

# Coro Energy

## South-East Asia growth strategy

Initiation of coverage

Oil & gas

Coro Energy is an independent E&P company that offers investors exposure to the rapidly growing South-East Asia gas markets. The company intends to execute its strategy of creating a portfolio of hydrocarbon-producing hubs in a region that is observing an exodus of the major oil and gas players, creating opportunities for small- and mid-cap independent E&Ps. With the experienced and well-connected in-region ex-Salamander CEO James Menzies at the helm, Coro is well placed to build on these opportunities and acquire low-cost discovered reserves, monetise existing resources and appraise the fields for potential upside. With the generated cash flows, Coro intends to acquire new opportunities, replicate the process and achieve a self-funding portfolio of hubs with the final goal of redistributing capital to shareholders.

Year-end	Revenue (\$m)	EBITDA (\$m)	PBT* (\$m)	Cash from operations (\$m)	Net (debt)/cash (\$m)	Capex (\$m)
12/18**	0.0	(3.5)	(3.5)	(12.7)	9.4	(1.0)
12/19e	0.0	(5.5)	(8.1)	(8.2)	(12.6)	(12.7)
12/20e	0.0	(4.6)	(4.6)	(4.6)	(69.1)	(51.9)

Note: \*PBT normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments. \*\*FY18 actuals reported in euros; FY18 not yet restated in US\$ and consequently FY18/19 estimated figures include some Edison assumptions.

## Extracting value from low-risk gas discoveries

Coro has acquired c 170bcf of net 2C gas resources across two offshore fields in Indonesia, in the Bulu PSC and the Duyung PSC. Both fields are gas discoveries ready to be developed and the company is concluding the gas sales agreements (GSA) necessary to take final investment decision (FID). Coro intends to expand its portfolio and, in 2018, joined forces with Petronas in Malaysia for a joint technical study in Block 2A. Additional M&A deals will be required to drive shareholder value, although to do this efficiently the company has to reduce its cost of financing given the relatively high capital intensity/ project internal rates of return (IRRs). Unlocked, low-risk upside can improve these projects' IRRs.

## Two-well drilling campaign in Duyung PSC ongoing

Tambak-2 has successfully appraised the intra-Muda at a 13.5km step-out from the Mako discovery well, which should lead to a material uplift in contingent resources, representing a pure example of what Coro intends to do in the region. The appraisal element of Tambak-1 has encountered better developed sands than expected in the intra-Muda reservoir in the central area of the Mako gas field with potential to add resources to the project. Coro estimates that Tambak holds c 250bcf gross prospective resources with a 45% chance of geological success.

## Valuation: 3.79p/share including appraisal upside

Our base case RENAV of 3.79p/share assumes equity related to 4.00p/share warrants and debt where capital programmes are unfunded. Relatively high capital intensity means our valuation is highly sensitive to WACC and gas price assumptions; we provide sensitivities to these valuation inputs.

21 November 2019

**Price** **2.25p**

**Market cap** **£18m**

US\$1.23/£

Net debt (\$m) at 30 June 2019 7.4

Shares in issue 789.6m

Free float 61%

Code CORO

Primary exchange AIM

Secondary exchange N/A

### Share price performance



% 1m 3m 12m

Abs (22.4) (7.2) (9.1)

Rel (local) (23.6) (9.8) (13.9)

52-week high/low 3.28p 1.91p

### Business description

Coro Energy is an upstream oil and gas company with a focus on South-East Asia. It targets discoveries that require commercialisation and have exploration upside, with a particular focus on gas assets.

### Next events

Tambak-1 results December 2019

Block 2A PSC Q419

### Analysts

Carlos Gomes +44 (0)20 3077 5700

Elaine Reynolds +44 (0)20 3077 5713

[oilandgas@edisongroup.com](mailto:oilandgas@edisongroup.com)

[Edison profile page](#)

**Coro Energy is a research client of Edison Investment Research Limited**

## Investment summary

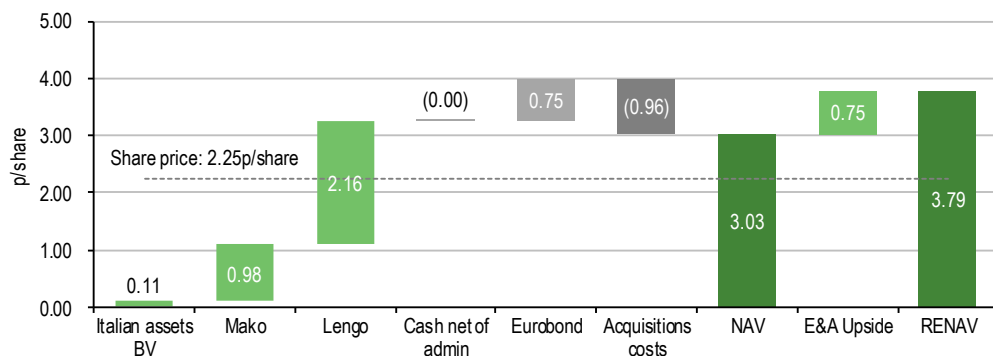
### South-East Asia gas developer

Coro Energy offers investors exposure to an active exploration and development programme in South-East Asia, focusing on Indonesia and Malaysia. It targets discovered assets that require commercialisation with exploration and appraisal upside, with a preference for gas over oil, lying close to existing infrastructure and potential buyers. A combination of attractive fiscal terms that enable cost recovery and relevant prospective resources provide an attractive risk-reward balance. The company intends to create a portfolio of hubs in a region that is observing an exodus of the major oil and gas players. Since 2018, Coro has secured c 170bcf of net 2C gas resources across two offshore fields in Indonesia, Lengo in the Bulu PSC and Mako in the Duyung PSC, and the company intends to acquire new opportunities, replicate the process and achieve a self-funding portfolio of hubs with the final goal of redistributing capital to shareholders. Coro's management is experienced, with a track record of value creation and strong regional connections. This is evidenced by the fact that, despite being a new and relatively small player, the company has been able to raise c \$18m of equity and \$19.7m debt over 2018 and 2019 and is funded through the upcoming exploration and appraisal campaign.

### Valuation: Exploration and appraisal upside

Our base case RENAV stands at 3.79p/share based on a 12.5% WACC (5.09p/share using a 10% WACC). We use a 12.5% cost of capital to reflect the through-cycle cost of funding for an E&P with assets under development and the relatively high cost of Coro's current debt. We also assume debt financing where appropriate and that asset/capital programmes are unfunded. However, we believe a certain level of equity dilution is very likely to be required to fund development capex (see sensitivities section below). Coro's current Eurobond has warrants that are potentially dilutive to the company valuation and we incorporate these in our calculation. Applying this valuation methodology to Coro's asset base and using gas prices as described in the South-East Asia gas prices section of this note, generates our base case valuation as shown below.

**Exhibit 1: RENAV waterfall post-warrants exercise risked valuation (NPV<sub>12.5</sub>)**



Source: Edison Investment Research. Note: Number of shares: 1,362.5m (current shares: 789.6m; shares to be issued relating to Bulu PSC acquisition: 99.4m; shares to be issued relating to Eurobond warrants: 473.6m).

### Financials: Additional funding required for project development

Coro is fully funded for its ongoing exploration and appraisal programme at Duyung. The company secured early debt funding, minimising upfront equity dilution for its shareholders. Nonetheless, regardless of the drilling results, to develop Mako and/or Lengo projects the company will need additional funding to comply with capital commitments contingent on the FID. We estimate Coro will

require total debt of c \$170m (peaking in 2021) to develop Mako and Lengo. The company is studying a combination of different funding sources including senior, vendor financing and a minor equity component. It is important to highlight Coro has shown its ability to access capital markets in the last two years.

## Key risks and sensitivities

We see the key risks to Coro as project milestone timing and access to capital. A key valuation uncertainty is the timing of signature of GSAs, FIDs and timing of first gas production at the Mako and Lengo projects. Even though through previous enterprises Coro's management has proved its ability to increase shareholder return, executing deals is not straightforward and delays tend to occur when closing agreements or getting regulatory approval. Moreover, Coro's partner and operator in the Lengo project, KrisEnergy, is undergoing a restructuring process, which might add to further delays. We account for this in our valuation by attributing a 5% lower chance of success for Lengo development. Concerning funding, the company will need to access capital markets to finance its share of capital for the development of its projects, which might be potentially dilutive to shareholder value. The 2019 Eurobond is potentially value dilutive due to the high number of warrants associated with an exercise price of 4.00p/share. If Coro grows in accordance with management strategy, through acquisitions and strategic partnerships with South-East Asian partners, the warrants will be in-the-money and therefore exercised. One of the key challenges Coro management will face relates to growing the company quickly and generating shareholder returns from projects with such a high cost of capital. Other sector-related risks include geological risk associated with the company's exploration programme. Previous wells targeting the Lower Gabus in Duyung failed to achieve the desired results. This geological risk is reflected in our risked valuation of these assets; however, for South-East Asia we consider these relatively low since Coro's assets are in brownfield areas.

## South-East Asia assets and exploration upside

Coro's strategy is focused on developing a business model that involves the acquisition, exploration and development of oil and gas resources (with a preference for gas) in South-East Asia. Coro is trying to build a portfolio of hubs of discovered resources that also offer exploration and appraisal upside and plans to target countries with a mature oil and gas business with existing infrastructure networks, such as Indonesia, Malaysia and Vietnam. Coro intends to monetise these molecules and appraise the fields for potential upside. Some of these projects can be acquired at low prices – small to mid-size discoveries with low level of appraisal; however, in the case of unlocking upside value by stepping out of the discovery well, these opportunities can become more attractive with relatively low investment. With the generated cash flows, Coro intends to acquire new opportunities with potential upside, replicate the process and achieve a self-funding portfolio of regional hubs with the final goal of redistributing capital to shareholders. Over the past year, the company has acquired a working interest in two licences in Indonesia and is participating in a joint study with Petronas in Malaysia.

