions, Jakarta	Planned	Further phase/s of the existing 230.9km in 13 BRT corridors and 10 cross-corridor routes and carrying 430,000 passengers daily in 2016, where buses run on dedicated bus lanes. Early estimates of Phase I show operational cost covered by fare revenue after 6 months. <i>Asset owner/Authority: Consortium of Indonesian SOEs and private operation</i>
	Transport Oriented Developments, Extensions, Jakarta	Planned	A total of 16 Transit Oriented Developments, for the integration of bus and train stops are planned, with one already complete. <i>Asset owner/Authority: Local government authorities</i>

Reference case studies

Urban railway, City of Medan, North Sumatra	Urban Railway City of Medan Map
<p>Status: Planned</p> <p>Description: A 19.2km railway line stretching from southwest to northwest Medan, allowing for the integration of LRT and BRT.</p> <p>Output: Improved accessibility and connectivity and reduced congestion and air pollution.</p> <p>Cost: Est. USD477.4m</p> <p>Concession period: Est. 35 years</p> <p>Asset owner/Authority: Mayor of Medan + Local Development Planning Authority, City of Medan.</p> <p>Financial structure: PPP, government support and guarantee</p> <p>Return on investment: An available payment is proposed for project investment in 10-15 years, with an end-user tariff scheme afterward. Farebox and non-farebox revenue, such as transit oriented development in the station, also possible sources of revenue.</p>	 <p>Source: BAPPENAS, 2017</p>
Batam Island Railway, Riau Islands	Batam Island Railway Map
<p>Status: Planned</p> <p>Description: A public mass transportation system with a railway segment of 27.55km to serve a demand of 16,986 passenger/hour/route.</p> <p>Output: Improved accessibility and connectivity; reduced congestion and air pollution; and tourism and port links.</p> <p>Cost: Est. USD635m</p> <p>Concession period: Est. 49 years</p> <p>Asset owner/Authority: Batam Indonesia Free Zone Authority (BIFZA)</p> <p>Financial structure: PPP, government support and guarantee</p> <p>Return on investment: Build, operate and transfer (BIFZA will acquire assets at contract completion).</p>	 <p>Source: BAPPENAS, 2017</p>





Future investment opportunities

Beyond 2019, in order for Indonesia to make the transition to a low-carbon society, investment opportunities should focus on increased rail and BRT developments as well as electric vehicle generation and sustainable waterborne transport. Table 3 contains examples of projects that would promote these investment priorities.

Future investment priorities:

- Rail
- BRT
- Electric vehicle generation
- Sustainable waterborne transport

Table 3. Future low-carbon transport investment opportunities

Subsector	Project	Description
Rail 	Rolling stock upgrades	The state-owned train manufacturer, the Indonesian Railway Industry (PT. Industri Kereta Api), produces electric passenger train wagons, freight wagons and related technologies for use locally and for export. This would make it possible to upgrade key rail routes with electric rather than diesel wagons (it would also require rail infrastructure upgrades to facilitate this technology.)
BRT 	BRT fleet upgrade	PT. Industri Kereta Api also manufactures Compressed Natural Gas-powered (CNG) buses, which are in use in Jakarta, known as Inobus (Innovation Bus). This would make it possible for the BRT fleet of buses to be upgraded across all BRT systems.
	BRT upgrades	All BRT systems across Indonesia should be upgraded to include segregated laneway for all routes, including those systems in Yogyakarta, Palembang, Bandung, Denpasar, Pekanbaru, Semarang, Makassar, and Padang.
Generation of electric vehicles 	Generation of electric vehicles	In 2007, Indonesia announced a set of tax incentives intended to help develop a "Low Cost Green Car"; in 2013, regulations were issued for a 0% luxury tax for cars under 1200 cc as long as they could meet the same 20 km/l mileage goal; and, in 2017, the government issued Presidential Regulation No. 22/2017 on the general plan for national energy to support the development of electric cars. This strong political impetus, paired with Indonesia's successful automotive industry would allow for substantial electric vehicle generation.
Waterborne transport 	Sustainable ports	Indonesia has planned the development and upgrade of several ports and port 'hubs' across the country. There is the potential for these to include measures that mitigate against and adapt to the effects of climate change. For example, on-site electricity production, energy efficiency measures for indoor and outdoor lighting as well as integration with public transport and freight rail infrastructure. It is also important for ports to protect themselves and the cities they support from the impacts of climate change by building adaptive features like reinforced sea-defences and improved drainage systems. Planned port developments that could be developed in a more sustainable manner include: Kabil Port; Kuala Tankung International Hub Port; Bitung International Hub Port; Makassar New Port; and, Patimban Port.
	Sustainable merchant and passenger marine vessels	As a vast archipelago, waterborne transport is an important part of inter-island connectivity. Boats in common use in Indonesia include large container ships, a variety of ferries, passenger ships, and smaller motorised vessels. For each of these there are technologies being developed around the world to decrease their, generally high, emissions. For example, hybrid tug boats are a readily available technology. Also, solar powered marine vessels already exist, specifically solar-electric jukung (traditional vessels) in Indonesia. The jukung, an 8-person capacity boat, is commonly used for local tourism, fishing and ferrying between islands. This technology could be scaled-up to provide more vessels or the technology could be adapted to larger vessels.

Energy

Overview

Renewable energy generation in Indonesia is currently dominated by hydropower and geothermal energy - with hydroelectric power contributing 9% to the total energy mix in 2017 and geothermal and other alternative energy sources contributing 5%⁴⁰. The other sources of renewable energy in Indonesia include solar power, wind power and bioenergy. The government is also pursuing tidal power opportunities. In Indonesia, renewable energy generation and distribution assets are privately owned or owned by SOEs, with the state-owned electricity distribution company PLN accounting for the majority of the country's power output.

Renewable energy is of importance to the government, as the nation's energy consumption is set to grow another 80% by 2030. In anticipation of this surge, the Indonesian Government aims to increase the nation's overall installed capacity as well as increase the share of renewable energy to 23% by 2025 (estimated at 45 GW) and 31% by 2050⁴¹. The government is encouraging increased investment by private electricity companies (IPPs) for the development of new renewable energy generation facilities.

To produce an ideal renewable energy mix, the government is aiming to continue to grow hydropower and geothermal energy, complemented by increased power generation from solar, wind and tidal technologies as well as different types of bioenergy generation. The current installed and potential capacity as well as the government targets for each of these energy sources are as follows:



Hydropower: The current installed capacity for all hydropower plants in Indonesia is about 4,260 MW, which is 5.8% of the total

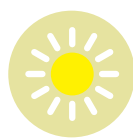
hydropower energy potential. Indonesia's current installed capacity comes from a mix of large-scale, medium and "mini" hydropower facilities. In the future, the government wants to focus on the development of mini-hydro (defined as having less than 10 MW of capacity per plant) and pumped-storage hydroelectricity, as they wish to increase electrification across the archipelago and meet peak demand⁴². Of the total renewable energy targets for 2025, hydropower represents the largest share, with 21 GW to be installed (of which 3 GW is envisioned to be in the form of small-scale hydropower).



Geothermal energy:

Indonesia has one of the largest installed geothermal energy generating capacities in the world,

with approximately 40% of the global potential, estimated at 28 GW. By 2025, Indonesia aims to produce more than 9 GW of geothermal power, accounting for 5% of Indonesia's total energy needs. As geothermal energy generation can result in emissions, new and existing geothermal projects are aiming to have direct emissions of less than 100gCO₂/kWh, through mitigation technologies that will render any non-condensable gas releases to the atmosphere negligible.



