EDISON

# Quantum Genomics

Initiation of coverage

## A fresh take on cardiovascular medicine

Pharma and biotech

**Quantum Genomics is focused on the development of new classes of cardiovascular medicines. Firibastat, the company's lead clinical asset, is in development for the management of treatment-resistant hypertension (TRH) and post-myocardial infarction heart failure (post-MI HF). We value Quantum Genomics at €701.3m or €20.3 per share, with 92% of this attributable to firibastat in TRH. In the near term, readouts from two Phase III trials in TRH are the main catalyst for the company. In our view, firibastat's unique mechanism of action offers the potential for significant differentiation in the sizeable cardiovascular drug market. If results from Phase III are positive, the company could file an NDA with the FDA by end-2023. With a handful of licensing deals already in place, we see the timely signing of licensing deals in the United States and EU5 as essential to maximising the commercial success of firibastat. We estimate that, post the capital raise, end April net cash was c €20.5m, providing a runway into Q223.**

| Year end | Revenue (€m) | PBT* (€m) | EPS* (€) | DPS (€) | P/E (x) | Yield (%) |
|---|---|---|---|---|---|---|
| 12/20 | 3.98 | (14.66) | (0.72) | 0.0 | N/A | N/A |
| 12/21 | 6.16 | (15.37) | (0.58) | 0.0 | N/A | N/A |
| 12/22e | 8.29 | (20.21) | (0.62) | 0.0 | N/A | N/A |
| 12/23e | 54.27 | 29.80 | 0.86 | 0.0 | 2.9 | N/A |

Note: *PBT and EPS are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments.

## BAPAIs: A new therapeutic class

Firibastat is a first-in-class brain aminopeptidase A inhibitor (BAPAI) being developed by Quantum Genomics. The drug's mechanism of action (central inhibition of angiotensin III synthesis) could offer differentiation to traditional classes of cardiovascular drugs, in our opinion. Firibastat is currently in two Phase III trials for TRH (FRESH and REFRESH). We expect a full Phase III data set by mid-2023, which, if positive, would represent a key near-term catalyst for the company.

## Large market potential but major partners needed

The global market for cardiovascular drugs is considerable; in 2021 the market for hypertension drugs alone was estimated to be worth c US$13bn. Quantum Genomics has already secured seven licensing deals worldwide (worth up to c US$123m) but has not yet signed an agreement in the key US or EU5 regions. We view the signing of a licensing agreement in these regions as key to maximising the commercial impact of the asset.

## Valuation: €701.3m or €20.3 per share

We value Quantum Genomics at €701.3m or €20.3 per share, based on a risk-adjusted NPV for firibastat in TRH and post-MI HF, including an estimated net cash position of €20.5m at end-April 2022. We apply a discount rate of 12.5% and assume a licensing deal for the United States and EU5 will be found pre-commercialisation of firibastat in TRH (estimated launch in 2024), in line with the company's strategy.

**30 August 2022**

| | |
|---|---|
| **Price** | **€2.49** |
| **Market cap** | **€86m** |
| | €0.99/US$ |
| Estimated net cash (€m) at end-April 2022 (includes end April capital raise) | 20.46 |
| Shares in issue | 34.62m |
| Free float | 90% |
| Code | ALQGC |
| Primary exchange | Euronext Paris |
| Secondary exchange | N/A |

### Share price performance


| % | 1m | 3m | 12m |
|---|---|---|---|
| Abs | 17.8 | 33.3 | (51.8) |
| Rel (local) | 22.2 | 40.2 | (47.5) |

| | | |
|---|---|---|
| 52-week high/low | €5.94 | €1.56 |

### Business description

Quantum Genomics is focused on the research and development of novel cardiovascular medicines. Lead asset firibastat is in two Phase III trials for the treatment of TRH and is also being investigated to treat post-MI HF. Readouts from the TRH programme, expected in Q422 and mid-2023, represent the most significant near-term catalysts.

### Next events

| | |
|---|---|
| Phase III FRESH top-line data | November 2022 |
| Phase III Refresh top-line data | Mid-2023 |

### Analysts

Soo Romanoff +44 (0)20 3077 5700

Dr Harry Shrives +44 (0)20 3077 5700

healthcare@edisongroup.com

Edison profile page

***Quantum Genomics is a research client of Edison Investment Research Limited***

# Investment summary

## Company description: Developing novel cardiovascular drugs

Quantum Genomics is a Paris-based biotechnology company focused on the development of new drugs to address unmet medical needs in the field of cardiovascular medicine. The primary focus is the development of lead asset firibastat, a new class of cardiovascular medicine called a BAPAI, to treat TRH and post-MI HF. The company's most advanced program is in TRH, where firibastat is currently in two Phase III trials, FRESH and REFRESH. It is estimated that c 45% of US adults suffer from hypertension, with c 20% of those treated for the condition being classed as treatment resistant. For these patients, treatment options are limited and firibastat's unique mechanism of action, specifically targeting TRH, potentially differentiates it from existing hypertensive medicines. Due to the large TRH patient population and the distinct unmet medical need for TRH treatments, we see positive results from the FRESH (top-line results expected November 2022) and REFRESH (top-line results expected mid-2023) trials as significant near-term catalysts for the company. If positive, management has communicated it will look to file an NDA, for the use of firibastat in the treatment of TRH, with the FDA by end-2023.

## Valuation: €701.3m or €20.3 per share

We value Quantum Genomics at €701.3m or €20.3 per share. Our valuation is based on a risk-adjusted NPV for firibastat in TRH (peak sales $4.7bn, rNPV of €644.0m) and post-MI HF (peak sales $1.5m, rNPV of €36.9m) and includes our estimated net cash position of €20.5m at end-April 2022. We apply a discount rate of 12.5% and assume a licensing deal will be found for the commercialisation of firibastat in TRH (launch 2024) and post-MI HF (launch 2028), in line with the company's strategy.