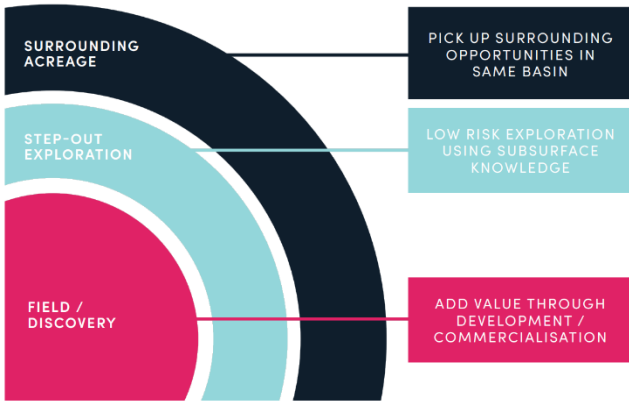
## The South-East Asia opportunity

Coro is not the first company to exploit a regional hub development strategy and Coro CEO James Menzies employed it to good effect at Salamander Energy where he grew the company to c 15kboed of production before selling it to Ophir Energy for \$850m. However, South-East Asia in particular lends itself to the regional gas hub development model for a number of reasons.

The region possesses some of the world's fastest-developing economies where demand for gas is increasing and already exceeds supply. It is also a mature hydrocarbon province, holding 57bnboe

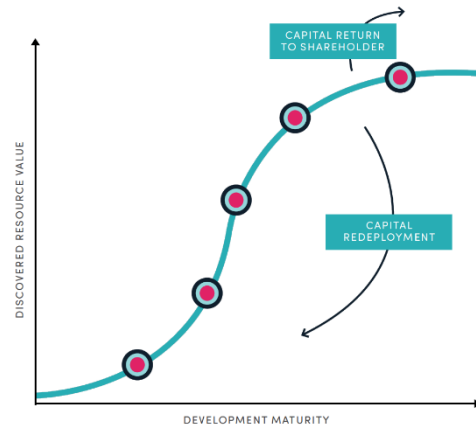
of discovered undeveloped resources and significant yet-to-find resources, at a time when the region's oil and gas industry is undergoing fundamental changes. At the same time, the region is observing an exodus of major oil and gas players, because it is no longer a priority in their portfolios, creating opportunities for small- and mid-cap independent E&Ps. To this end, Coro is focusing its resources into acquiring natural gas assets, lying close to existing infrastructure and potential buyers.

**Exhibit 2: Coro's hub strategy**



Source: Coro Energy

**Exhibit 3: Coro's capital plan**



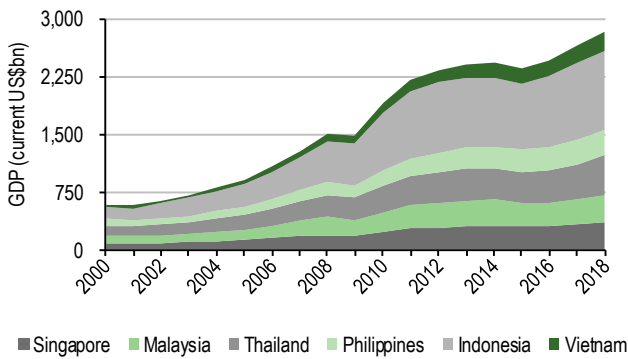
Source: Coro Energy

The region offers an array of greenfield and brownfield acquisition options at attractive prices. Importantly, many of these fields have only been partially explored, appraised or developed and Coro is looking for acquisition opportunities where resources can be increased, often pre-development, through step-out exploration, and where surrounding acreage in the same basin can potentially be acquired and developed as part of the overall hub strategy (Exhibit 2). Consistent with Salamander, the company will then seek to replicated this across multiple basins and countries, recycling operational cash flow where it can to minimise further equity dilution and ultimately where capital can be returned to shareholders (Exhibit 3).

## High growth and declining gas supply

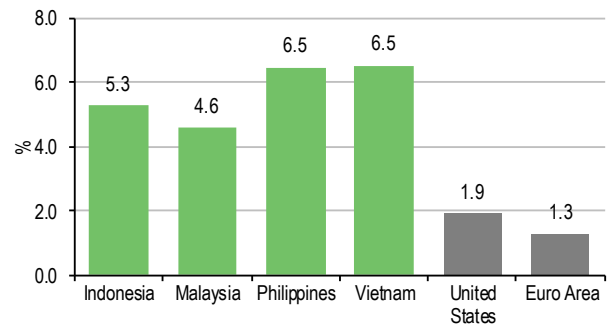
Since 2000, primary energy consumption in South-East Asia more than doubled, while its gross domestic product (GDP) grew by almost 400% over the same period as can be seen in Exhibit 4. Rising incomes, urbanisation, expanded access to energy and growing populations all contributed to strong energy demand growth. Fossil fuels dominate the primary energy mix, accounting for more than 50% of the total in 2018. Of the Association of Southeast Asian Nations (ASEAN) members, Indonesia has the highest energy demand, accounting for c 30% of the region's total, followed by Thailand with c 20%. Growth in the region is projected to slow from 6.3% in 2018 to 5.9% in 2019–2020 and to ease further to 5.8% in 2021. This is expected to be the first time in the last 20 years that South-East Asia growth will drop below 6.0%. Despite this, the region continues to lead economic growth as shown in Exhibit 5, resulting in increasing energy demand in South-East Asia.

**Exhibit 4: South-East Asia GDP evolution since 2000**



Source: World Bank, Edison Investment Research

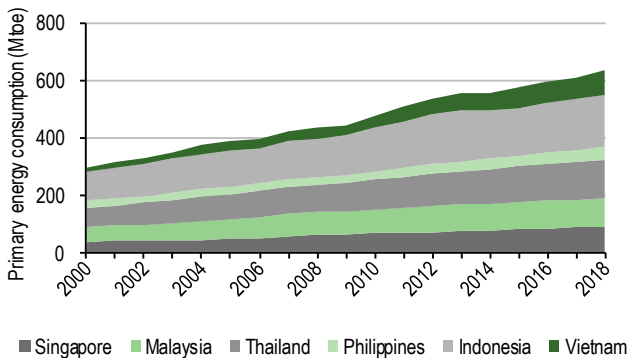
**Exhibit 5: 2019–2021 average real GDP growth rates**



Source: World Bank, Edison Investment Research

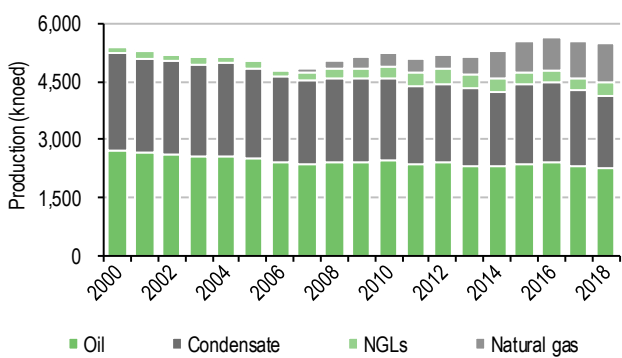
South-East Asia is a mature oil and gas province where 68% of current production is from mid-life and mature fields. Over the last 20 years production has been relatively steady at c 5mmbod (Exhibit 7); however, output is forecast to decline by 15% by 2025. Natural gas supply will decline after 2020 while demand for natural gas is forecast to grow at c 2.3% per year to 2025. The International Energy Agency (IEA) forecasts that the region as a whole will become a net importer of gas in the mid-2020s, although Indonesia will become a net importer in the mid-2030s.

**Exhibit 6: South-East Asia primary energy consumption since 2000**



Source: BP Statistical Review 2019, Edison Investment Research

**Exhibit 7: South-East Asia hydrocarbon production since 2000**

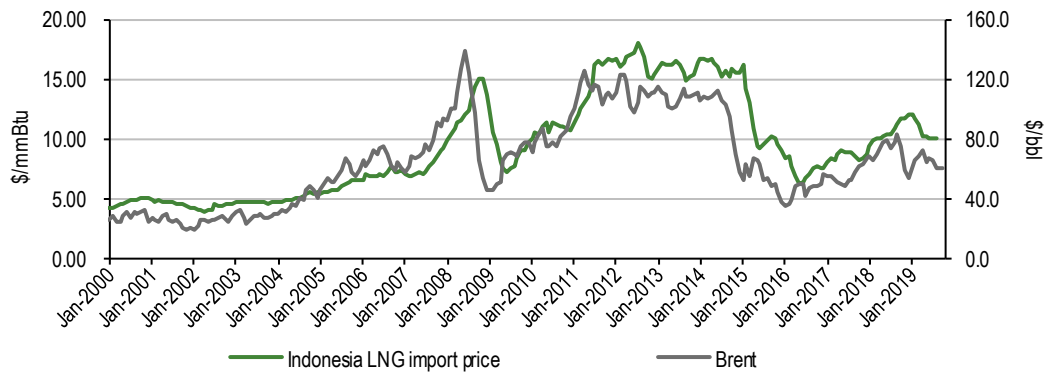


Source: BP Statistical Review 2019, Edison Investment Research

### South-East Asia natural gas prices

Unlike in the US, natural gas prices in Asia typically reflect LNG import contracts that are indexed to oil prices (Exhibit 8). The decline in oil prices in 2014 had a significant effect on Asian natural gas prices and markets. South-East Asia gas pricing has become more complex over the last few years. There are several operating fields, a network of pipelines with multiple owners and LNG export commitments. In addition, sales to private consumers of gas, such as industrial clusters, have been growing. The observed decline in natural gas production and increasing demand has allowed producers to secure higher GSAs, consistent with LNG import prices. According to Coro, the East Java average market price currently ranges between \$5.5–8.0/mmBtu and Singapore average market price ranges between \$8.0–11.0/mmBtu. The company believes it will be able to agree gas sales prices within the above-mentioned ranges for Lengo and Mako gas projects. These prices are at a significant premium to the main European benchmarks, TTF (\$5.61/mmBtu one-year average) and NBP (\$5.92/mmBtu one-year average), and the US Henry Hub (\$2.85/mmBtu one-year average).