Solar power: In 2017, there was only 4.80 KWh/m²/day of solar power in Indonesia; however, the government plans to significantly

increase this amount, aiming for an annual solar power capacity of 6.4 GW by 2025. According to the International Renewable Energy Agency, Indonesia has the potential for 47 GW of installed capacity by 2030, should it develop on-grid and off-grid sources including solar farms and rooftop solar panels and solar heating.



Wind power: The installed wind power capacity in early 2016 was estimated at 9.4 MW; however, this would have increased

significantly over the last couple of years, with the construction of several wind farms in 2017. The government target for wind energy is 1.8 GW, which is only a fraction of the wind power potential - estimated at around 9.5 GW.



Bioenergy: The installed capacity from biomass is currently approximately 1.6 GW, while there is the potential for around 50 GW.

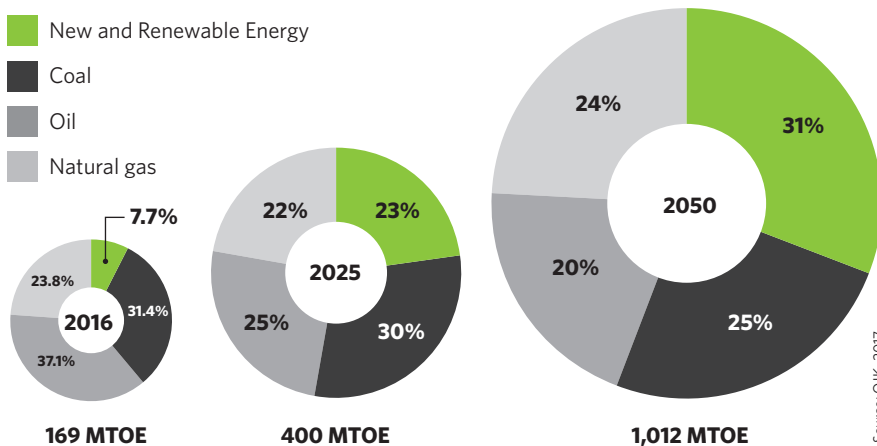
The government is aiming for bioenergy to contribute at least 5% of the total energy mix by 2025 (about 5.5 GW), based on current technologies. However, with new types of biomass being discovered in Indonesia, the government could increase its target (as long as new technologies do not jeopardise food security or risk forest clearing for production).



Tidal energy: The current installed capacity for tidal-or marine-energy is zero, with a theoretical installed potential of 18 GW. Having

committed to providing a combined capacity of almost 300 MW through two tidal projects, due for completion in the next two years, the government is already on its way to achieving its target to reach 3.1 GW of installed tidal energy capacity by 2025⁴³.

Figure 11. Indonesia's energy targets



Investment opportunities (2018-19)

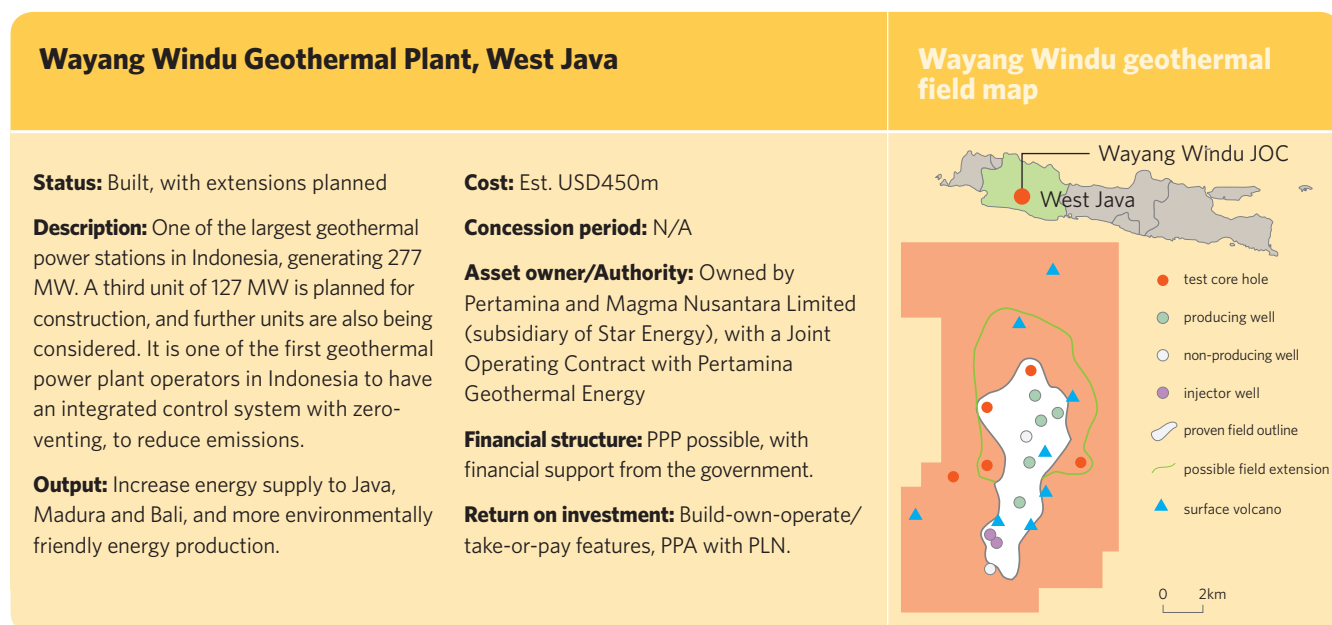
Renewable energy investment opportunities in Indonesia, available in 2018-2019, include geothermal, hydropower, solar, wind, tidal and bio-energy facilities that are planned for development and would benefit from project finance. Those that are under construction or have already been built could benefit from refinancing on favourable terms following Indonesia's recent ratings upgrade. These projects are listed in Table 4, accompanied by two detailed reference case studies.