## Financials: Funded to Q223, licensing deal essential

Quantum Genomics reported a cash and cash equivalent position of €13.6m at end-FY21. A share offering and capital subscription at end April 2022 raised capital of €17.6m leading to a post-deal cash position of €23.6m. At our estimated burn rate (FY22e: €19.9m) and accounting for increased operating costs in FY22 and FY23, we estimate operations are sufficiently funded into Q223. The company does not intend to commercialise firibastat itself; therefore, we assume a licensing deal for firibastat will be agreed in early-2023, following positive results from FRESH. If delayed, the company may need to raise additional funds during H123 to fund operations until a commercialisation deal for firibastat is found.

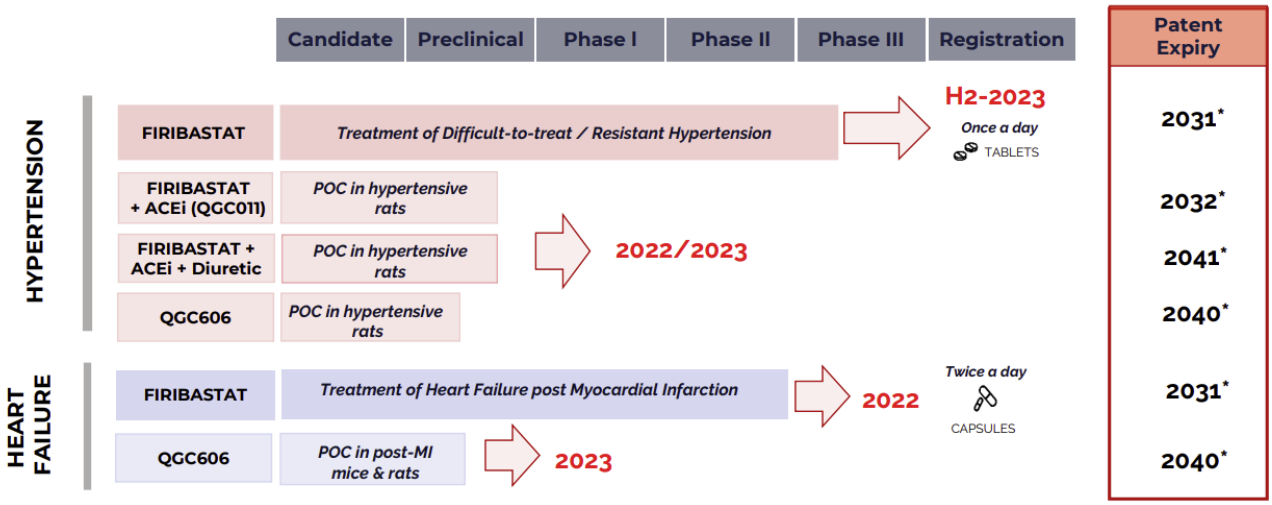
## Sensitivities: Drug development risks

Quantum Genomics is subject to the regular risks associated with drug research and development. As a pureplay biotech, the company will be affected by development delays or failures, regulatory risks, competitor successes, partnering setbacks and financing risks. The largest development sensitivities relate to the company's lead clinical asset, firibastat, in TRH and HF. The most prominent near-term risk would be failure to demonstrate clinical efficacy and safety in the Phase III FRESH and REFRESH trials. The company does not currently have a licensing deal in place for the United States and EU5 (UK, Germany, Spain, Italy and France), and failure to complete one in a timely manner could affect the commercial success of firibastat. While our model accounts for financing(s) as long-term debt, the company may need to issue equity instead, at pricing that may not be favourable for current shareholders and could lead to significant dilution.

## Firibastat: A novel cardiovascular drug

Quantum Genomics' main operations revolve around the clinical development of lead asset firibastat in TRH and HF, two cardiovascular indications with high unmet medical needs. Firibastat is a first-in-class inhibitor of brain aminopeptidase, the activity of which directly raises blood pressure, currently in clinical development for the treatment of TRH and post-MI HF (Exhibit 1). Firibastat's novel mechanism of action in TRH and HF has demonstrated a potentially attractive safety and efficacy profile in animal models. Notably, firibastat does not lower blood pressure, heart rate or body temperature in animals that have normal blood pressure. Commonly prescribed anti-hypertensive medicines can cause side effects associated with hypotension (low blood pressure), and preclinical and clinical studies suggest that firibastat could potential avoid these. Additionally, the drug has shown synergistic action (increased efficacy in combination) with antihypertensive medicines in rat models, suggesting firibastat may be useful in combination with other blood pressure drugs.

**Exhibit 1: Quantum Genomics' pipeline summary**




Source: Quantum Genomics company presentation May 2022. Note: POC = proof of concept. *With a possible five-year extension.

## Treatment-resistant hypertension an unmet medical need

Hypertension is a common condition characterised by elevated blood pressure. Over 500k deaths were attributed to the disease in the United States in 2019 and it is estimated that 45% of adults aged 18 or over have hypertension in the same region (2017 data). Exhibit 2 shows a breakdown of commonly prescribed drugs for the treatment of hypertension (and HF). Despite the variety and success of modern hypertension drugs, a large portion of patients taking these treatments are unresponsive. TRH is defined as uncontrolled blood pressure above 130/80mm Hg (US) or 140/90mm Hg (Europe) despite treatment with three or more antihypertensive agents, including one diuretic. It is estimated that c 10% of hypertensive patients are treatment-resistant. As hypertension is associated with serious, sometimes life-threatening complications, such as heart attack or stroke, TRH represents a clear unmet medical need, in our view.