**Exhibit 8: Indonesian LNG import price vs Brent**



Source: Bloomberg, International Monetary Fund, Edison Investment Research

### Industry shift

The region has historically been dominated by oil majors and international oil companies. However, since the oil price crash of 2014, these companies have been restructuring and focusing on key growth areas, resulting in the divestment of almost 800mmboe in South-East Asia over the last three years as they exit or dilute positions in the region. The most recent of these deals in March 2019 saw US independent, Murphy Oil end its 20-year presence in Malaysia with the sale of its assets in the region for \$2.13bn to Thai company, PTTEP. Regional national oil companies are also expected to farm down their assets to manage their portfolios technically and financially.

Against this backdrop, Coro entered Indonesia in 2018 and in less than 18 months secured c 170bcf of net 2C resources. The company holds interests in the Bulu and Duyung PSCs. In addition, Coro is participating in a joint study with Petronas in Malaysia. Management plans to build on this position with further assets across the full field cycle through acquisitions, where technical risks are low and low-cost development solutions are feasible.

## Coro's South-East Asia portfolio

### Indonesia

Coro holds interests in two PSCs offshore Indonesia: 42.5% working interest (WI) in the Bulu PSC in the East Java Basin with KrisEnergy (42.5% and operator) and Satria Group (15%), and 15% working interest in the Duyung PSC in the West Natuna Basin with West Natuna Exploration (WNEL) (85%) – WNEL shareholders are Singapore's Conrad Petroleum (90%) and Emyprean Energy (10%).

#### Bulu PSC: Entry to South-East Asia

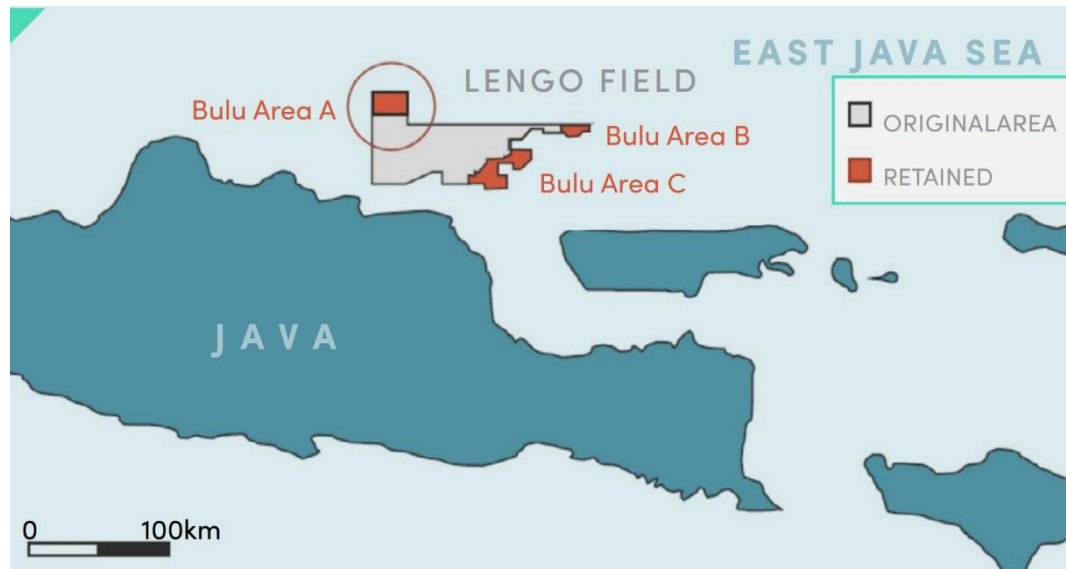
Coro entered South-East Asia in 2018 with the acquisition of a 42.5% WI in the Bulu PSC in the East Java Basin. The PSC covers an area of 697km<sup>2</sup> and holds three separate areas, A, B and C. Bulu Area A contains the Lengo gas field, independently assessed in 2014 to hold 2C resources of 359bcf by Netherlands, Sewell and Associates.

The East Java Basin covers the north-east side of Java and extends along the northern parts of the islands of Bali, Lombok and Sumbawa and into offshore waters. The basin has a complex tectonic history and is comprised of a series of north-east/south-west (NE-SW) trending troughs separated by ridges and arches. The basin contains significant accumulations of carbonates that form large petroleum reservoirs. From the Eocene to early Oligocene, a marine transgression associated with increased subsidence flooded the area and marine carbonates were deposited across the region.



Rifting ceased in the early Miocene, and most of the carbonate mounds were drowned as a result of a rise in sea level. Exploration in East Java has a long history dating from the late 19<sup>th</sup> century and the onshore and shallow offshore areas are now well established with extensive infrastructure.

**Exhibit 9: Bulu PSC location**



Source: Coro Energy

Lengo was discovered in 2008 by the Lengo-1 exploration well, drilled by the previous operator, Mubadala, and appraised in 2013 with a second well, Lengo-2, which was located more centrally on the structure. The field is in shallow waters of 60m and is a four-way dip structure defined on good quality 3D seismic acquired in 2008. The reservoir is the late Oligocene-early Miocene Kujung formation carbonate build-up, consisting of an upper, poorer quality section, and a lower high-quality section. An open-hole test across the entire Kujung I interval produced at 12.9mmscfd in Lengo-1 and 20.6mmscfd in Lengo-2. Pressures recorded from these drill stem tests and modular dynamic tester wireline samples indicate a gas-water contact (GWC) at 780m true vertical depth (TVD). The produced gas contains 34% of inert gases, of which 20% is N<sub>2</sub> and 14% is CO<sub>2</sub>.

The Lengo field development plan was approved in 2014 and consists of an unmanned wellhead platform with four production wells. First gas is expected around 24 months after FID and a plateau rate of 70mmscfd is planned. The produced gas will be exported untreated through a 65km pipeline to shore and a further 5km overland to an onshore receiving facility, where the gas will be dried through minimal gas processing facilities. Compression will be required later.

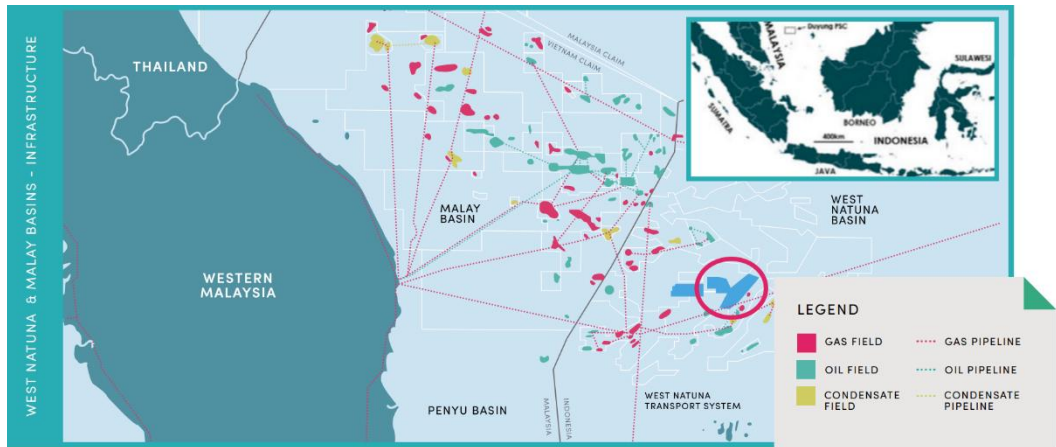
FEED study and qualification has been completed and there is a Memorandum of Understanding in place for gas sales. A GSA has still to be approved. Progress on the project has been delayed while the field operator, KrisEnergy, undergoes restructuring, having filed for a moratorium in August 2019. Coro's expectation was to conclude the GSA in Q419; however, there is a risk of potential delays given the operator's current situation. We account for this potential risk in our valuation by attributing a 5% lower chance of success for Lengo compared to Mako, which corresponds to around a one-year delay in project development. An update on KrisEnergy restructuring process should be announced by 14 November 2019, the end of the moratorium period.

**Duyung PSC: 276bcf field and drilling campaign underway**

Coro quickly built on its position in Indonesia with the acquisition of a 15% WI in the Duyung PSC in February 2019. Duyung sits in the West Natuna basin and contains the 276bcf shallow gas Mako field alongside low-risk exploration step-out potential. A two-well exploration and appraisal programme is underway with the first well, Tambak-2, having successfully appraised the southern area of the field. Mako is 440km from Singapore and is only 16km from the Kerisi platform, the

nearest tie-in point to the West Natuna Pipeline System, which delivers gas from Indonesia to Singapore.