Table 4. Renewable energy assets and projects for investment in 2018-2019

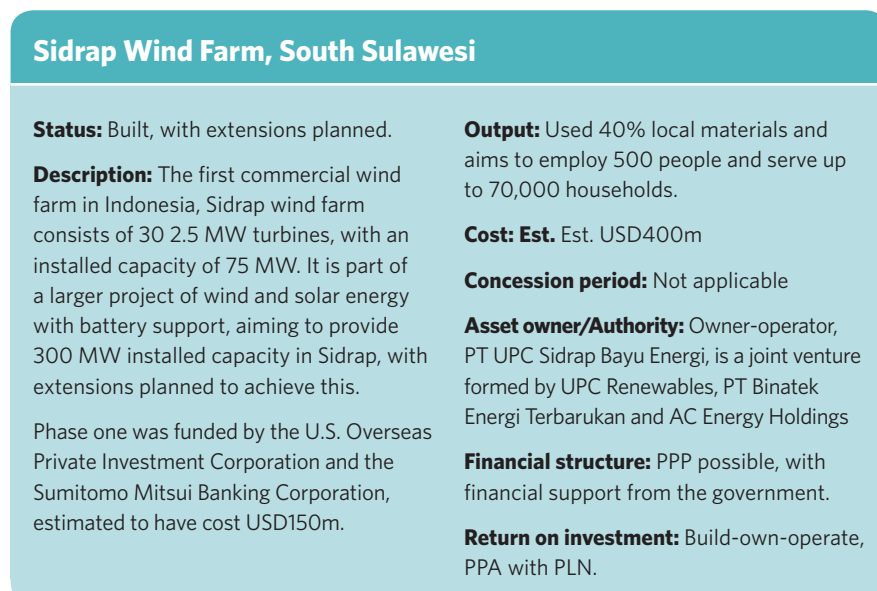
Subsector	Project	Status	Description
Geothermal 	Kamojang Geothermal Plant, Phases VI and VII, West Java	Planned	Five units generating power with an installed capacity of 235 MW and plans for expansion with units 6 and 7. <i>Asset owner/Authority: PT. Indonesia Power and Pertamina Geothermal Energy</i>
	Geothermal Power Station, Expansion, South Sumatra	Planned	To be in operation by 2021 with an installed capacity of 86 MW. This is an extension of current geothermal activities in the area. <i>Asset owner/Authority: SERD and PLN</i>
	Gunung Salak Geothermal Plant, Expansion, West Java	Planned	Six units operating with a capacity of 377 MW, with expansions planned. <i>Asset owner/Authority: Star Energy and PLN</i>
	Star Energy Geothermal Darajat II, Expansion, West Java	Planned	Three units generating 275 MW, with expansion planned. <i>Asset owner/Authority: Star Energy and PLN</i>
	Wayang Windu Geothermal Plant, Phase II, West Java	Planned	One of the largest geothermal power stations in Indonesia, generating 277 MW. A third unit of 127 MW is planned for construction, and further units are also being considered. <i>Asset owner/Authority: Pertamina and Magma Nusantara Limited (subsidiary of Star Energy)</i>
	Sarulla Geothermal power plant, North Sumatra province	Built	One of the largest geothermal power plants in the world, with a capacity of 330 MW. Funded by a loan of USD492m from the Japan Bank for International Cooperation and other foreign investors. <i>Asset owner/Authority: Itochu Corp., Kyushu Electric Power Co., PT Medco Power Indonesia and INPEX Corp.</i>
Hydropower 	Poso Energy Hydroelectric Power Plant, Central Sulawesi	Planned	To build three hydroelectric power plants with a total capacity of 615 MW by 2022. The Poso Energy Hydroelectric Power Plant consists of three projects: Poso-1 Hydroelectric Power Plant with a potential capacity of 60 MW, Poso-2 hydropower with a potential capacity of 180 MW, and PLTA Poso-3 with a capacity of 300 MW. Until now, a 3x65 MW hydro power plant called PLTA Poso 2 has been in operation. The estimated cost is USD831m. <i>Asset owner/Authority: PLN and PLTA Poso-2 and PT Poso Energy</i>
	Matenggeng Pumped-Storage Hydro Power Plant, Central Java	Planned	To be in operation by 2024, with an installed capacity of 900 MW. The project will include the construction of a dam, a powerhouse, a substation, water catchment area, the installation of turbines, generators, and the laying of power transmission lines. The estimated price is USD600m. <i>Asset owner/Authority: PT PLN Persero</i>
	Upper Cisokan Pumped Storage Power Plant, West Java	Under construction	A pumped Storage Hydro-Electrical Power Plant with an installed capacity of 1,040 MW. The cost is USD800m, currently funded by both the World Bank (USD640m) and PLN (USD160m). <i>Asset owner/Authority: PLN</i>
	Agam hydro power plant, West Sumatra	Built	A 10 MW mini hydro power plant, small enough to potentially qualify under the Indonesian sovereign green bond and green sukuk framework. <i>Asset owner/Authority: PLN</i>

Subsector	Project	Status	Description
Solar power 	Kupang Solar farm, Nusa Tenggara	Built	The largest existing solar farm in Indonesia, with an on-grid facility producing 5 MW. The cost was USD11.2m. <i>Asset owner/Authority: PT. LEN Industri and PLN</i>
	Floating solar farm, West Java	Planned	The 200 MW floating solar power station will be the world's largest floating solar farm, covering an area of 225 hectares of the Cirata Reservoir in West Java, which already features a 1 GW hydroelectric power station. <i>Asset owner/Authority: PT Pembangunan Jawa-Bali</i>
	Distributed solar power project, East Nusa Tenggara	Planned	Ten small scale solar power facilities with a total generation capacity of up to 10 MW at peak. The cost is estimated at USD15m. <i>Asset owner/Authority: French energy group ENGIE and PT Arya Watala Capital</i>
Wind power 	Sidrap I wind farm, Phase II, South Sulawesi	Planned	The first commercial wind farm in Indonesia, with an installed capacity of 75 MW. Sidrap I is the first phase of a larger project with further wind and solar energy generation facilities, with battery support, planned for Sidrap. It that used 40% local materials during construction and will employ 500 people and serve up to 70,000 households. Phase one was funded by U.S. and Japanese investors. <i>Asset owner/Authority: Ayala Corporation</i>
	Tolo 1 Wind Farm, South Sulawesi	Under construction	21 wind turbines producing 72 MW and due for completion in 2018. <i>Asset owner/Authority: Equis</i>
	Solo Wind farm, Central Java	Planned	Wind farms with expected capacity of 75 MW. <i>Asset owner/Authority: Ministry of Energy and Mineral Resources and PLN</i>
Bioenergy 	Palm Oil Mill Effluent (POME) Power Generator Program, Kalimantan and Sumatra	Planned	Program for development of 15 POME-to-electricity biogas power plants, with GmbH 480,000 tCO ₂ -eq per year. This will reduce POME and increase distributed access. The cost is estimated at USD40.5m. <i>Asset owner/Authority: PLN, Indonesia Climate Change Trust Fund and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)</i>
	Biogas plant, South Kalimantan	Under construction	POME-to-electricity biogas power plant with a capacity of 16 MW. <i>Asset owner/Authority: PLN</i>
	Biogas power plant, North Sumatra	Under construction	POME-to-electricity biogas power plant, also using waste materials like empty fruit bunches to generate 4 MW. <i>Asset owner/Authority: PT Herfinta Farm and Plantation, traded under the name PT Power Energi Nusantara Indonesia</i>
Tidal power 	Palmerah Tidal Bridge, Phases 1 and 2, East Nusa Tenggara	Planned	A bridge and integrated power plant with 18 to 23 MW capacity. Plans include constructing the 800-meter long (floating) Palmerah Bridge at Lantaka Strait and a tidal energy power plant completed by the end of 2019 and is scheduled to be world's largest tidal power plant. Phase II - is a powerhouse extension of 90 MW to 115 MW could be realized in 2020. Phase 1- contract value was up to USD200m <i>Asset owner/Authority: Tidal Bridge BV</i>
	Lombok Fund tidal power, Phases 2 and 3, East Nusa Tenggara	Planned	A150 MW tidal-stream array. Phase 1 will be the construction of 12 MW, expected to be completed by the first quarter of 2020. This will be followed progressively by site expansions to 70 MW (Phase II), through 150 MW (Phase III). Overall, it involves the installation of eight 1.5 MW tidal energy turbines. The project sites in Indonesia will be located in the straits around islands of Bali and Lombok. The first phase is funded by private equity investors. <i>Asset owner/Authority: Atlantis Resources Ltd and DCNS Energies</i>

Reference case studies



Source: BAPPENAS, 2017



Future investment opportunities

Beyond 2019, investment opportunities should focus on solar power, wind power, bioenergy and geothermal power generation.

Table 5 contains examples of projects that would promote these investment priorities.