**Exhibit 2: Classes of cardiovascular drugs**

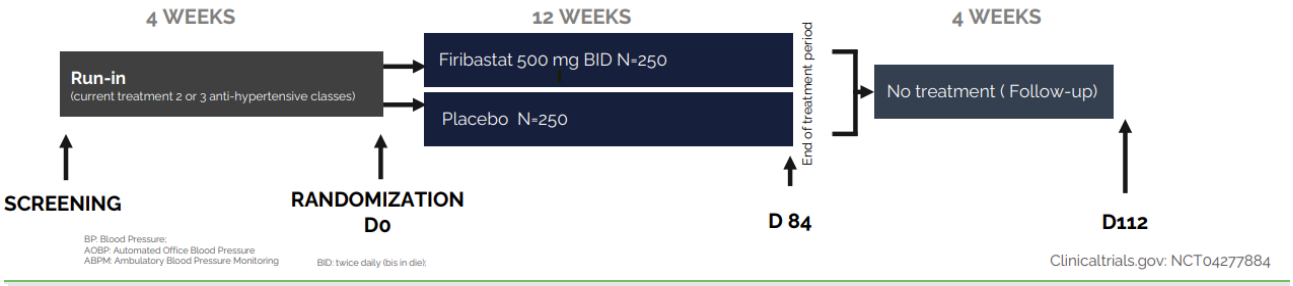
| Class | Example drugs | Example indications | Mechanism of action | Effect | Notes |
|---|---|---|---|---|---|
| Angiotensin converting enzyme (ACE) inhibitors | ramipril, enalapril, perindopril, zofenopril | Hypertension, heart failure | Inhibit ACE, reducing peripheral production of angiotensin II | Decreased vascular resistance (lower blood pressure) | First-line antihypertensive. Common side effects include persistent cough, headache, dizziness, nausea and kidney impairment. |
| Angiotensin II receptor blockers (ARBs) | valsartan, irbesartan, sparsentan, telmisartan | Hypertension, congestive heart failure, kidney damage due to diabetes | Inhibit action of angiotensin II by blocking angiotensin II receptors | Decreased vascular resistance (lower blood pressure), heart rate control | First-line antihypertensive. Generally well tolerated. Common side effects include dizziness and headache. Often preferred to ACE inhibitors as no persistent cough. |
| Diuretics | tolvaptan, indapamide, furosemide, spironolactone, hydrochlorothiazide | Hypertension, heart failure, influenza, kidney diseases, liver cirrhosis | Varied but include vasopressin 2 receptor antagonist and loop diuretics | Increased excretion of water (diuresis), lower blood volume, reduced blood pressure | Side effects vary depending on class, but can include hypotension, thirst, weakness, gout, fatigue and arrhythmia. |
| Calcium channel inhibitors | nifedipine, amlodipine, bencyclane, manidipine | Hypertension, chronic heart failure, angina pectoris | Disrupt movement of calcium ions through calcium channels | Arterial vasodilation, heart rate control, reduced aldosterone production | Several classes, including dihydropyridines, benzothiazepines and phenylalkylamines. Common side effects include constipation and peripheral oedema. |
| Beta-blockers | bisoprolol, metoprolol, nebivolol, celiprolol | Hypertension, heart failure, angina pectoris | Competitive beta receptor antagonists | Heart rate control | Although useful in the treatment of hypertension, evidence suggests beta-blockers as a first-line therapy are not as effective as ACE inhibitors, ARBs, calcium channel blockers or diuretics. |

Source: Edison Investment Research

## Key trials in TRH: FRESH and REFRESH

Quantum Genomics' development program for firibastat in TRH revolves around two Phase III studies that are currently underway. The FRESH trial (NCT04277884) is a double-blinded, placebo-controlled, multicentre, pivotal efficacy and safety study investigating the use of firibastat in adult patients with uncontrolled primary hypertension (n=502). After a run-in period of two weeks on current treatments (two to three anti-hypertensive classes), participants are randomised into a placebo or active arm (firibastat 2 × 500mg daily, on top of current treatment) for 12 weeks, followed by a four-week follow-up period of no treatment (Exhibit 3). The primary endpoint is change in systolic blood pressure (measured automatically at clinician's office) from baseline after 12 weeks. Supporting secondary endpoints are diastolic blood pressure at office, 24-hour ambulatory systolic/diastolic blood pressure and safety.

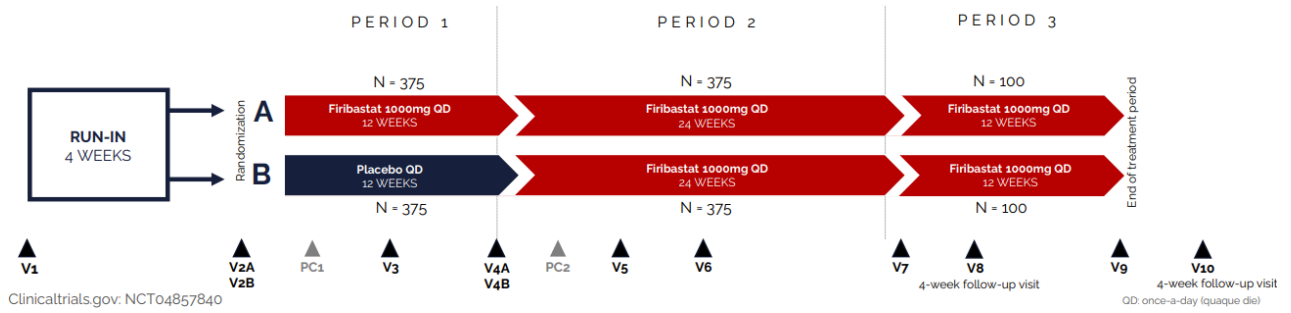
**Exhibit 3: FRESH trial design**




Source: Quantum Genomics corporate presentation May 2022. Note: BID = bis en die, twice a day.

In parallel to FRESH, the company is conducting the double-blind, placebo-controlled, open-label, multicentre Phase III REFRESH study (NCT04857840) to gather important safety and efficacy data for longer term-use of firibastat in TRH. In contrast to FRESH, TRH patients in REFRESH (n=750) will receive a single dose of firibastat (1 × 1,000mg daily) for 36 or 48 weeks (placebo or active arm, respectively; see Exhibit 4), on top of their current treatment regimen (two or three anti-hypertensive classes). The primary efficacy endpoint is change in systolic automated office blood pressure from baseline after 12 weeks. REFRESH will provide the company with valuable long-term efficacy and safety data.