**Exhibit 10: West Natuna and Malay basin infrastructure**



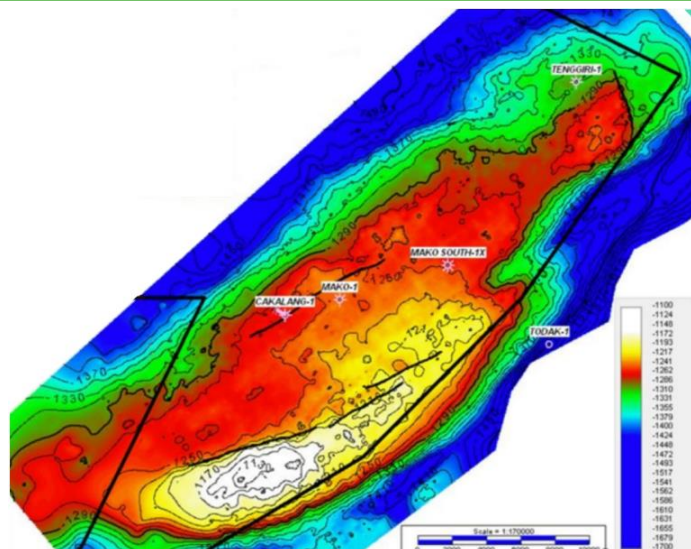
Source: Coro Energy

The West Natuna Basin is the south-eastern extension of the Malay Graben and, as in the East Java Basin, there is a complex tectonic history. The basin was formed in the Late Eocene–Early Oligocene with an extension caused by the break-up of the Sunda Platform. The extension caused the formation of a series of NE-SW grabens, which eventually coalesced into three major half grabens and the Duing PSC sits over the largest of these: the Bawal Graben. During the Early Miocene, a period of regional compression resulted in the development of NE-SW trending anticlines and uplifts that characterise the West Natuna Basin.

The primary reservoir target in the Mako field, the intra-Muda sands, were deposited in a marginal marine delta plain setting and exhibit high porosities due to the unconsolidated nature of the sands. These sands were originally considered to be a shallow gas hazard while drilling wells targeting the deeper Gabus reservoirs, so that, although four wells have penetrated the field to date, not a lot of data were historically gathered in the intra-Muda sands. The intra-Muda is sealed within the Muda Formation, which is a thick regional claystone sequence.

Exploration began in the basin in the late 1960s and in 1975 the first well on the Mako structure, Tengiri-1, intersected gas sands in the intra-Muda.

**Exhibit 11: Mako field anticline**



Source: Coro Energy



The Mako field is a large low-relief structure that forms an elongate, NE-SW trending four-way dip closed anticline. The structure is 47km long and 16km wide and has c 350km<sup>2</sup> closure above the GWC. The field sits in shallow waters of c 90m and the reservoir is also shallow, with a GWC of 391m TVD. The commercial viability of the field was demonstrated in 2017 with the drilling of Mako South-1. The well was cored, logged and tested, flowing dry gas at 10.8mmscfd with a CO<sub>2</sub> content of 3.3%. The sands have an average porosity of 25% and multi-Darcy permeability of up to 4 Darcy. Mako was independently assessed to contain 2C resources of 276bcf by Gaffney, Cline and Associates in 2018. The low pressure and unconsolidated sands will require pressure optimisation to maximise recovery and effective sand control measures. A plan of development has been approved and a set of heads of agreement for Mako gas was signed with a Singaporean buyer in 2018.

**Drilling programme: Mako step out appraisal and 250bcf exploration target**

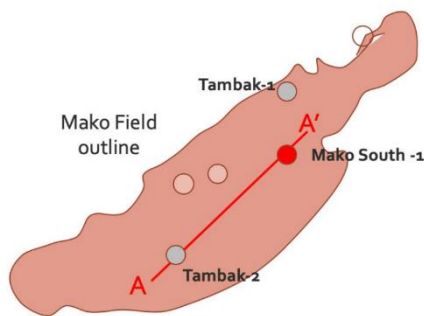
A series of prospects have been mapped both above and below the Mako field, and one of these will be tested as part of a two-well drilling campaign in 2019 that has also appraised the intra-Muda sands.

The first well, Tambak-2, was drilled in October 2019 to evaluate the reservoir properties and deliverability of the intra-Muda sandstones in the southern area of the Mako field. This was the most southerly test of the Mako field and is a step-out of over 13.5km from Mako South-1. The intra-Muda sandstone reservoir was encountered on prognosis at a depth of 381m and a gross gas interval of 10m was identified. Log data have confirmed the upper sandstone unit is of better quality than expected, with excellent porosity and permeabilities of 200mD to 3D across the best quality zone. The GWC and pressure data have been interpreted to be the same as seen in Mako-South-1, demonstrating the presence of a continuous gas-bearing reservoir in Mako across a large distance.

The company then tried to carry out a drill stem test (DST) in Tambak-2, but was unsuccessful over two separate attempts due to the reservoir being damaged as a result of well control operations. The well had kicked during attempts to isolate the gas-bearing reservoir with a bridge plug, and gas flowed to surface. Heavy barite mud was then used to control the well, which plugged and damaged the reservoir formation.

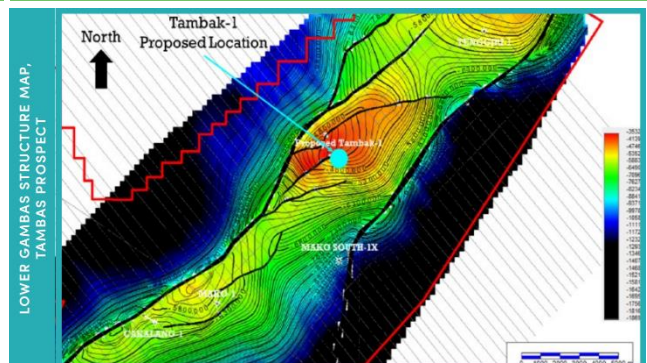
Even without a successful DST, Tambak-2 has demonstrated the presence of a good-quality gas bearing reservoir that can flow gas to surface, and which has the same GWC and pressure system as Mako South-1. Coro believes that this will be sufficient to increase the contingent resources of the field. Prior to drilling the well the company estimated that, if successful, up to c 100bcf of gross contingent resources could be moved from 3C to 2C.

**Exhibit 12: Mako schematic: Tambak-1 and Tambak-2 locations**



Source: Coro Energy

**Exhibit 13: Lower Gabus structure map, and Tambak-1 well location**



Source: Coro Energy

Following on from the drilling of Tambak-2, the Asian Endeavour-1 jack-up moved to the central area of the Mako field and spudded Tambak-1 in early November 2019. The well is designed to

appraise the intra-Muda sands, before drilling on to an expected TD of 1,370m to evaluate the Lower Gabus reservoir in the Tambak prospect. A key objective of the appraisal element of the well was to locate the edge of the gas accumulation by finding the GWC in the intra-Muda to confirm the upper limit of resources in the reservoir. At the time of writing, the well has been drilled through the intra-Muda to an intermediate depth of 513m and the sands have been evaluated with logs, a pressure survey, and fluid and gas samples. The top of the reservoir was encountered on prognosis at 389m and the intra-Muda sands were found to be better developed than expected, with a 5.2m thick upper unit showing excellent porosities and permeabilities. In addition, the lower sandstone unit was 20m thick (cf 7.3m in Mako South-1), providing upside potential.

Pressure data have confirmed that Tambak-1 sits in the same pressure system as Mako South-1 and Tambak-2, while the reservoir gas samples have confirmed the same gas composition as seen in Mako South-1, and these data support the company's large, areally extensive single tank model for the field. The GWC was also encountered in the well and found to be 1.5m deeper than inferred from Mako South-1 and Tambak-2. The well will now be drilled to test the Tambak prospect.

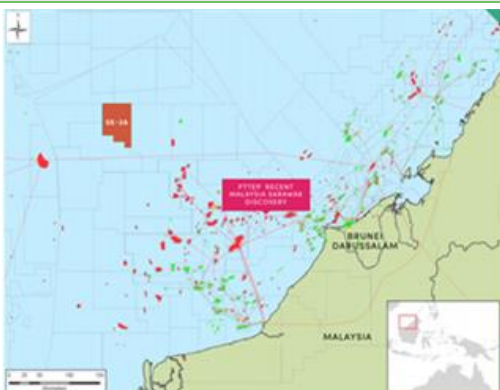
Tambak is a three-way dip closed inverted anticlinal structure, with a closure of approximately 15km<sup>2</sup>. The Lower Gabus is the classic West Natuna basin play and nearby analogue fields include Kerisi, Anoa Forel and KF. Previous wells targeting the Lower Gabus in the block failed; however, the Tambak prospect demonstrates amplitude brights that are conformable with the structure, whereas the other structures do not. Coro has assigned a 45% technical chance of success to the Lower Gabus and mid-case prospective resources of 250bcf. The company sees the presence of enough reservoir quality sands in the Lower Gabus as the key exploration risk here. The well is expected to take around 33 days to complete, including extensive testing, and will be plugged and abandoned, after which the rig will be demobilised.

The development plan envisages Mako being developed in two phases. Phase 1 will target a production rate of 90mmscf from four horizontal development wells (three subsea wells and one platform well), producing through an unmanned minimal facilities platform. The gas will then be exported via an 8km pipeline to the Kerisi platform. A second phase will be required as the reservoir depletes to maintain the gas plateau period. An additional four subsea wells are expected, together with compression facilities.