Future investment priorities

- Solar energy
- Wind power
- Bioenergy
- Geothermal

Table 5. Future renewable energy investment opportunities

Subsector	Project	Description
Solar 	Small, distributed solar facilities	As a topographically diverse archipelago, one of Indonesia's greatest challenges is electrifying isolated communities. In response, the government has begun developing several small-scale solar facilities that supply communities not connected to the grid. This approach should be expanded, and projects could be aggregated to attract commercial finance.
Wind 	Large scale wind farms	The Ministry of Energy and Mineral Resources is planning to develop the potential of wind power in 16 locations in Indonesia. The government partnered with UNDP as well as wind energy experts in Denmark to map the wind potential for Indonesia and plan the scale and technology. The development of large-scale wind power facilities in these areas will occur within the next five to ten years.
Bioenergy 	POME-to-electricity	Indonesia is the largest palm oil producer in the world. There are more than 680 palm oil mills in Kalimantan and Sumatera alone that would benefit from having their own POME to electricity biogas power facilities installed. The production of palm oil generates abundant waste water, which can be converted into biogas through a gasification process. To ensure that this source of energy remains sustainable, the POME must come from existing palm oil mills that are Certified Sustainable Palm Oil (CSPO).

Water and waste management

Overview

Two of the greatest challenges for the Indonesian Government and municipal authorities are the provision of clean drinking water and the safe collection of waste. A challenge for water supply is the uneven distribution of water resources, due to a lack of infrastructure provision in both remote communities and in rapidly expanding urban areas (Java has almost 60% of the population with less than 10% of the water supply).

In response, the government has made plans to build 65 new reservoirs with a capacity of 8.2bn m³ by 2019 (with a total capacity of 12.56bn m³), to raise water availability per capita from 52.55 m³ to 76.4 m³ ⁴⁴. The government also has a policy detailing how water resources should be managed to provide adequate and modern infrastructures, which will require significant upgrades in the future.

With regard to waste, currently 69% of the 64 million tonnes of solid waste produced by Indonesians per year is sent to open dumpsites, which has a negative effect on the health of the environment and local communities⁴⁵. The government's response to the waste challenge focuses on sustainable methods of waste disposal.


In their NDC, the government committed to developing a comprehensive strategy to improve policy and institutional capacity for waste management at the local level; enhancing the management capacity of urban waste water; reducing landfill waste by promoting the "Reduce, Reuse, Recycle" approach; and turning waste and garbage into energy production⁴⁶. The latter has become central to the national government's waste management strategy, with seven waste-to-energy plants planned for development in the next few years. As



long as these facilities undertake adequate sorting and removal of plastics and metals, they will make a significant contribution to the achievement of national waste reduction and low-emission energy targets.

Investment opportunities (2018-19)


Sustainable water and waste investment opportunities in Indonesia, available in 2018-2019, include water supply and water treatment facilities as well as waste recycling and waste-to-energy facilities that are either planned (and would benefit from project finance) or are under construction (and would benefit from refinancing). These projects are listed in Table 6, accompanied by two detailed reference case studies.

Table 6. Sustainable water and waste assets and projects for investment in 2018-2019

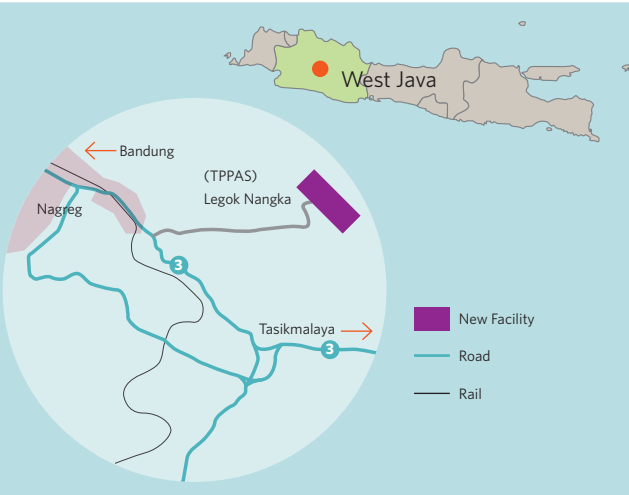
Subsector	Name and Location	Status	Description
Water supply 	Umbulan Water Supply, East Java	Under construction	A water supply system due for completion in 2019, with 93kms of drinking water pipelines network across five cities and regencies in East Java. The cost is estimated at USD150m. <i>Asset owner/Authority: PT SMI</i>
	Pekanbaru Water Supply, Riau	Planned	Infrastructure for water intake and transmission, a water treatment plant of 500lps, distribution pipelines 133.61km, 4 service reservoirs. It will increase in the level of service from 8% in 2014 to 27% in 2019 – serving 40,000 households. The cost is estimated at USD35.5m, with a concession period of 25 years with the opportunity for a PPP, government support and guarantee, via a Build-Operate-Transfer arrangement. <i>Asset owner/Authority: PDAM Kota Pekanbaru</i>
	Pondok Gede Water Supply, West Java	Planned	Infrastructure for water intake, transmission and a treatment plant of 300lps, with two service reservoirs, 98km of pipelines and 31,700 connections. Coverage target is to provide service for 29,660 domestic and 2,040 non-domestic customers, resulting in increased and sustainable access to safe drinking water. The cost is estimated at USD25m with a concession period of 25 years, via PPP, government support and guarantee and full concession. <i>Asset owner/Authority: PDAM Tirta Patriot</i>
	Bandar Lampung Water Supply, Lampung	Planned	The distribution and service component of a larger water supply project, with the level of services expected to increase from 20% in 2015 to 46% in 2024. It should cost USD81.48m, with a concession period of 25 years, via PPP, government support and guarantee and with Build-Operate-Transfer arrangement. <i>Asset owner/Authority: PDAM Way Rilau, Bandar Lampung City</i>

Subsector	Name and Location	Status	Description
Water treatment 	Sindang Heula Water Treatment Plant, Banten	Planned	<p>A water treatment plant, including processing and distribution systems and a service reservoir, which will improve quality of service of drinking water in Banten Province. The cost is estimated at USD17m, with a concession period of 15-20 years, via PPP, government support and guarantee and full concession.</p> <p><i>Asset owner/Authority: Governor of Banten and Water Resources and Settlement Agency, Banten Province</i></p>
Waste 	Plastic pouch Recycling facilities, Jakarta	Planned	<p>A series of facilities with a new technology called CreaSolv process for recycling sachets or plastic pouches used to hold shampoos and other products. It will allow plastic to be recovered to create new sachets for Unilever products, creating a circular economy approach. The first project has been built, with several others planned.</p> <p><i>Asset owner/Authority: Unilever</i></p>
	Final Waste Disposal Site (TPPAS), West Java	Planned	<p>Waste disposal facility with a waste plan of 2,180 tonnes per day maximum input, and the output is electricity production of 342,000 kWh per day and 90 tonnes per day of compost, using full gasification.</p> <p><i>Asset owner/Authority: Government of West Java Province and Department of Housing and Settlement, West Java Province</i></p>

Reference case studies

Bandar Lampung Water Supply, Lampung	Bandar Lampung water supply map
<p>Status: Planned</p> <p>Description: The distribution and service component of a larger water supply project, with the level of services expected to increase from 20% in 2015 to 46% in 2024.</p> <p>Output: Sustainable access to safe drinking water.</p> <p>Cost: USD81.48m</p> <p>Concession period: Est. 25 years</p> <p>Asset owner/Authority: PDAM Way Rilau, Bandar Lampung City</p> <p>Financial structure: PPP, government support and guarantee</p> <p>Return on investment: Build-Operate-Transfer (BOT) scheme</p>	 <p>The map shows the location of Bandar Lampung on the island of Sumatra. It highlights the Teluk Lampung area, which is divided into greenfield (dotted green line), brownfield area to be developed (dotted orange line), and brownfield area (solid orange line).</p>