**Exhibit 4: REFRESH trial design**




Source: Quantum Genomics corporate presentation May 2022

The FRESH trial completed enrolment in May 2022 and we expect top-line results to be reported in November 2022, followed by further top-line data from REFRESH in mid-2023. A meta-analysis of randomised clinical trial data has demonstrated that for each 5 mmHg reduction in systolic blood pressure, a patient's risk of cardiovascular events is cut by 10%. We therefore expect that a greater than or equal to 5 mmHg reduction in blood pressure for patients in the FRESH and REFRESH trials would constitute a clinically meaningful result. Indeed, the Phase IIb NEWHOPE study (NCT03198793) of firibastat, in the treatment of hypertensive, overweight patients of multiple ethnic origins, reported an average decrease of 9.5 mmHg in patients (n=254, all obese or overweight and c 54% black or Hispanic). Hypertension is often more severe, occurs earlier and is less well controlled (with an associated higher morbidity and mortality rate) in black and/or obese patients and individuals in this group are also more likely to develop TRH. If the NEWHOPE results can be reliably replicated or improved upon in the Phase III FRESH and REFRESH trials, this would represent significant clinical progress in TRH, in our view.

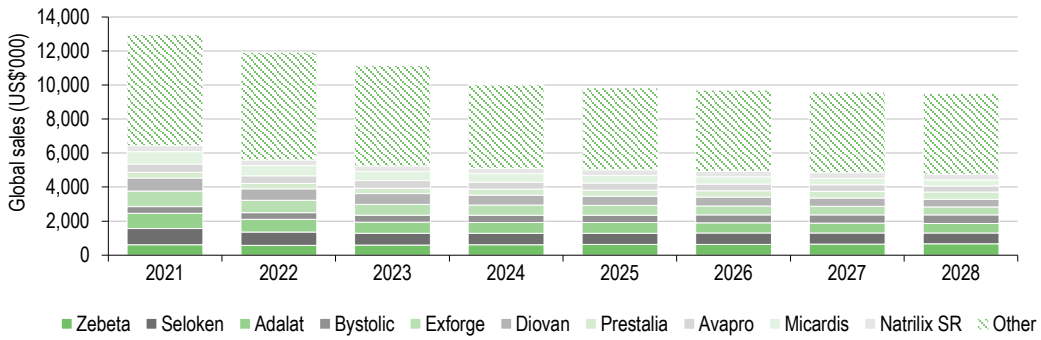
## Next step: Market approval

Management has indicated that, in the event of a positive readout from both Phase III trials in TRH, the company could potentially submit an NDA to the FDA by end-2023. Quantum Genomics possesses patent protection for firibastat and its therapeutic use until 2031, with the potential to extend this to 2036 upon approval. An expected launch in 2024 would therefore provide 12 years of protected market access in TRH (including the potential five-year extension).

## Market opportunity in TRH

The anti-hypertension market is largely composed of generic medicines, consisting of diuretics, ACE inhibitors, ARBs, beta-blockers and calcium channel blockers. The global market for hypertension drugs in 2021 was estimated at US$13bn but is expected to shrink to c $9.5bn by 2028 (Evaluate Pharma, Exhibit 5), driven by increased generic competition. Firibastat targets patients with TRH (c 20% of the overall hypertension market) and there are no currently approved therapeutics for the sole treatment of TRH. As the market is highly fragmented (with c 127 approved drugs marketed for the treatment of hypertension, a large majority of which are off-patent generics), we believe this represents an opportunity for Quantum Genomics to capture a significant share of the TRH treatment market and pursue premium pricing.

**Exhibit 5: Estimated global hypertension market to 2028**




Source: EvaluatePharma

Only a handful of therapies are currently in clinical development for the treatment of TRH. Of note is aprocitentan (Johnson & Johnson, Idorsia), which targets a novel mechanism of action (endothelin A and B receptor antagonism). Idorsia has communicated positive results from the multi-centre, blinded, randomised, parallel-group Phase III PRECISION study (NCT03541174) of aprocitentan TRH patients (n=730), but at the time of writing has not reported detailed efficacy data. However, it was reported that 28% of patients on 12.5mg of aprocitentan and 37% of patients on 25mg of aprocitentan experienced treatment-emergent adverse events. In the absence of clear efficacy data, we see the high percentage of adverse events seen with aprocitentan as a potential point of differentiation for firibastat, which demonstrated 14.1% treatment-emergent adverse events in the Phase IIb NEWHOPE study. We note that in the Phase IIb QUORUM study in heart failure, 10% of patients experienced allergic skin reactions; a point that may be a concern for regulators, who will be considering the potential long-term use of firibastat in a large patient population without imminent mortality/morbidity. However, in comparison to side-effects commonly seen with existing hypertension treatments (hypotension, cough, oedema, nausea, dizziness), skin reactions may be considered mild.

Idorsia is now preparing for launch, and we expect an NDA to be filled with the FDA by end of CY22. We note that the high levels of adverse events seen with aprocitentan may be a point of contention when pursuing market authorisation. Despite this, we believe aprocitentan could represent a competitor for firibastat, if both are approved. However, we note that firibastat's unique mechanism of action and good safety profile, in our opinion, offer potentially significant benefits over aprocitentan. Other potential competitors include Novartis's LHW090 (a neprilysin inhibitor) and Cincor's CIN-107 (an aldosterone synthase inhibitor). However, these programs are in Phase II and have non-novel mechanisms of action. Hence, in our view, they pose a less significant competitive threat to firibastat.

## The renin-angiotensin system and blood pressure

We see firibastat's differentiation as its unique mechanism of action. Most 'traditional' anti-hypertensive medicines target the systemic renin-angiotensin system (RAS), a biological mechanism by which the body regulates blood pressure, fluid balance and vascular resistance. In contrast, firibastat targets the brain renin-angiotensin system (BRAS), a similar pathway that is controlled by and located in the brain rather than the periphery.