## Malaysia: First step into region with multi tcf growth potential

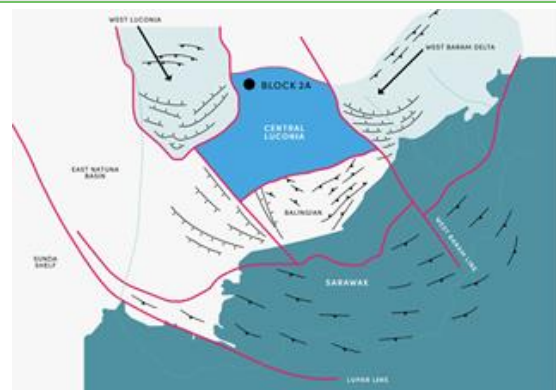
In December 2018, Coro announced it had signed a joint study agreement to conduct a joint technical study with Petronas over Block 2A in Eastern Malaysia. This first step into Malaysia gives the company the opportunity to showcase its technical skills and build a relationship with the national oil company. Coro believes Block 2A sits in a core area of potential and success could provide a platform to expand further in a region that it sees as holding significant growth potential.

**Exhibit 14: Block 2A location**



Source: Coro Energy

**Exhibit 15: Geological provinces of the Sarawak basin**



Source: Coro Energy

Malaysia has a well-established oil and gas industry with well-developed infrastructure and access to markets. Historically, acreage in Malaysia has been dominated by Petronas, ExxonMobil and Shell and the region has been perceived as difficult for smaller companies to enter. Although some have had success more recently, there has been a lack of small-cap independent operators. However, the majors are now re-focusing on North America and exiting the region or re-structuring, which could provide space for smaller independents.

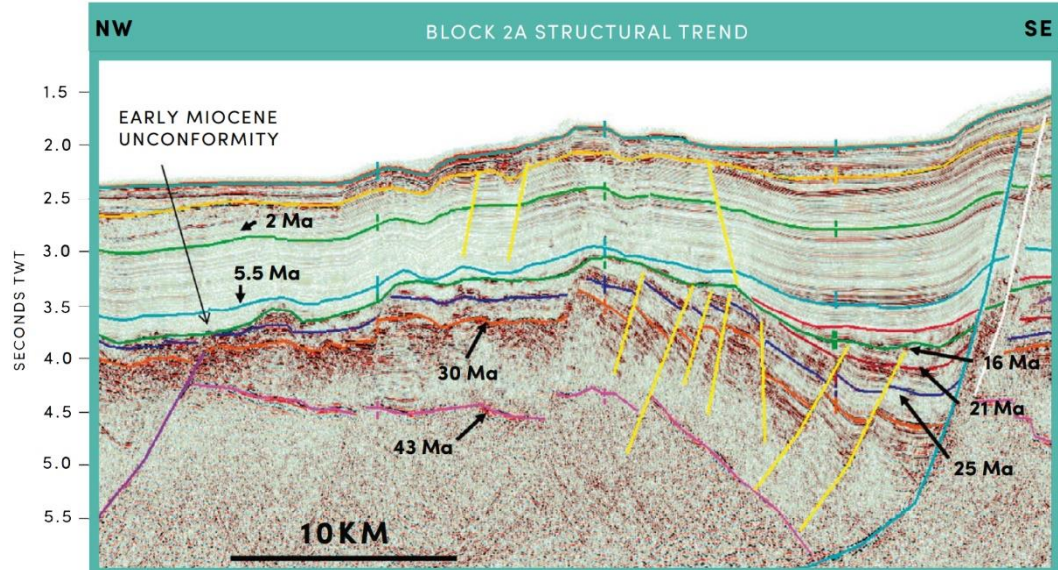
The region is prolific and in 2018 Wood Mackenzie estimated that over 1.75bnbbbls and 20tcf of reserves remain in place across the basins. Discovered resources are held in over 170 fields in open acreage, representing an opportunity for independents.

By partnering with Petronas, Coro has the opportunity to show its technical capabilities and develop its relationship with the main operator in the region. In line with company strategy, this may enable Coro future access to discovered undeveloped resources in South-East Asia that are not core to Petronas. The company's management has the expertise and connection that could unlock an additional stream of revenues and natural gas in a market that is entering into a period of supply deficit.

## Block 2A

Block 2A sits in the north of Central Luconia province, one of eight geological regions in the Sarawak basin. The undrilled block is 100–250km offshore in water depths of over 250m. The main play to the south of the block is Miocene-age reefal carbonates. Sapura E&P had a string of exploration successes in this play to the south east of Block 2A in Block SK408 and first gas from this development is expected in Q419. In addition, the Talang gas discovery is 70km to the east.

**Exhibit 16: Block 2A structural trend**



Source: Coro Energy

During the 12-month study period, Coro will have access to an extensive dataset including 2,900km<sup>2</sup> of high-quality 3D data acquired by previous operator BHP in 2016 and data from a number of offset wells (located off block). The company is still forming a regional view of the prospectivity, which it will review with Petronas, but it sees potential for both carbonate and clastic plays.

## Italian assets up for sale

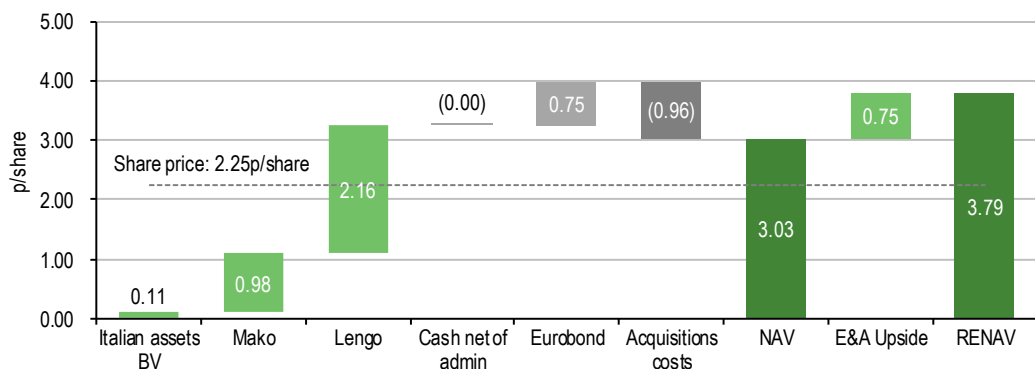
Coro has a portfolio of development and production assets in Italy, operating six production concessions, four exploration permits and six exploration permit applications. However, the company strategy is to focus on growth in South-East Asia and, following the acquisition of Bulu and Duyung PSC, the board of directors decided to prioritise divestment of its entire Italian business to direct all resources towards South-East Asia. As a result, the Italian assets and liabilities (net value in end June 2019 balance sheet of \$1.8m) have been classified as a disposal group held for sale.

## Valuation

We value Coro's asset base using a conventional risked net asset value (NAV) approach, using a risked valuation for proven undeveloped reserves, contingent and prospective resources. Key assumptions in our valuation include estimates of production profiles, asset development costs, operational costs and abandonment costs in addition to realised commodity prices, costs of capital and warrants that can be dilutive to the valuation. We use publicly available sources for key assumptions, including company guidance, analysis of analogous field developments and government data.

We use a 12.5% cost of capital to reflect the through-cycle cost of funding for an E&P with assets under development and the high cost of Coro's debt. For Coro's RENAV we include the book value for its Italian assets as per the end June 2019 balance sheet, risked value for Mako and Lengo development projects and additional risked exploration upside. We also incorporate the year-end FY18 net cash position, SG&A for the next three years, the capital committed for Bulu and Duyung acquisitions and the net value of the Eurobond cash flows. Exhibit 17 below shows a breakdown of our base case valuation by asset class. Key components include risked development value in Coro's Indonesian asset base.

**Exhibit 17: Base case valuation waterfall**



Source: Edison Investment Research. Note: Number of shares: 1,362.5m (current shares: 789.6m; shares to be issued relating to Bulu PSC acquisition: 99.4m; shares to be issued relating to Eurobond warrants: 473.6m).

Based on our analysis and our underlying commodity price and WACC assumptions, the market appears to be fully valuing Coro's production assets and risked development or prospective resource, assuming a 12.5% WACC. However, we note that Coro's valuation is highly sensitive to WACC and the assumed chance of success, as can be observed in Exhibit 18. We risk Mako at 70% chance of success (CoS) and Lengo at 65% CoS, given that both projects still need to close their respective GSAs and achieve FID. Lengo's CoS is lower due to KrisEnergy's financial situation, which might cause delays until the restructuring process is concluded, which is expected imminently. However, we do not see KrisEnergy as a major deterrent for project development. The



5% lower CoS for Lengo corresponds to a valuation impact similar to a one-year delay in first gas for Lengo development.

**Exhibit 18: Sensitivity to WACC and CoS\***

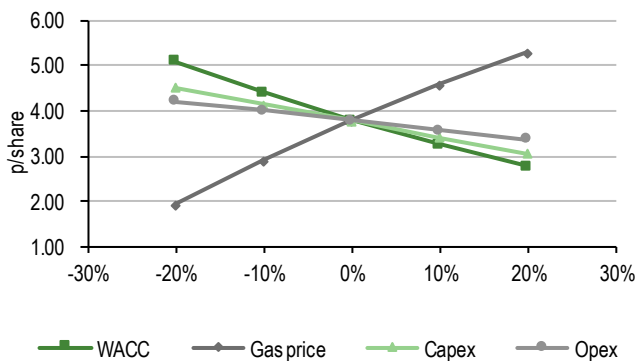
WACC/CoS	65%	70%	75%	80%	85%	90%	95%	100%
10.0%	4.70	5.09	5.48	5.88	6.27	6.67	7.06	7.45
12.5%	3.50	<b>3.79</b>	4.08	4.37	4.66	4.95	5.25	5.54
15.0%	2.56	2.77	2.99	3.20	3.41	3.62	3.83	4.05

Source: Edison Investment Research. Note: Number of shares: 1,362.5m (current shares: 789.6m; shares to be issued relating to Bulu PSC acquisition: 99.4m; shares to be issued relating to Eurobond warrants: 473.6m). \*We assume Lengo CoS is 5% lower than Mako due to KrisEnergy current financial situation, which might reflect in delays in project execution (base case: 3.79p/share – Mako: 70% CoS, Lengo 65% CoS).