Source: BAPPENAS, 2017

Final Waste Disposal Site (TPPAS), West Java	Final Waste Disposal Site map
<p>Status: Planned</p> <p>Description: Waste disposal facility with 2,180t per day maximum input, and the output is electricity production of 342,000 kWh per day and 90 tonnes per day of compost, using full gasification.</p> <p>Output: Reduce total waste in West Java</p> <p>Cost: Est. USD43.73m</p> <p>Concession period: Est. 20 years</p> <p>Asset owner/Authority: Government of West Java Province</p> <p>Financial structure: PPP, government support and guarantee</p> <p>Return on investment: BOT scheme, Power Purchase Agreement (PPA) with PLN</p>	 <p>The map shows the location of the Final Waste Disposal Site (TPPAS) in West Java, near Legok Nangka. It highlights the new facility (purple rectangle) and the surrounding area, including the road and rail network. The map also shows the location of Bandung, Nagreg, and Tasikmalaya.</p>

Source: BAPPENAS, 2017



Future investment opportunities

Beyond 2019, investment opportunities should focus on water infrastructure upgrades that promote resilience and the development of low-emission wastewater treatment, recycling and low-emission waste-to-energy facilities. Table 7 contains examples of projects that would promote these investment priorities.

Future investment priorities

- Resilient water infrastructure
- Low-emission wastewater treatment facilities
- Recycling facilities
- Low-emission waste-to-energy facilities

Table 7. Future sustainable water and waste investment opportunities

Subsector	Project	Description
Water 	Distribution network upgrades	In Indonesia, flooding can overwhelm urban infrastructure and the water supply is prone to leaks. In response, the government recently invited private operators to reduce their amount of unaccounted water, which will result in upgrades to water infrastructure to optimise the network, increase water supply, and build resilience. These types of works could be covered by a green debt security.
Waste 	Rainwater harvesting project	With plentiful rain during the monsoons, Indonesia is an ideal place to practice rainwater harvesting. This technology would be particularly helpful as it could allow for more isolated rural communities to have a stable and clean water supply. The widespread installation of rainwater tanks and water capture infrastructure, in combination with the roll-out of other sustainable built water infrastructure would present a good opportunity to increase water supply, which could potentially be financed by green debt securities.
	Solid waste infrastructure	The World Bank will work with ten cities that have sufficient capacity and commitment in solid waste management to develop solid waste management infrastructure not currently in place, including collection, transfer, treatment, disposal, and waste recycling/composting as well as advanced treatment technologies, such as anaerobic digesters and refuse-derived fuel production. These will require investment and partnership. The aim of their program is to develop benchmark solid waste management cities.
	Low-emissions waste-to-energy technology	With landfill space fast disappearing, Indonesia needs to find a method for disposing of waste (unable to be reused or recycled) that is healthy and does not have a significant impact on the environment. Waste-to-energy technology is an ideal solution. However, it is only considered low-emissions technology when the waste used has been sorted and does not include plastics or metals. There have been seven waste-to-energy plants planned for development in the next few years (in Jakarta, Tangerang, Bandung, Surabaya, Surakarta, Makassar and Semarang, each of which should be planned to have a low-emissions output.

Built environment

Overview

In 2012, the first Indonesian green buildings regulation was released, requiring the construction of environmentally friendly buildings across the country. This policy was largely unenforced and did not result in many green buildings. The Jakarta administrative office responded to this challenge by signed the *30:30 Commitment* policy, which aims to reduce energy and water consumption and carbon emissions up to 30% by 2030. It also established the *Jakarta Green Building Implementation Grand Design* to ensure more efficient compliance.

In addition to government policy, efforts to green the urban landscape have been led by the Green Building Council Indonesia, a non-government organization, that administers an Indonesian-based green buildings rating system called *Greenship*. It is also responsible for EDGE certification services in Indonesia. There are already ten EDGE certified facilities, with more under consideration. EDGE certified buildings are suited to green bond issuance.

Looking forward, under the '30:30 Commitment', around 260 building managers in Jakarta, with a total land area of almost 15 million square metres, have confirmed their willingness to comply with green building regulations and undertake development to do so. The Indonesian Government is also committed to using the latest technologies and techniques for upgrading its buildings as well as to 'greening' tourism facilities. With rapid population growth and record urbanisation rates, these commitments enable Indonesia to meet the increasing demand for housing and commercial space in a more environmentally sustainable manner.

Investment opportunities (2018-19)

Green building and green built environment investment opportunities in Indonesia, available in 2018-2019, include the development or refinancing of EDGE and Greenship certified buildings⁴⁷ as well as the development of low-carbon street lighting. These projects are listed in Table 8, accompanied by two detailed reference case studies.




EDGE Certification for green buildings

Created by the International Finance Corporation (IFC), EDGE is a green building certification program for nearly 140 countries. The EDGE standard defines green buildings as having a minimum of 20% less energy use, 20% less water use, and 20% less energy contained in materials.


Greening Tourism

Existing Indonesian policies consider green tourism as the development and operation of tourism buildings and facilities with low-emissions and minimal environmental impacts. Already in Indonesia, there are many eco-resorts with sustainable design, built with natural and locally sourced materials, have onsite renewable electricity generation, and green water supply and waste processing.

Table 8. Green buildings and green built environment assets and projects for investment in 2018-2019

Subsector	Name and Location	Status	Description
EDGE buildings 	Daan Mogot Towers 3-7 – “Rusunawa”, Jakarta	Under construction	Simple, low-cost apartment buildings, with green energy, water and materials solutions, earning a preliminary EDGE Certificate. <i>Asset owner/Authority: Provincial Government of DKI Jakarta</i>
	Ecoloft, Jababeka, West Java	Built	Resource-efficient and environmentally friendly serviced apartments with final EDGE certification. There are 82% energy savings primarily due to the installation of rooftop solar technology. <i>Asset owner/Authority: Jl. Taman Golf Utama I No 5 Jababeka</i>
Greenship buildings 	Ciputra World 1, Jakarta	Under construction	An environmentally-friendly office building awarded Greenship Gold rating. <i>Asset owner/Authority: Ciputra Group</i>
	BCA Tower PT Grand Indonesia, Jakarta	Built	An office building with energy consumption savings by 35%, which received a Greenship Platinum certification. <i>Asset owner/Authority: PT. Djarum</i>
Built environment 	Bandung Street Lighting, West Java	Planned	At least 9600 new street lights, pillars and installation cables to be built, with the installation of LED light bulbs. This is part of an efficient and effective street lighting system called Caana. This will reduce costs of operation and maintenance. <i>Asset owner/Authority: Mayor of Bandung and Regional Roads Offices</i>

Reference case studies

Daan Mogot Towers 3-7 - "Rusunawa"	Daan Mogot Towers 3-7 architectural rendering
<p>Status: Under construction</p> <p>Description: 1,887 green, affordable rental flats in simple, low-cost apartment buildings, with green energy, water and materials solutions, earning a preliminary EDGE Certificate. Specifically, low-flow plumbing fixtures and dual-flush toilets; reduced window-to-wall ratio and natural ventilation design; energy-saving lighting systems; and autoclaved aerated concrete blocks.</p> <p>Output: Reduce significant cost of operation and maintenance, for owner and occupiers.</p> <p>Cost: N/A</p> <p>Concession period: N/A</p> <p>Asset owner/Authority: Provincial Government of DKI Jakarta</p> <p>Financial structure: N/A</p> <p>Return on investment: Lease from occupants.</p>	 <p>Source: Edge Buildings, 2018</p>

Bandung Street Lighting, West Java
<p>Status: Planned</p> <p>Description: Build at least 9600 new street lights, pillars and installation cables, with the installation of LED light bulbs. This is part of an efficient and effective street lighting system called Caana.</p> <p>Output: Reduce significant cost of operation and maintenance.</p> <p>Cost: Est. USD157m</p> <p>Concession period: Est. 49 years</p> <p>Asset owner/Authority: Mayor of Bandung, Regional Roads Offices</p> <p>Financial structure: PPP, government support and guarantee</p> <p>Return on investment: Availability Payment (AP) scheme</p>



Future investment opportunities

Beyond 2019, investment opportunities should focus on developing net zero carbon buildings, undertaking deep retrofitting of existing buildings, using low emissions technologies in, and making improvements to, the built environment to minimise emissions. Table 9 contains examples of projects that would promote these investment priorities.