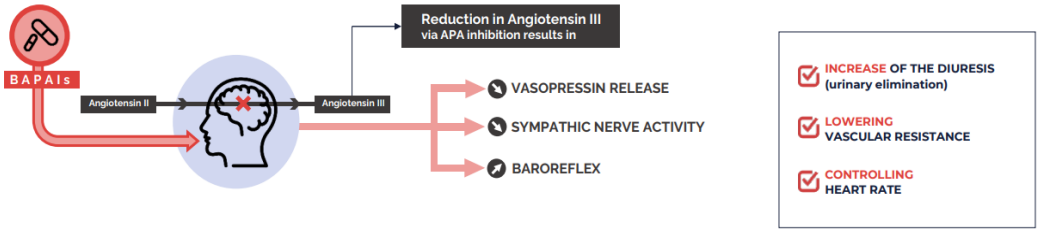
In the RAS, reduced blood pressure causes secretion of the enzyme renin by the kidneys. In the bloodstream, renin converts angiotensinogen to angiotensin I, which is in turn converted to angiotensin II by an enzyme called angiotensin converting enzyme (ACE). Angiotensin II causes potent vasoconstriction (constriction of blood vessels) and water retention (anti-diuretic effect), causing an increase in blood pressure. In circulation, angiotensin II is quickly converted to

angiotensin III (by the enzyme aminopeptidase A, APA), which not only has a vasoconstriction and anti-diuretic effect but is also a powerful stimulator of aldosterone release, a steroid hormone that causes further water retention by the kidneys. Activation of either the RAS or BRAS and the combined effects of vasoconstriction and increased water retention cause a rise in blood pressure.

### Targeting the BRAS may be advantageous

With firibastat, Quantum Genomics aims to inhibit aminopeptidase A, therefore blocking the conversion of angiotensin II to angiotensin III and reducing the hypertensive effects. Importantly, firibastat is a first-in-class therapeutic that targets the BRAS (Exhibit 6), meaning it could potentially avoid peripheral side effects. Through its effect on the BRAS, firibastat is proposed to exhibit a triple mechanism of action. The reduction of brain angiotensin III levels causes a decrease in vascular resistance (seen with ACE inhibitors and ARBs), increased urine production (as seen with diuretics) and a control of heart rate (normally seen with beta-blockers or calcium channel inhibition). Thus, firibastat has the potential to produce the combined effect of three main classes of cardiovascular drug. Importantly, through action on the BRAS, firibastat may lack many peripheral side effects seen with other hypertensive drugs. Particularly, it does not cause hypotension (low blood pressure), making firibastat a true anti-hypertensive therapy. Over-activation of the BRAS has been implicated in the development of hypertension and has been linked to resistant hypertension. In our view, firibastat's unique mechanism of action provides the potential for Quantum Genomics to address a significant area of unmet medical need (TRH).

**Exhibit 6: Firibastat's effect on BRAS**




Source: Quantum Genomics company presentation

## Phase IIb data paves way for Phase III in heart failure

In August 2021, Quantum Genomics announced top-line results from the randomised, double-blind, Phase IIb QUORUM trial (NCT03715998), investigating the use of firibastat in patients with post-MI left ventricular dysfunction (n=294). The study showed that firibastat had a comparable efficacy to standard-of-care ramipril (ACE inhibitor) in preventing left ventricular ejection fraction degradation in the total population and slightly better efficacy in patients with a low ejection fraction. Importantly, and in contrast to ramipril, firibastat did not lower blood pressure in participants of either type. The company is now evaluating a Phase III strategy for firibastat in HF. However, given that firibastat has shown only comparable efficacy to standard of care ramipril, we expect a Phase III trial would need to be a large mortality study spanning several years. For this reason, we anticipate that management will only begin a Phase III study in HF once a development or financial partnership has been secured.

### Historical lack of innovation in heart failure

Heart failure is a condition where the heart cannot pump enough blood around the body, resulting in a lack of oxygen in organs. HF is a serious condition; in 2018 it contributed to 379,800 deaths in the United States. HF is a common complication after MI due to a number of reasons, including cardiac tissue death or paralysis and cardiac muscle rupture. Treatment of post-MI HF often includes the

use of ACE inhibitors, ARBs or other cardiovascular agents. There has been little innovation in the post-MI HF space over the last decade, with Novartis's Entresto being the only novel pharmaceutical approved in that time. Considering this lack of innovation and the serious nature of HF, we view the area as one with a significant unmet need for novel therapies. A growing body of evidence shows that the activation of the BRAS plays a major role in HF post MI. As firibastat acts on the BRAS, it may be able to effectively treat post-MI HF, while avoiding unwanted peripheral side effects (especially hypotension). To this end, Quantum Genomics is pursuing the clinical development of firibastat in the treatment of HF in post-MI patients.

### Unique mechanism of action provides potential differentiation

The total value for the chronic HF therapeutics market was estimated by EvaluatePharma to be US$4.3bn in 2021, with c 84% of sales allocated to Novartis's Entresto (global 2021 sales US$3.6bn, EvaluatePharma), a fixed-dose combination of sacubitril (neprilysin inhibitor) and valsartan (an ARB). Sales of Entresto are expected to grow to c US$5.7bn (EvaluatePharma) in 2025 before the drug's patent expiry in the same year. In our view, this presents a potential opportunity for firibastat to disrupt the HF market. Patients on traditional HF medications (ACE inhibitors, ARBs) often suffer from side effects, such as hypotension, that can be a limiting factor when determining a treatment course. Therefore, we see firibastat's unique mechanism of action and non-hypotensive effect as a potential point of differentiation against competitors.

### Licensing deal in United States and EU5 is key

Management's strategy for the commercialisation of firibastat is focused on licensing the drug to a development/commercialisation partner. Given the considerable size of the cardiovascular drug market in the United States and EU5, we see a licensing deal here as key to the commercial success of firibastat. We anticipate management will pursue an agreement with a global pharmaceutical company for the commercialisation of firibastat in these regions based on data from the Phase III FRESH/REFRESH program, given it is the most advanced program in the development pipeline. We expect potential partners will be looking for Quantum Genomics to demonstrate a blood pressure reduction of at least 5 mmHg with a clean safety profile in the Phase III program. We expect management will engage potential partners, assuming positive results from FRESH in November 2022, with an aim to secure a deal prior to the REFRESH data announcement in mid-2023.