In Exhibits 19 and 20 we provide sensitivities to various factors that influence our valuation. In Exhibit 19 we can see that WACC and realised gas prices are the most relevant components of the valuation. Coro projects generate c 25–30% IRRs. Although the execution risk is low, there is a requirement for relatively high capital commitment upfront to generate the planned gas sales and the related cash flows. Gas revenues are directly linked to realised gas prices, which is why the valuation is highly sensitive to gas prices. South-East Asia gas prices have typically been linked to crude benchmarks that have been relatively stable over the past 12 months. The current macroeconomic environment in South-East Asia and strong demand should allow Coro to achieve favourable terms for the GSAs, which in our view should provide a certain level of stability in terms of realised gas prices.

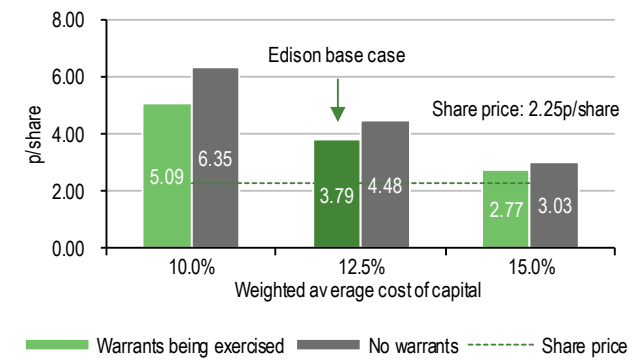
An important sensitivity lies in the potential dilution from the future exercise of the Eurobond warrants exercise. Even though the warrants' exercise price is 4.00p/share (the Eurobond matures in April 2022 and warrants can be exercised at any time over the three-year term of the bond), when we consider the net present value of all bond-related cash flows, the related increase in the number of shares has a higher impact on valuation than the net present value of the proceeds resulting from the exercise of the warrants. We show this sensitivity in Exhibit 20.

**Exhibit 19: Key valuation sensitivities**



Source: Edison Investment Research. Note: Number of shares: 1,362.5m (current shares: 789.6m; shares to be issued relating to Bulu PSC acquisition: 99.4m; shares to be issued relating to Eurobond warrants: 473.6m).

**Exhibit 20: Sensitivity to WACC and warrant exercise**



Source: Edison Investment Research. Note: Number of shares: 1,362.5m (current shares: 789.6m; shares to be issued relating to Bulu PSC acquisition: 99.4m; shares to be issued relating to Eurobond warrants: 473.6m).

A full breakdown of our asset values that make up our base case RENAV are provided below including sensitivities to WACC. As can be seen, key components include Coro's key development projects in Indonesia – Mako and Lengo – as well as exploration upside from the 2019 exploration and appraisal campaign.

**Exhibit 21: Base case NAV breakdown**

Asset	Country	Diluted WI %	CoS %	Recoverable reserves		Net risked value @ 12.5%			@10%	@15%
				Gross	Net	NPV/boe	Value	Risked	Risked	Risked
				bcf	bcf	\$/boe	\$m	p/share	p/share	p/share
Net cash - end 2018							9.4	0.56	0.56	0.56
SG&A - NPV <sub>12.5</sub> of 3yrs							(9.4)	(0.56)	(0.59)	(0.54)
Acquisitions (in 2019)							(16.2)	(0.96)	(0.99)	(0.94)
Eurobond							12.6	0.75	0.75	0.75
Italian assets book value	Italy	100.0%	100%				1.8	0.11	0.11	0.11
<b>Development</b>										
Mako (Duyung)	Indonesia	15.0%	70%	267.9	40.2	3.5	16.5	0.98	1.32	0.72
Lengo (Bulu)	Indonesia	42.5%	65%	308.6	131.1	2.5	36.2	2.16	2.92	1.56
<b>NAV</b>				<b>576.5</b>	<b>171.3</b>		<b>50.9</b>	<b>3.03</b>	<b>4.08</b>	<b>2.23</b>
Mako 3C Upside (Duyung)	Indonesia	15.0%	65%	100.0	15.0	3.5	5.7	0.34	0.46	0.25
Tambak (Duyung)	Indonesia	15.0%	32%	250.0	37.5	3.5	6.9	0.41	0.55	0.30
<b>RENAV</b>				<b>926.5</b>	<b>223.8</b>		<b>63.6</b>	<b>3.79</b>	<b>5.09</b>	<b>2.77</b>

Source: Coro Energy, Edison Investment Research. Note: Number of shares: 1,362.5m (current shares: 789.6m; shares to be issued relating to Bulu PSC acquisition: 99.4m; shares to be issued relating to Eurobond warrants: 473.6m).

As already mentioned, Coro is studying a combination of different funding sources including senior and vendor financing and a minor equity component. For the purpose of our model, in our valuation we do not incorporate any equity dilution and we assume capital expenditure for the development of Mako and Lengo is fully funded via senior debt and vendor financing. However, it is unlikely Coro will be able to fully finance its projects without any kind of further equity dilution. Exhibit 22 provides sensitivity to Coro's valuation for varying percentages of capex, which amounts to a total of c \$140m net to Coro, if it was to be funded via equity at a range of exercise prices. This shows how dilutive an equity raise can be.

**Exhibit 22: Valuation sensitivity to equity dilution for capex at different exercise prices**

p/share / % of capex raised	0%	5%	10%	15%	20%
1.00	3.79	2.99	2.56	2.28	2.09
2.00	3.79	3.50	3.30	3.15	3.03
3.00	3.79	3.71	3.65	3.60	3.56
4.00	3.79	3.83	3.86	3.88	3.91

Source: Edison Investment Research

Our base-case gas price assumptions relevant to Coro are provided in Exhibit 23 and are based on company guidance included in its Q3 2019 Investor presentation. We assume Coro realises prices within Singapore average market price ranging between \$8.0–11.0/mmBtu and East Java average market price ranging between \$5.5–8.0/mmBtu. Coro expects to export Mako gas via the West Natuna Transport System to Singapore. We assume this will equate to a realised gas price of \$8.56/mcf for 2019. Lengo natural gas will be exported to East Java and we assume a realised price of \$6.48/mcf for 2019, lower than Mako, reflecting the higher content of N<sub>2</sub> and CO<sub>2</sub> in the gas stream. In our model we escalate prices and operating costs at 2.5% pa.

**Exhibit 23: Our gas pricing assumptions for Coro's South-East Asia projects**

US\$/mcf	2019	2020	2021	2022	2023
Mako	8.56	8.77	8.99	9.21	9.44
Lengo	6.48	6.64	6.81	6.98	7.15

Source: Edison Investment Research

As previously discussed, gas price realisations are one of the key elements behind Coro's valuation. Exhibit 24 below provides a sensitivity analysis to the realised gas prices for Lengo (first column) and Mako (top row).



**Exhibit 24: Valuation sensitivity to realised gas prices**

Lengo prices / Mako prices (US\$/mcf)	6.84	7.70	8.56	9.41	10.27
5.19	1.92	2.39	2.81	3.15	3.42
5.83	2.43	2.90	3.32	3.66	3.93
6.48	2.90	3.36	3.79	4.13	4.40
7.13	3.35	3.82	4.25	4.58	4.86
7.78	3.79	4.25	4.68	5.02	5.29

Source: Edison Investment Research

## Risks and sensitivities

Coro is subject to several sector- and company-specific risks. We highlight the key risks below.

- Small-cap availability of funding: Coro has access to debt; however, this might be dilutive to the share price.
- Financing risks: as with most capital-constrained independent E&Ps, Coro is reliant on a wide range of sources of capital to progress exploration activity and to monetise discovered resource. The cost of capital will depend on source, but expensive sources of capital can lead to material asset/shareholder dilution.
- Joint venture risks: KrisEnergy, operator and Coro's partner in Lengo development project is restructuring. This may lead to delays in concluding GSA negotiations and achieving FID independent of restructuring resolution. An update on KrisEnergy restructuring process should be announced by 14 November 2019, the end of the moratorium period.
- Gas price volatility: as with all companies operating in the upstream oil and gas sector, returns are driven by underlying commodity prices. Coro is not immune to this, with the bulk of its prospects leveraged to contracted gas prices. Agreed gas pricing could be indexed to other global commodity benchmarks (eg Brent).
- Geological risk: there is always a certain level of geological risk and uncertainty relating to exploration assets and reservoir performance uncertainty at assets such as Mako and Lengo. Previous wells targeting the Lower Gabus in Duyung failed to achieve the desired results, which demonstrates the geological risk is present even in mature basins.
- Operational risks: Coro's operations are focused offshore South-East Asia. Production and development risks are typically higher in an offshore environment in comparison to onshore, but we note that offshore Indonesia and Malaysia are mature operation areas with established operational practices and regulations that help minimise health, safety and environmental risks.
- Infrastructure access: Coro's gas discoveries will be reliant on third-party infrastructure for commercialisation.

## Management

---

Coro's management team has a track record of oil and gas business development and is experienced and very well connected in South-East Asia. James Menzies was the co-founder and CEO of South-East Asia-focused Salamander Energy from 2005 to 2015, when it was acquired by Ophir Energy for \$850m. Coro non-executive directors James Parsons, Marco Fumagalli and Fiona Macaulay are members of the Sound Energy and Echo Energy boards of directors.