Future investment priorities

- Net zero carbon buildings
- Deep retrofitting of existing buildings
- Low emissions technologies in the built environment
- Improvements to the built environment to minimise emissions

Table 9. Future green building and green built environment investment opportunities


Subsector	Project	Description
Buildings 	Solar PV development in Tourism	Mandalika in Lombok island is a tourism Special Economic Zone (SEZ) operated by Indonesia Tourism Development Corporation (ITDC). Global Green Growth Institute (GGGI) and PT Sarana Multi Infrastruktur (PT SMI) support the ITDC's vision to provide clean power for their tenants and want to ensure availability of power supply to the area. GGGI and PT SMI jointly conducted feasibility study to support the development of solar PV project in this zone, starting at 10 MW. The project has potential to scale up within the zone and across other tourism SEZs. Considering the significant size of the Indonesian tourism sector and the governments bold plans for expansion (creating ten new Balis), a program like this would be an effective means of generating environmental benefits and energy savings. Adding the cache of "green" to these facilities could also result in higher revenues and return on investment.
	Retrofitting government buildings	The Indonesian Government has already built several new government buildings compliant with <i>GreenShip</i> certification standards. The next step is for the government to retrofit all existing government buildings using the <i>GreenShip</i> Existing Buildings Guideline, which would allow them to ultimately reduce operation costs as well as set a precedent for private developers.
Built environment 	Green neighbourhoods	The <i>GreenShip Neighbourhood Guide</i> was developed to improve public spaces, concerning accessibility, green space, public water management, green building materials and energy efficiency. The Green Building Council Indonesia are providing training to local authorities on how to green their cities, which will see the implementation of these standards in new and existing public spaces across Indonesia.

Green assets and projects pipeline (2018-2019)

To enable a comprehensive view of the green infrastructure investment opportunities

available in Indonesia, each of the transport, energy, water, waste and built environment assets and projects for investment in 2018-2019 (excluding projects already built) have been collated in a single pipeline and map.

Table 10. Pipeline of green assets and projects for investment in 2018-2019

Sector	Subsector	Project name	Location	Cost (USD)	Status
Transport 	Rail	Medan urban railway	North Sumatra	477.4m	Planned
		Batam Island Railway	Riau Islands Province	635m	Planned
		Jakarta MRT, Phase II	Jakarta	-	Planned
		Jakarta LRT, Phase II	Jakarta	-	Planned
		Airport rail link, the Railink, Phase II	Jakarta	-	Planned
		Commuterline, Extension	Jakarta	-	Planned
		Jakarta-Bandung High-Speed Rail	West/ Central Java Province	6bn	Under construction
		High-speed rail connecting Jakarta and Surabaya	West/ Central/ East Java Province	-	Planned
	BRT	TransJakarta, BRT, Extensions	Jakarta	-	Planned
		Transport Oriented Developments, Extensions	Jakarta	-	Planned
Energy 	Geothermal	Kamojang geothermal plant, Phases VI and VII	West Java Province	-	Planned
		Geothermal Power Station, Expansion	South Sumatra Province	-	Planned
		Gunung Salak Geothermal Plant, Expansion	West Java Province	-	Planned
		Star Energy Geothermal Darajat II, Expansion	West Java Province	-	Planned
		Wayang Windu Geothermal Plant, Phase II	West Java Province	-	Planned
	Hydropower	Poso Hydropower	Central Sulawesi Province	831m	Planned
		Matenggeng Pumped-Storage Hydro Power Plant	Central Java Province	600m	Planned
		Upper Cisokan Pumped Storage Power Plant	West Java Province	800m	Under construction
	Solar power	Floating solar farm	West Java Province	-	Planned
		Distributed solar power project	East Nusa Tenggara	15m	Planned
	Wind power	Sidrap I wind farm, Phase II	South Sulawesi Province	400m	Planned
		Tolo 1 Wind Farm	South Sulawesi Province	-	Under construction
		Solo Wind farm	East Java Province	-	Planned
	Bioenergy	Biogas plant	South Kalimantan Province	-	Under construction
		Biogas power plant	North Sumatra Province	-	Under construction
		Palm Oil Mill Effluent (POME) Power Generator Program	Kalimantan/ Sumatra Provinces	40.5m	Planned
	Tidal power	Palmerah Tidal Bridge, Phase I and II	East Nusa Tenggara	300m	Planned
		Lombok Fund tidal power, Phases 2 and 3	West Nusa Tenggara	-	Planned



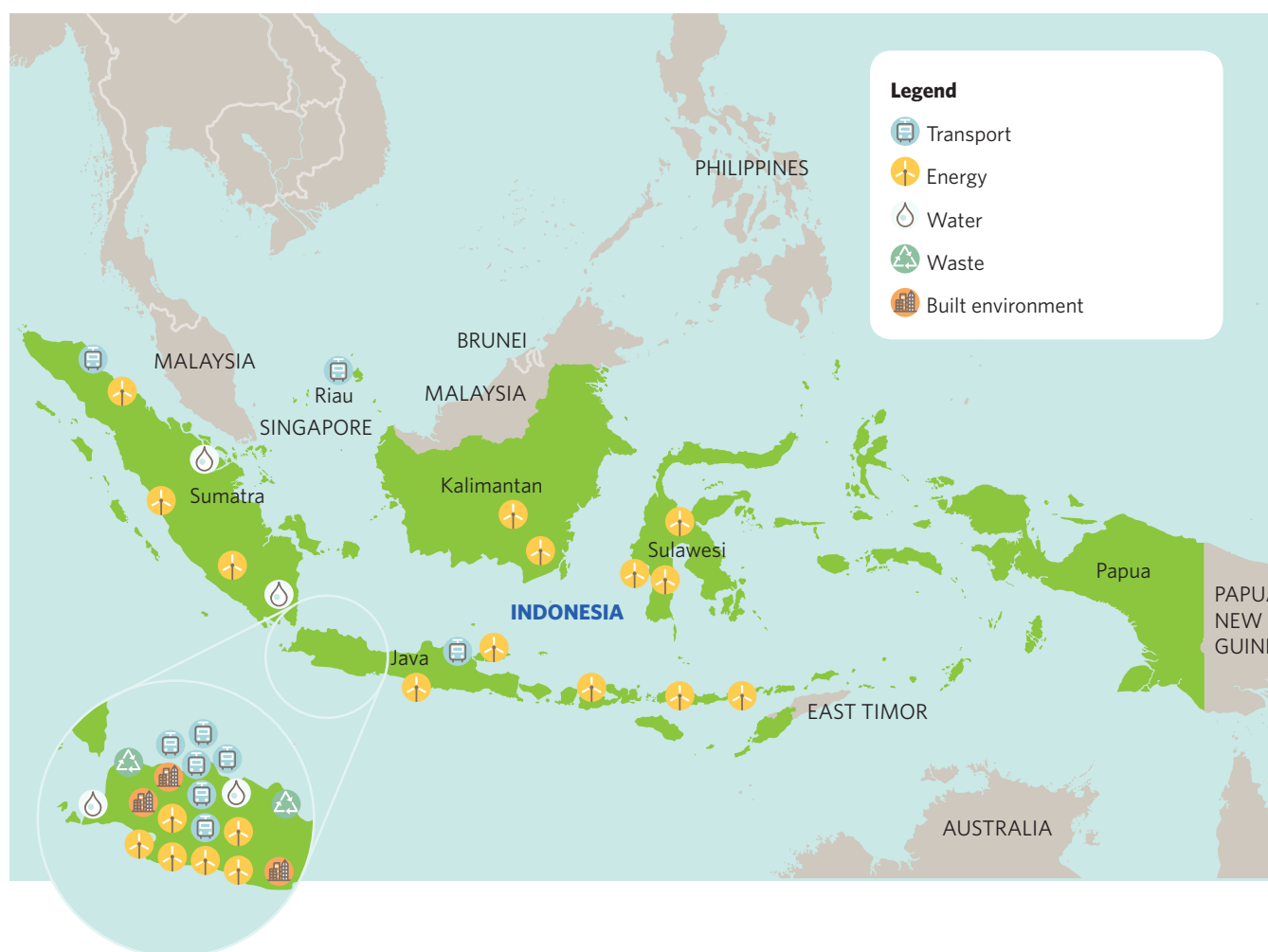
Sector	Subsector	Project name	Location	Cost (USD)	Status
Water 	Water supply	Umbulan Water Supply	East Java Province	150m	Under construction
		Pekanbaru Water Supply	Riau Province	35.5m	Planned
		Pondok Gede Water Supply	West Java Province	25m	Planned
		Bandar Lampung Water Supply	Lampung Province	81.48m	Planned
	Water treatment	Sindang Heula Water Treatment Plant	Banten Province	17m	Planned
Waste 	Waste	Plastic pouch recycling facility	Jakarta	-	Planned
		Final Waste Disposal Site (TPPAS)	West Java Province	43.73m	Planned
Built environment 	EDGE building	Daan Mogot Towers 3-7 – “Rusunawa”	Jakarta	-	Under construction
	Greenship building	Ciputra World 1	Jakarta	-	Under construction
	Built environment	Bandung Street Lighting	West Java Province	157m	Planned