## Sensitivities

Quantum Genomics is subject to the regular risks associated with drug research and development. The company may be affected by development delays or failures, regulatory risks, competitor successes and financing risks. Although the company has a selection of licensing deals in place, it has not secured a deal for commercialisation in the United States and EU5, the largest global markets for hypertension. Failure to secure a licensing deal in these geographies could result in significant setbacks for the company. The largest development sensitivities relate to the company's lead clinical asset, firibastat. The most prominent near-term risk would be failure to demonstrate the clinical efficacy and safety in the FRESH and REFRESH trials needed to secure FDA authorisation. As a drug developer, Quantum Genomics is a highly cash consumptive business and may need to raise capital beyond our forecasts. In the event of future new funding needs, as per our methodology we would apply notional debt funding to our model. However, the company may need to issue equity instead, at pricing that may not be favourable for current shareholders and could lead to significant dilution.

## Valuation

We value Quantum Genomics at €701.3m or €20.3 per share. Our valuation is based on a risk-adjusted net present value (rNPV) for firibastat in TRH (peak sales US$4.7bn, rNPV €644.0m) and post-MI HF (peak sales US$1.5bn, rNPV €36.9m) and includes an estimated net cash position of €20.5m at end-April 2022, applying a discount rate of 12.5%. In our model we assume a licensing deal will be found in early-2023, following the FRESH study results, for the commercialisation of firibastat in TRH (launch in 2024) and post-MI HF (launch 2028) in the United States and EU5 regions, in line with the company's strategy. Due to the dominant size and considerable commercial potential of the US and EU5 cardiovascular drug markets, we have excluded the company's existing licensing deals for other regions from our valuation. A summary of our valuation assumptions is presented in Exhibit 7.

**Exhibit 7: Risk-adjusted NPV assumptions for firibastat**

| Indication | Assumptions |
|---|---|
| Treatment resistant hypertension | ■ **Target population:** We assume a prevalence of hypertension in the United States and EU5 population of 45% and 39%*, respectively, 67% of whom are treated for the disease in high income western countries. Further, we assume that 20% of patients treated develop apparent TRH. Considering the highly fragmented market, we assume a peak penetration of 4%, prior to patent expiry in 2031.<br>■ **Pricing:** $5,000 per patient per year in the United States, applying a 50% discount to patients in the EU5. Peak sales are reached in five years.<br>■ **Trial timelines and R&D cost:** €18m in FY22 and €14m in FY23 to complete the FRESH and REFRESH Phase III trials in TRH. We assume a licensing deal is found mid-FY23, at which point the licensee assumes all further R&D, COGS and SG&A expenses. |
| Post- MI heart failure | ■ **Target population:** We assume a United States and EU5 prevalence of 3%, of whom 70% are prescribed ACE inhibitors or ARBs. We assume a peak penetration of 1%, prior to patent expiry in 2031.<br>■ **Pricing:** $10,000 per patient per year in the United States with a 50% discount to patients in EU5. Peak sales reached in five years.<br>■ **Trial timelines and R&D cost:** €3m in FY22 and a further €3m in FY23 for Phase III trial preparation. We assume a licensing deal would be for firibastat in all indications. |

Source: Edison Investment Research, *average prevalence in France, Italy, Germany, Spain and UK

Our pricing assumption in TRH is based on the average price of the top five selling hypertension drugs in the United States (c $3,500 per patient per year); however, these are all generic compounds. As firibastat possesses a novel mechanism of action and will be focused on the treatment of resistant hypertension, where no existing therapies exist, we have applied a premium to the average generic price. We assume a price for firibastat of US$5,000 per patient per year in TRH, a c 43% premium to the average generic price, and believe this is attainable given the unmet need for TRH-specific therapeutics. If the company chooses to market firibastat at a lower price of US$4,000 per patient per year, this would lower our valuation to €580.8m or €16.8 per share. We note that, should firibastat demonstrate good results (ie significantly greater than a 5 mmHg reduction in systolic blood pressure, with good safety) in Phase III, we believe there could be an opportunity for higher pricing than our assumed US$5,000 price point.

Based on an assessment of recent Phase III licensing deals in the hypertension space, for the purpose of our model we have assumed a total deal value of US$250m for firibastat in all indications, to be signed in early-2023 following the FRESH study results and prior to the REFRESH data. We estimate this will consist of US$50m upfront and US$200m in sales and regulatory milestones, along with 10% royalties on sales. We assume the partner will assume all responsibility for any further R&D, administrative or marketing costs from the time of the deal.

A breakdown of our rNPV for Quantum Genomics can be found in Exhibit 8. We estimate peak sales for firibastat in TRH of US$3.07bn and US$1.65bn in the US and EU5, respectively, in 2029 after approval in 2024. Additionally, we estimate peak sales in HF of US$1.05bn and US$0.49bn for the US and EU in 2032, respectively, following a launch in 2028. Based on the large size and highly fragmented nature of the hypertension drug market (c 127 drugs approved globally), we assume a peak market penetration for firibastat in TRH of 4%. In contrast, the HF market is dominated by Novartis's Entresto, therefore we assume a peak penetration of 1% for firibastat in HF. Considering the relative stages of development and previously reported data, we have assigned a probability of

success of 50% to firibastat in TRH and 20% in HF. We ascribe 92% of the company's valuation to firibastat's potential use in TRH, 5% to its use in post-MI HF and 3% to cash.

**Exhibit 8: Quantum Genomics risk-adjusted NPV**

| Product | Launch | Peak | Peak sales ($m) | Value (€m) | Probability of success | rNPV (€m) | rNPV/share* (€) |
|---|---|---|---|---|---|---|---|
| Firibastat in TRH | 2024 | 2029 | 4,728.0 | 1,290.1 | 50% | 644.0 | 18.6 |
| Firibastat in post-MI HF | 2028 | 2032 | 1,531.4 | 177.6 | 20% | 36.9 | 1.1 |
| Estimated net cash at end-April 2022 | | | | 20.5 | 100% | 20.5 | 0.6 |
| **Valuation** | | | | **1,488.2** | | **701.3** | **20.3** |

Source: Edison Investment Research. Note: *Shares outstanding at end-H122: 34.6m.