### **James Menzies: Chief executive officer**

James is a qualified geologist with over 30 years' industry experience, having held senior technical and commercial roles at Lasmo in the UK, Vietnam and Indonesia. James subsequently worked for boutique M&A house Lambert Energy in London before founding Salamander. James is a non-executive director of Trinity Exploration.

### **Andrew Dennan: Chief financial officer**

Andrew has many years' experience unlocking growth across AIM-listed companies as a corporate financier and investment manager. Throughout his career he has been involved in stockbroking and asset management in prominent roles, leading proprietary investment decisions, capital raising, risk oversight and portfolio management. For many years he worked closely with key members of the newly appointed board. Andrew brings a wealth of capital markets and corporate transaction experience to the team and is a non-executive director of Alpha Growth.

### **Dr Pierre Eliet: Business development**

Dr Pierre Eliet is an oil and gas executive with over 20 years' experience in the oil industry and a proven track record in organic and inorganic growth projects and business development, with extensive South-East Asian and South Asian career experience. Dr Eliet worked with Roc Oil and Lundin Petroleum in senior leadership roles based in Kuala Lumpur, Malaysia. He previously worked at TOTAL and Cairn Energy in the United Kingdom and India across a wide variety of assets including the North Sea and Atlantic margin as well as new venture projects.

### **James Parsons: Non-executive chairman**

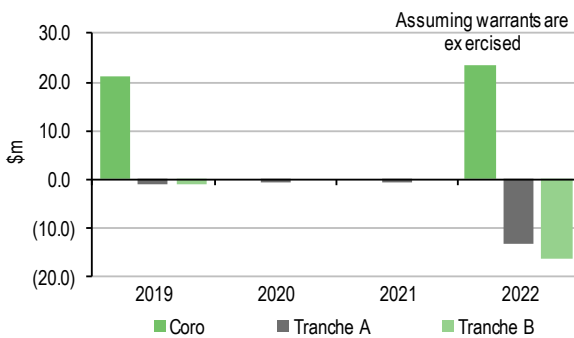
As chief executive officer at Sound Energy and non-executive chairman at Echo Energy, James has over 20 years' experience in the fields of strategy, management, finance and corporate development in the energy industry. He started his career with the Royal Dutch Shell group in 1994 and spent 12 years with Shell working in Brazil, the Dominican Republic, Scandinavia, the Netherlands and London. James is a qualified accountant and has a BA Honours in business economics.

## Financials

Coro changed its presentation currency from euros to United States dollars in its H119 interim results. The company has restated its FY18 balance sheet, but not the relevant period income statement or cash flow statement. As a result, we had to make some assumptions in our model and valuation. We will update accordingly once the year-end FY19 results are published, at which point year-end FY18 figures should be restated. We note that H119 results included the reclassification of the company's Italian assets as 'held for sale' and the adoption of IFRS 16.

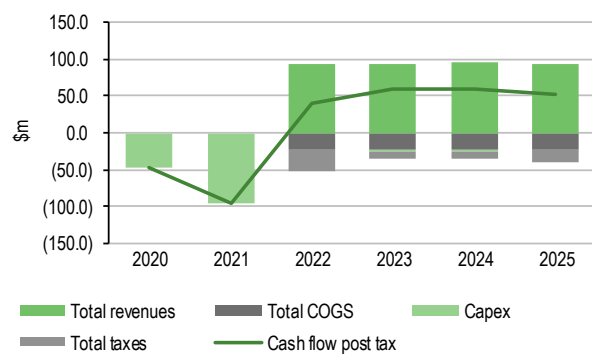
Coro is an early-stage E&P, hence current earnings and short-term P&L projections have little relevance. As it stands, the company's income statement simply reflects the ongoing cost of running the company's Italian operations and corporate functions. The positive cash flow impact of any development is unlikely to have a material impact on earnings and cash flow until 2022 at the earliest, in our view. The 2019 Eurobond is potentially value dilutive due to the high number of associated warrants.

**Exhibit 25: Eurobond cash flows**



Source: Edison Investment Research

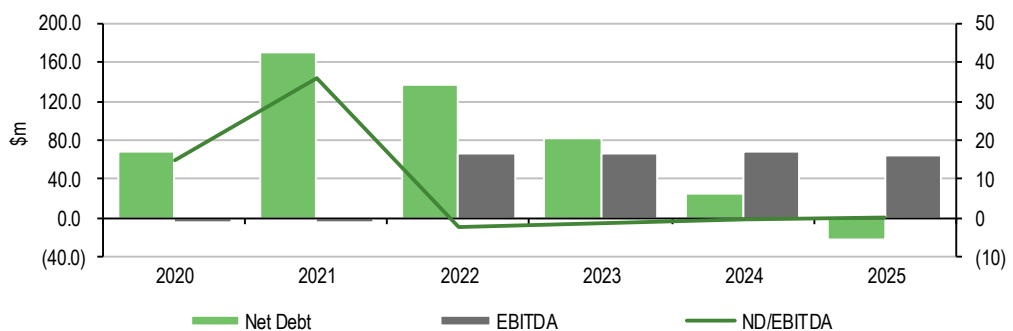
**Exhibit 26: Mako and Lengo cash flows**



Source: Edison Investment Research

At end June 2019 Coro had c \$7m cash and is fully funded for its ongoing exploration and appraisal programme in Duyung PSC. The company secured early debt funding, minimising upfront equity dilution for its shareholders. Despite this, regardless of the of the drilling programme result, to develop Mako and/or Lengo projects the company will have to resort to additional funding to comply with capital commitments contingent on the FID. In our model, we estimate that Coro will require total debt of over \$160m (peaking in 2021) to develop Mako and Lengo. The company is studying a combination of different funding sources including senior and vendor financing and a minor equity component. It is important to highlight Coro has shown its ability to access capital markets in the last two years. Net well costs prior to first gas are likely to be funded through a combination of senior debt, vendor debt and equity.

**Exhibit 27: Net debt and net debt/EBITDA**



Source: Edison Investment Research

**Exhibit 28: Financial summary**

	\$'000s	2018*	2019e	2020e	2021e	2022e
Dec		IFRS	IFRS	IFRS	IFRS	IFRS
<b>PROFIT &amp; LOSS</b>						
Revenue		0	0	0	0	93,009
Cost of Sales		0	0	0	0	(22,078)
Gross Profit		0	0	0	0	70,931
General & admin		(2,939)	(4,476)	(4,588)	(4,703)	(4,820)
Share based payments		(523)	(1,034)	0	0	0
EBITDA		(3,462)	(5,547)	(4,588)	(4,703)	66,111
Operating Profit (before amort. and except.)		(3,462)	(5,660)	(4,588)	(4,703)	30,786
Intangible Amortisation		0	0	0	0	0
Exceptionals		0	(37)	0	0	0
Other		0	0	0	0	0
Operating Profit		(3,462)	(5,697)	(4,588)	(4,703)	30,786
Net Interest (incl finance lease change)		0	(1,401)	0	0	0
Foreign exchange gains/(losses)		(81)	(990)	0	0	0
Other		0	0	0	0	0
Profit Before Tax (norm)		(3,543)	(8,087)	(4,588)	(4,703)	30,786
Profit Before Tax (FRS 3)		(3,543)	(8,087)	(4,588)	(4,703)	30,786
Reported Tax		1,706	0	0	0	(31,453)
Profit After Tax (norm)		(1,837)	(8,087)	(4,588)	(4,703)	(667)
Profit After Tax (FRS 3)		(1,837)	(8,087)	(4,588)	(4,703)	(667)
Losses on Discontinued Businesses		(9,653)	(8,925)	(8,925)	(8,925)	(8,925)
Average Number of Shares Outstanding (m)		578,377	778,750	832,020	832,020	860,487
EPS - normalised (\$)		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
EPS - normalised and fully diluted (\$)		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
EPS - (IFRS) (\$)		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Dividend per share (\$)		0.0	0.0	0.0	0.0	0.0
Gross Margin (%)		-	-	-	-	76.3
EBITDA Margin (%)		-	-	-	-	71.1
Operating Margin (before GW and except.) (%)		-	-	-	-	33.1
<b>BALANCE SHEET</b>						
Fixed Assets		17,022	14,253	66,159	161,878	128,052
Intangible Assets		7,474	13,948	13,948	13,948	13,948
Tangible Assets		6,615	6	51,912	147,631	113,805
Investments		648	0	0	0	0
Other		2,285	299	299	299	299
Current Assets		16,116	8,652	1,772	1,772	1,772
Stocks		325	0	0	0	0
Debtors		4,223	1,772	1,772	1,772	1,772
Cash		9,361	6,880	0	0	0
Other		2,207	0	0	0	0
Current Liabilities		(7,655)	(1,121)	(1,121)	(1,121)	(1,121)
Creditors		(6,131)	(397)	(397)	(397)	(397)
Tax and social security		0	0	0	0	0
Short term borrowings		0	(724)	(724)	(724)	(724)
Other		(1,524)	0	0	0	0
Long Term Liabilities		(8,289)	(18,781)	(68,395)	(168,816)	(135,658)
Long term borrowings		0	(18,768)	(68,382)	(168,803)	(135,645)
Other long term liabilities		(8,289)	(13)	(13)	(13)	(13)
Net Assets		17,194	4,819	231	(4,471)	(5,139)
		0	1,816	1,816	1,816	1,816
<b>CASH FLOW</b>						
Operating Cash Flow		(12,680)	(8,189)	(4,588)	(4,703)	34,658
Net Interest		0	0	0	0	0
Tax		0	0	0	0	0
Capex		(998)	(12,739)	(51,906)	(95,719)	(1,500)
Acquisitions/disposals		0	0	0	0	0
Financing		18,634	0	0	0	0
Dividends		0	0	0	0	0
Other		3,967	0	0	0	0
Net Cash Flow		8,923	(20,928)	(56,494)	(100,421)	33,158
Opening net debt/(cash)		438	(9,361)	12,612	69,106	169,527
FX		0	(764)	0	0	0
Other		876	(281)	0	0	0
Closing net debt/(cash)		(9,361)	12,612	69,106	169,527	136,369

Source: Coro Energy, Edison Investment Research. Note: \*FY18 historical figures were reported in euros. As they have not yet been fully restated in US\$, we have made some assumptions in the figures above.