Figure 12. 2018-2019 Green pipeline projects are spread across the country



Green investment opportunities are growing

Indonesia is making progress on transitioning to a low-carbon, sustainable and inclusive society.

With strong political support, a facilitative policy framework, and improving macroeconomic conditions, the opportunities for green infrastructure investments are increasing.

In summary:

- **The government aims to develop billions of dollars of new public-works projects over five years.**

This will include a significant scaling up of green infrastructure.

Infrastructure investment at scale is crucial for Indonesia to successfully maintain economic growth and deal with domestic challenges, such as rapid urbanization and climate change.

Ensuring this infrastructure expansion is low-carbon and climate resilient allows them to pursue sustainable economic growth while meeting their climate targets.

- **There is an increasing demand for investment opportunities that address environmental issues and support sustainable development.**

The rapid growth of the global green bond market is evidence of this strong demand, reaching USD160.8bn issuance in 2017 from USD87bn in 2016.

Demand is especially strong from OECD countries and from Chinese investors responding to President

Xi Jinping's exhortations to "green" their BRI investments. Both the China Development Bank and the world's largest bank, ICBC, issued "green belt and road bonds" in 2017, both certified under the Climate Bonds Standard.

In early 2018 a USD1.25bn green sovereign sukuk was successfully issued by the Government of Indonesia to finance low-carbon and climate-resilient projects across ministries.

- **An analysis of a selection of Indonesia's green infrastructure pipeline reveals a wide variety of green investment opportunities.**

These range from a USD15m distributed solar generation plant to the USD6bn Jakarta-Bandung High-Speed Rail, from investments in bonds issued by transport SOEs to equity as IPPs or a stake in a PPP.

Planning green infrastructure that is in line with international definitions for "green" can help meet global institutional investor demand for green assets; accessing private sector capital is essential for Indonesia to finance their infrastructure plans.

Key green sectors for current and future opportunities include:

- **Transport** - increased rail and BRT development as well as electric vehicle generation and sustainable waterborne transport in the future;
- **Energy** - while the current focus is on expanding hydro and geothermal power

generation, solar and wind energy remain largely untapped and therefore hold future potential;

- **Water and waste** - the provision of clean drinking water is the current priority; resilient water infrastructure, low-emission wastewater treatment facilities, recycling facilities and low-emission waste-to-energy facilities are expected to be the next phase of green projects in this sector;
- **Built environment** - although the enforcement of green buildings regulation has been difficult, commitments by the government and in the private sector in Jakarta seem promising for the development of net zero carbon buildings, deep retrofitting of public buildings, and deployment of rooftop solar and energy efficient street lighting; and,
- **Other** - emerging projects regarding forestry and agriculture, ICT and industry as well as adaptation technologies and measures will take focus in the future.

Improving project visibility

Researching green investment opportunities in Indonesia takes time.

Improving visibility for such projects will make it easier to attract investors interested in looking for green.

An opportunity exists to develop an online database of green infrastructure projects, listed by sector and tagged as planned, under preparation or ready to offer.

Climate Bonds INITIATIVE

The Climate Bonds Initiative is an international investor-focused not-for-profit working to mobilize the USD100tn bond market for climate change solutions.

It promotes investment in projects and assets needed for a rapid transition to a low-carbon and climate resilient economy.

The mission focus is to help drive down the cost of capital for large scale climate and infrastructure projects and to support governments seeking increased capital markets investment to meet climate goals.

The Climate Bonds Initiative carries out market analysis, policy research, market development; advises governments and regulators; and administers a global green bond standards and certification scheme.

Climate Bond Partners range from investors representing USD14tn of AUM and the world's leading investment banks to governments like Switzerland and France and government agencies like PINA in Indonesia.

The Climate Bonds Initiative is also the lead partner in the Green Infrastructure Investment Coalition.



Annexes

Annex 1 - Credit-enhancement mechanisms

Mechanism	Description
Partial Credit Guarantee (PCG)	A PCG is created to absorb part or all the debt service default risk of an infrastructure project, irrespective of the cause of default. PCGs can be used for any commercial debt instrument (loans, bonds) from a private lender. The existence or proposed implementation of a PCG is indicative of confidence in the product being floated by the government and can even assist in bringing new lenders to the table.
Partial Risk Guarantee (PRG)	PRGs cover private lenders and investors for certain risks of lending to sovereign or sub-sovereign borrowers. A PRG needs to include private participation in the project. A PRG can cover a number of sovereign or sub-sovereign risks such as currency inconvertibility, political force majeure such as war, regulatory risk and government payment obligations (such as tariffs). PRGs are used quite often and favourably in green energy/energy efficiency projects.
First-loss provisions	First-loss provisions refer to any device designed to protect investors from the loss of capital that is exposed first if there is a financial loss of security. These could be debt, equity or derivatives instruments such as cash facilities or guarantees. They could also take the form of insurance that insures debt security providers who are liable to pay compensation to the investors, irrespective of the cause of the loss.
Contingent loans	Contingent loans are often used in project finance to backstop the main debt by providing a payment option for specific case scenarios. For instance, if the government fails to obtain quality cash flows, the contingent loan is triggered, and investors are paid.
Viability gap funding (VGF)	VGF is used specifically and heavily in infrastructure to cover for the heavy upfront funding that is required to kick start projects. An analysis of the viability of a proposed project points out the weak areas that prevent large-scale funding from being obtained. A VGF scheme can be implemented through capital grants, subordinated loans or even interest subsidies to target specific issues that are affecting the viability of the project.
A/B loans or grants	A/B loans or grants are where a Multilateral Development Bank (MDB) offers the “A” portion of the loan while attracting other lenders to join in a second (or “B”) tranche. The MDB will be the lender-of-record, lead lender and administrative agent in the transaction. This reduces part of the risks of the operations, by also being covered by the “umbrella” of the MDBs that include a preferred creditor status and de jure immunity from taxation.