# Financials and forecasts

Quantum Genomics has several revenue streams. The company records revenues from the sale of licences relating to the development, production and marketing of firibastat. In FY21, licence sales amounted to €2.26m, as the company signed new regional deals with DongWha Pharm, Faran S.A. and Xedition Pharmaceuticals, an increase from €1.54m in FY20. Additionally, the company receives revenues relating to firibastat's Phase III clinical trial performance services (which includes upfront, milestone and royalty payments). Payments of this type were €874k in 2021, an increase of c 300% from a year prior (FY20: €294k). Quantum Genomics also receives a research tax credit, which in FY21 came to €2.66m, bringing total revenue for the year to €6.16m, up from €3.98m in FY20. As to be expected from a pure-play biotechnology company, Quantum Genomics' R&D expenses comprise the majority of its operating costs. The company outsources all clinical development to a contract development organisation, so much of this expense is fees charged by these. In FY21 the company recorded €13.55m (FY20: €10.00m) in R&D expenses, with the increase from FY20 being attributable to the commencement of the Phase III FRESH study in July 2021. In total, the operating loss for FY21 came to €17.19m, compared to €14.68m in FY20. Excluding R&D expenses, the remaining operating costs for FY21 consisted mainly of personnel expenses (FY21: €4.28m), purchases of materials (FY21: €1.70m) and various other charges.

FY21 operating cash flow was €17.02m, a considerable increase from €11.99m in FY20. At end-FY21 the company held debt liabilities of €3.46m (current debt €288k, non-current debt €3.17m, leases included). Debt liabilities comprise largely two €1.5m loans granted in FY21 from Bpifrance and BNP Paribas (state guaranteed loans, up to 90% guaranteed), at rates of 0.72% and 0.25%, respectively. Recognition of the value of firibastat by governmental and institutional capital is, in our view, encouraging for the company.

We forecast revenue for FY22 of €8.29m, consisting of research tax credits (€4.2m) and milestone payments, assuming a positive outcome from the Phase III FRESH study in November 2022. We assume a licensing deal for the commercialisation of firibastat in the United States and EU5 will be signed in early-2023 following the FRESH results and prior to the REFRESH data announcement, with an upfront payment of c $50m. This, combined with other partner milestones, leads to our estimated total revenue for FY23 of €54.27m. In FY22, both the FRESH and REFRESH Phase III trials will be running simultaneously. Therefore, based on R&D costs from previous years, we estimate an R&D expense for the year of €21.0m (FY21: €13.5m). We forecast a decrease in R&D expenses in FY23 to €17.0m, as an increase in REFRESH patient recruitment is offset by the ending of FRESH. Thus, we forecast total operating expenses for FY22 and FY23 of €30.03m and €26.08m, respectively. Overall, we forecast an operating cash outflow of €19.9m in FY22, an increase of 17% y-o-y. In FY23, incorporating our assumed licensing deal in mid-2023, we forecast positive cash flow from operations of €30.0m.

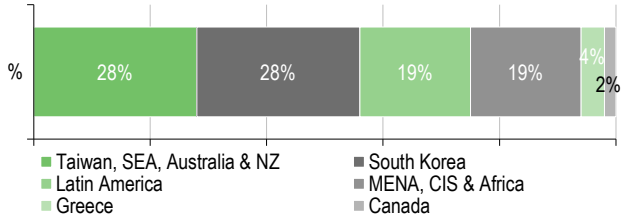
Quantum Genomics reported a cash and cash equivalent position of €13.6m at end-FY21. A €15.6m share offering and a €1.87m capital subscription by partner Julphar Gulf Pharmaceutical

Industries at end April 2022 raised capital of €17.5m leading to a post-deal cash position of €23.6m, which at the current burn rate (we estimate €19.9m in FY22) will fund operations into Q223. With the readout from the Phase III REFRESH study expected in mid-2023 and our estimated licensing deal date for firibastat lying in early-2023 following the FRESH study results, delays could mean the company may need to raise additional funds during H123 to continue operations. We caveat that the timing and achievement of potential licensing deals and the outcome of clinical announcements could change our assumptions and estimates.