<b>Contact details</b> 4 <sup>th</sup> Floor 40 George Street W1U 7DW London United Kingdom +44 (0) 20 3965 7917 www.coroenergyplc.com	<b>Revenue by geography</b> N/A
<b>Management team</b>	
<b>Chief executive officer: James Menzies</b> James was the co-founder and CEO of South-East Asia focused Salamander Energy from 2005 to 2015 when it was acquired by Ophir Energy for \$850m. He is a qualified geologist with over 30 years' industry experience, having held senior technical and commercial roles at Lasmo in the UK, Vietnam and Indonesia. James subsequently worked for boutique M&A house Lambert Energy in London before founding Salamander. James is a non-executive director of Trinity Exploration.	<b>Chief financial officer: Andrew Dennon</b> Andrew has many years' experience unlocking growth across AIM-listed companies as a corporate financier and investment manager. Throughout his career he has been involved in stockbroking and asset management in prominent roles, leading proprietary investment decisions, capital raising, risk oversight and portfolio management. For many years he has worked closely with key members of the newly appointed board. Andrew brings a wealth of capital markets and corporate transaction experience to the team and is a non-executive director of Alpha Growth.
<b>Business development: Dr Pierre Eliet</b> Dr Pierre Eliet is an oil and gas executive with over 20 years' experience in the oil industry with a proven track record in growth projects and business development and extensive South-East Asian and South Asian career experience. Dr Eliet worked with Roc Oil and Lundin Petroleum in senior leadership roles based in Kuala Lumpur. Dr Eliet previously worked at TOTAL and Cairn Energy in the United Kingdom and India across a wide variety of assets including the North Sea and Atlantic margin as well as new venture projects. Dr Eliet holds a BA in earth science from Trinity College in Dublin and a PhD in geology from Manchester University. Dr Eliet is a Fellow of the Geological Society, London.	<b>Non-executive chairman: James Parsons</b> As chief executive officer at Sound Energy and non-executive chairman at Echo Energy, James has over 20 years' experience in the fields of strategy, management, finance and corporate development in the energy industry. He started his career with the Royal Dutch Shell group in 1994 and spent 12 years with Shell working in Brazil, the Dominican Republic, Scandinavia, the Netherlands and London. James is a qualified accountant and has a BA honours in business economics.
<b>Principal shareholders</b>	<b>(%)</b>
Banque Lombard Odier & Cie	24.50
CIP Merchant Capital	19.08
Po Valley Energy	12.66
Conrad Petroleum	6.94
Hargreaves Lansdown Asset Management	4.89
Cazadores Investments	4.34
Bailey, Kevin	2.83
<b>Companies named in this report</b>	
Conrad Petroleum; Empyrean Energy; KrisEnergy; Ophir Energy; Petronas; PTTEP; Salamander Energy; Sapura E&P; Satria Group; West Natuna Exploration	

---

## General disclaimer and copyright

This report has been commissioned by Coro Energy and prepared and issued by Edison, in consideration of a fee payable by Coro Energy. Edison Investment Research standard fees are £49,500 pa for the production and broad dissemination of a detailed note (Outlook) following by regular (typically quarterly) update notes. Fees are paid upfront in cash without recourse. Edison may seek additional fees for the provision of roadshows and related IR services for the client but does not get remunerated for any investment banking services. We never take payment in stock, options or warrants for any of our services.

**Accuracy of content:** All information used in the publication of this report has been compiled from publicly available sources that are believed to be reliable, however we do not guarantee the accuracy or completeness of this report and have not sought for this information to be independently verified. Opinions contained in this report represent those of the research department of Edison at the time of publication. Forward-looking information or statements in this report contain information that is based on assumptions, forecasts of future results, estimates of amounts not yet determinable, and therefore involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of their subject matter to be materially different from current expectations.

**Exclusion of Liability:** To the fullest extent allowed by law, Edison shall not be liable for any direct, indirect or consequential losses, loss of profits, damages, costs or expenses incurred or suffered by you arising out of or in connection with the access to, use of or reliance on any information contained on this note.

**No personalised advice:** The information that we provide should not be construed in any manner whatsoever as, personalised advice. Also, the information provided by us should not be construed by any subscriber or prospective subscriber as Edison's solicitation to effect, or attempt to effect, any transaction in a security. The securities described in the report may not be eligible for sale in all jurisdictions or to certain categories of investors.

**Investment in securities mentioned:** Edison has a restrictive policy relating to personal dealing and conflicts of interest. Edison Group does not conduct any investment business and, accordingly, does not itself hold any positions in the securities mentioned in this report. However, the respective directors, officers, employees and contractors of Edison may have a position in any or related securities mentioned in this report, subject to Edison's policies on personal dealing and conflicts of interest.

**Copyright:** Copyright 2019 Edison Investment Research Limited (Edison). All rights reserved FTSE International Limited ("FTSE") © FTSE 2019. "FTSE®" is a trade mark of the London Stock Exchange Group companies and is used by FTSE International Limited under license. All rights in the FTSE indices and/or FTSE ratings vest in FTSE and/or its licensors. Neither FTSE nor its licensors accept any liability for any errors or omissions in the FTSE indices and/or FTSE ratings or underlying data. No further distribution of FTSE Data is permitted without FTSE's express written consent.

---

## Australia

Edison Investment Research Pty Ltd (Edison AU) is the Australian subsidiary of Edison. Edison AU is a Corporate Authorised Representative (1252501) of Crown Wealth Group Pty Ltd who holds an Australian Financial Services Licence (Number: 494274). This research is issued in Australia by Edison AU and any access to it, is intended only for "wholesale clients" within the meaning of the Corporations Act 2001 of Australia. Any advice given by Edison AU is general advice only and does not take into account your personal circumstances, needs or objectives. You should, before acting on this advice, consider the appropriateness of the advice, having regard to your objectives, financial situation and needs. If our advice relates to the acquisition, or possible acquisition, of a particular financial product you should read any relevant Product Disclosure Statement or like instrument.

---

## New Zealand

The research in this document is intended for New Zealand resident professional financial advisers or brokers (for use in their roles as financial advisers or brokers) and habitual investors who are "wholesale clients" for the purpose of the Financial Advisers Act 2008 (FAA) (as described in sections 5(c) (1)(a), (b) and (c) of the FAA). This is not a solicitation or inducement to buy, sell, subscribe, or underwrite any securities mentioned or in the topic of this document. For the purpose of the FAA, the content of this report is of a general nature, is intended as a source of general information only and is not intended to constitute a recommendation or opinion in relation to acquiring or disposing (including refraining from acquiring or disposing) of securities. The distribution of this document is not a "personalised service" and, to the extent that it contains any financial advice, is intended only as a "class service" provided by Edison within the meaning of the FAA (i.e. without taking into account the particular financial situation or goals of any person). As such, it should not be relied upon in making an investment decision.

---

## United Kingdom

This document is prepared and provided by Edison for information purposes only and should not be construed as an offer or solicitation for investment in any securities mentioned or in the topic of this document. A marketing communication under FCA Rules, this document has not been prepared in accordance with the legal requirements designed to promote the independence of investment research and is not subject to any prohibition on dealing ahead of the dissemination of investment research.

This Communication is being distributed in the United Kingdom and is directed only at (i) persons having professional experience in matters relating to investments, i.e. investment professionals within the meaning of Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended (the "FPO") (ii) high net-worth companies, unincorporated associations or other bodies within the meaning of Article 49 of the FPO and (iii) persons to whom it is otherwise lawful to distribute it. The investment or investment activity to which this document relates is available only to such persons. It is not intended that this document be distributed or passed on, directly or indirectly, to any other class of persons and in any event and under no circumstances should persons of any other description rely on or act upon the contents of this document.

This Communication is being supplied to you solely for your information and may not be reproduced by, further distributed to or published in whole or in part by, any other person.

---

## United States

Edison relies upon the "publishers' exclusion" from the definition of investment adviser under Section 202(a)(11) of the Investment Advisers Act of 1940 and corresponding state securities laws. This report is a bona fide publication of general and regular circulation offering impersonal investment-related advice, not tailored to a specific investment portfolio or the needs of current and/or prospective subscribers. As such, Edison does not offer or provide personal advice and the research provided is for informational purposes only. No mention of a particular security in this report constitutes a recommendation to buy, sell or hold that or any security, or that any particular security, portfolio of securities, transaction or investment strategy is suitable for any specific person.

Frankfurt +49 (0)69 78 8076 960  
Schumannstrasse 34b  
60325 Frankfurt  
Germany

London +44 (0)20 3077 5700  
280 High Holborn  
London, WC1V 7EE  
United Kingdom

New York +1 646 653 7026  
1,185 Avenue of the Americas  
3rd Floor, New York, NY 10036  
United States of America

Sydney +61 (0)2 8249 8342  
Level 4, Office 1205  
95 Pitt Street, Sydney  
NSW 2000, Australia