Information source: IISD, 2015

Annex 2 - Key funds and facilities that support infrastructure investment in Indonesia

Fund/Facility	Description
Indonesia Infrastructure Guarantee Fund (IIGF)	A guarantee fund financed by authorized capital of approximately USD1bn from the Government of Indonesia's budget, with financial assistance provided by the World Bank. ⁴⁸
Credit Guarantee Investment Facility	A multilateral credit guarantee facility established by ASEAN+3 and the ADB to provide credit guarantees for local currency denominated bonds issued by investment grade companies in ASEAN+3 countries and supported by the Asian Bond Markets Initiative (ABMI) of the ASEAN+3 cooperation. ⁴⁹
ASEAN Infrastructure Fund	A multilateral fund established by ADB and ASEAN members to help mobilise regional savings, including foreign exchange reserves, to fund infrastructure projects – with co-financing by ADB funds. ADB also acts as a co-financier and the lender of record for AIF loans. ⁵⁰
Leading Asia's Private Sector Infrastructure Fund	An infrastructure co-financing fund, established by ADB, that supports PPPs, joint ventures, private finance initiative projects, and privatizations, as well as conventional project finance by providing financing to companies, projects, and financial intermediaries (e.g., holding companies and local currency vehicles) linked to Infrastructure. ⁵¹
GuarantCo	GuarantCo encourages infrastructure development in low income countries through the provision of credit guarantees that enable infrastructure projects to raise debt finance. GuarantCo is part of the Private Infrastructure Development Group and sponsored by five G12 governments. ⁵²
TCX currency hedging	The Currency Exchange Fund ('TCX') was founded in 2007 by a group of development finance institutions and donors to offer solutions to manage currency risk in developing and frontier markets. ⁵³

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Notes

1. OBG, 2017
2. OJK 2015
3. Initial estimates indicated the 2017 annual issuance was USD155bn; however, this was revised to USD160.8bn (CBI, 2018).
4. "Indonesia becomes first Asian sovereign green bond issuer", Environmental Finance, 23 February 2018
5. World Bank, 2017
6. PwC, 2017(a)
7. OBG, 2017
8. GOI, 2017
9. Transparency International, 2018
10. Malino II Accord - reaffirms the unitary state of Indonesia and the rights and responsibilities of the inhabitants of Moluccas Province in Sulawesi (UN Peacemaker, 2002).
11. Indonesia Investments, 2018
12. GOI, 2015
13. GOI, 2014
14. GOI, 2013
15. GOI, 2016
16. ADB, 2016
17. PwC, 2017(b)
18. OECD, 2018
19. BAPPENAS, 2017
20. The SDGs consist of 17 global goals for ending poverty, protecting the planet, and ensuring peace and prosperity for all people. They were set by the United Nations, and came into effect in January 2016, four months after the 193 countries of the UN General Assembly adopted the 2030 Development Agenda, which outlined the goals and their 169 associated targets (UNDP, 2018).
21. OJK, 2015
22. For definitions relating to green debt securities, see the Climate Bonds Initiative website, at: <https://www.climatebonds.net/>
23. Sukuk are Sharia compliant quasi-debt securities.
24. Climate Bonds Initiative, 2017
25. Institutional Asset Manager, 2018
26. HSBC, 2017
27. Government of the People's Republic of China, 2017. Guidance on Promoting Green Belt and Road. Available online, at: <https://www.yidaiyilu.gov.cn/wcm.files/upload/CMSydylgw/201705/20170516104041.pdf>
28. The Green Loan Principles were recently released, which are voluntary guidelines for loans that finance or re-finance new and/or existing eligible Green Projects - providing a benchmark for the wholesale green loan market (LMA & APLMA, 2018).
29. ICMA, 2018
30. GOI, 2018
31. OECD, 2014
32. UNEP, 2017
33. UNEP, 2017
34. Global Business Guide Indonesia, 2017
35. Sustainability bonds usually finance or re-finance a combination of green and social projects, but can be used solely for "green".
36. Star Energy, 2018
37. "Star Energy Geothermal Wayang Windu menerbitkan green bond US\$ 580 juta", Business Insight, Kontan.co.id, 18 April 2018
38. Silviana, 2017
39. "Second Opinion" on The Republic of Indonesia's Green Bond and Green Sukuk Framework, CICERO, 23 January 2018. The SPO is available online, at: <https://bit.ly/2HGahQC>
40. OBG, 2017
41. GOI, 2014
42. GOI, 2018
43. IRENA, 2017
44. ADB, 2016(b)
45. Messenger, 2017
46. GOI, 2016
47. The government might consider increasing the green credentials of buildings funded under its *Green Bond and Green Sukuk Framework* as CICERO assessed the proposed *GreenShip* certification as "Light Green" with the justification that the type of building certification does not ensure that energy efficiency is improved.
48. IIGF, 2018: <http://www.iigf.co.id/en/about-pt-pii/vision-mission>
49. Credit Guarantee Investment Facility, 2018: <http://www.cgif-abmi.org/#about-us>
50. ADB, 2018. ASEAN Infrastructure Fund (AIF): <https://www.adb.org/site/funds/funds/asean-infrastructure-fund>
51. ADB, 2018. Leading Asia's Private Sector Infrastructure Fund (LEAP): <https://www.adb.org/site/funds/funds/leap>
52. GuarantCo, 2018: <http://www.guarantco.com/about-us>
53. TCX Fund, 2018: <https://www.txfund.com/about-the-fund/>

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ClimateWorks Foundation

ClimateWorks Foundation is a team of researchers, strategists, collaborators, and grant-makers who are committed to climate action and believe in the power of collective philanthropy. They are a non-governmental organization that works globally, collaborating with funders, regional and research partners, and other climate leaders to strengthen philanthropy's response to climate change.

The ClimateWorks team is united in their commitment to climate action, bringing combined expertise in climate science, public policy, economic and social development, and strategic philanthropy. ClimateWorks collaborates with a wide range of funders, NGOs, and climate leaders from around the world to accelerate climate action.

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PINA

PINA is a non-government investment fund that raises financing from alternative funding sources to make financial contributions to national strategic infrastructure projects that have a positive commercial value and are expected to have a positive impact on the Indonesian economy. Under the PINA scheme, infrastructure and non-infrastructure developments can be implemented without using the government budget.

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PT. EBA

A consulting firm based in Indonesia, providing advice on Green Bonds & Asset-Backed Securities for the Indonesian market. PT. EBA partner with their clients to help them achieve their transaction objectives or investment plans by providing them with insightful market information, bespoke products and world-class service. Their team comprises staff from local and international financial firms whose knowledge and passion for excellence are backed by cutting edge technology, qualitative and timely market research materials and a pedigree of integrity, innovation and excellence of ethics.

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"The priority is to accelerate green finance and climate investment between now and 2020 at a scale never seen before. Funding clean energy and green infrastructure to meet NDC goals is the objective. \$1tn in green finance by 2020 is the performance measure."

Christiana Figueres,
Former UN Climate Chief