## Exhibit 9: Financial summary

| Accounts: IFRS; year end 31 December; €000s | 2019 | 2020 | 2021 | 2022e | 2023e |
|---|---|---|---|---|---|
| **PROFIT & LOSS** | | | | | |
| Total revenues | 1,547 | 3,977 | 6,157 | 8,293 | 54,271 |
| Cost of sales | 0 | 0 | 0 | 0 | 0 |
| Gross profit | 1,547 | 3,977 | 6,157 | 8,293 | 54,271 |
| Total operating expenses | (11,420) | (18,661) | (23,251) | (30,032) | (26,078) |
| Research and development expenses | (4,861) | (10,003) | (13,548) | (21,000) | (17,000) |
| SG&A | 0 | 0 | 0 | 0 | 0 |
| EBITDA (normalized) | (8,861) | (13,067) | (14,883) | (19,876) | 30,013 |
| Operating income (reported) | (9,873) | (14,684) | (17,094) | (21,739) | 28,193 |
| Finance income/(expense) | (13) | (1,457) | (95) | (40) | 36 |
| Exceptionals and adjustments | 859 | 1,480 | 1,821 | 1,568 | 1,568 |
| Profit before tax (reported) | (9,886) | (16,141) | (17,189) | (21,780) | 28,229 |
| Profit before tax (normalised) | (9,027) | (14,661) | (15,368) | (20,212) | 29,797 |
| Income tax expense (includes exceptionals) | 0 | (83) | (170) | (170) | (170) |
| Net income (reported) | (9,886) | (16,224) | (17,359) | (21,950) | 28,059 |
| Net income (normalised) | (9,027) | (14,744) | (15,538) | (20,382) | 29,627 |
| Basic average number of shares, m | 16.8 | 20.4 | 27.0 | 32.7 | 34.6 |
| Basic EPS (€) | (0.59) | (0.79) | (0.64) | (0.67) | 0.81 |
| Adjusted EPS (€) | (0.54) | (0.72) | (0.58) | (0.62) | 0.86 |
| Dividend per share (€) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | |
| **BALANCE SHEET** | | | | | |
| Tangible assets | 27.0 | 27.0 | 30.0 | 33.4 | 36.5 |
| Intangible assets | 360.0 | 760.0 | 537.0 | 537.0 | 537.0 |
| Right-of-use assets | 275.0 | 154.0 | 412.0 | 317.2 | 244.3 |
| Other non-current assets | 38.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| Total non-current assets | 700 | 973 | 1,011 | 920 | 850 |
| Cash and equivalents | 11,164 | 27,153 | 13,552 | 10,081 | 39,777 |
| Contract assets | 0 | 0 | 684 | 684 | 684 |
| Trade and other receivables | 0 | 740 | 12 | 12 | 12 |
| Current non-financial assets | 2,711 | 3,650 | 5,727 | 5,727 | 5,727 |
| Other current assets | 204 | 285 | 257 | 0 | 0 |
| Total current assets | 14,079 | 31,828 | 20,232 | 16,504 | 46,200 |
| Non-current loans and borrowings | 490 | 470 | 2,882 | 2,582 | 2,282 |
| Long-term rental debt | 159 | 29 | 290 | 290 | 290 |
| Provisions for pensions and similar | 367 | 376 | 441 | 441 | 441 |
| Other non-current liabilities | 33.00 | 0.00 | 96.00 | 96.00 | 96.00 |
| Total non-current liabilities | 1,049 | 875 | 3,709 | 3,409 | 3,109 |
| Accounts payable | 3,353 | 5,921 | 6,746 | 6,746 | 6,746 |
| Current loans and borrowing | 204 | 252 | 163 | 163 | 163 |
| Short-term rental debt | 133 | 133 | 125 | 125 | 125 |
| Contract liabilities | 0 | 200 | 125 | 0 | 0 |
| Other current liabilities | 634 | 766 | 708 | 708 | 708 |
| Total current liabilities | 4,324 | 7,272 | 7,867 | 7,742 | 7,742 |
| Equity attributable to company | 9,406 | 24,654 | 9,667 | 6,272 | 36,199 |
| | | | | | |
| **CASH FLOW STATEMENT** | | | | | |
| Operating income | (9,873) | (14,684) | (17,094) | (21,739) | 28,193 |
| Depreciation and amortisation | 153 | 137 | 390 | 296 | 252 |
| Share based payments | 859 | 1,480 | 1,568 | 1,568 | 1,568 |
| Other adjustments | 44 | (19) | (314) | 0 | 0 |
| Movements in working capital | (1,611) | 1,093 | (1,567) | 0 | 0 |
| Cash from operations (CFO) | (10,428) | (11,993) | (17,017) | (19,876) | 30,013 |
| Capex | (45) | (411) | (15) | (16) | (17) |
| Acquisitions & disposals net | 0 | 0 | (30) | 0 | 0 |
| Other investing activities | 0 | 6 | 0 | 0 | 0 |
| Cash used in investing activities (CFIA) | (45) | (405) | (45) | (16) | (17) |
| Capital changes | 7,381 | 28,501 | 846 | 16,720 | 0 |
| Debt Changes | (462) | (108) | 2,620 | (300) | (300) |
| Interest paid | (7) | (6) | (5) | 0 | 0 |
| Other financing activities | 0 | 0 | 0 | 0 | 0 |
| Cash from financing activities (CFF) | 6,912 | 28,387 | 3,461 | 16,420 | (300) |
| Cash and equivalents at beginning of period | 14,725 | 11,164 | 27,153 | 13,552 | 10,081 |
| Increase/(decrease) in cash and equivalents | (3,561) | 15,989 | (13,601) | (3,471) | 29,696 |
| Effect of FX on cash and equivalents | 0 | 0 | 0 | 0 | 0 |
| Cash and equivalents at end of period | 11,164 | 27,153 | 13,552 | 10,081 | 39,777 |
| Net (debt)/cash | 10,178 | 26,269 | 10,092 | 6,921 | 36,917 |

Source: Quantum Genomics company accounts, Edison Investment Research

| Contact details | Revenue by geography (as at 20 June 2022) |
|---|---|
| 33 rue Marbeuf<br>Paris – 75008<br>France<br>+33(0)185347770<br>www.quantum-genomics.com |  |



**Management team**

| Chief Executive Officer: Jean-Philippe Milon | Chief Financial Officer: Benoît Gueugnon |
|---|---|
| Jean-Philippe Milon held several management positions at Bayer HealthCare, then was a member of the Worldwide Executive Committee as head of WW Business Development, Licensing, Mergers & Acquisitions. Previously he was head of the cardiovascular business at Sandoz. He has more than 25 years of experience in healthcare mainly in the pharmaceutical Industry. | Benoît Gueugnon was previously head of financial control at Quantum Genomics. He was a senior financial auditor at KPMG Paris. He graduated from the Normandie School of Management and holds a master II audit & corporate finance qualification. |
| **Chief Medical Officer: Bruno Besse** | **Chief Operating Officer: Stéphane Cohen** |
| Bruno Besse has more than 20 years' experience in the pharmaceutical industry, including several positions in R&D and medical affairs in big pharmaceutical companies (Aventis, Bristol-Myers-Squibb) in the field of cardiology and thrombosis as well as in a start-up company (medical devices). He is an MD, cardiologist and graduated in biostatistics. | Stéphane Cohen previously held operational management and senior leadership positions in major pharmaceutical companies, particularly at Bayer and Pfizer, for 18 years. Stéphane has been involved in dozens of successful market launches of new treatments. He has a PharmD from the University of Aix-Marseille and holds an MBA in marketing management from ESSEC. |

| Principal shareholders | (%) |
|---|---|
| Otium Capital | 14.7 |
| TETHYS SAS | 2.9 |
| Management | 5.0 |
| Institutional investors | 20.9 |
| Retail investors | 53.2 |

## General disclaimer and copyright

This report has been commissioned by Quantum Genomics and prepared and issued by Edison, in consideration of a fee payable by Quantum Genomics. Edison Investment Research standard fees are £60,000 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 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.



## 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
1185 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