

Investing in the green economy – sizing the opportunity

December 2020

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Overview

The green economy is an increasingly important part of addressing environmental objectives and its data, a key part of investors sustainable investment tool kit.

With the development of new green taxonomies at the national level, broad, granular datasets are going to be important in their implementation.

The FTSE Russell Green Revenues 2.0 (“GR 2.0”) Data Model provides investors with data on more than 3,000 global listed companies that have exposure to the green economy. It addresses important challenges of green economy data; the taxonomy of green activities, tiers of “greenness” and low levels of disclosure of green revenues.

The green economy investment opportunity is US\$4 trillion market cap, an equivalent to 5% of the total listed equity market. It has grown faster than the overall equity market since 2009 and is estimated to have overtaken the size of the oil & gas sector. However, it will require further acceleration to achieve global environmental objectives.

Energy management and efficiency is by far the largest sector in the green economy (33% of the economy). However, other important sectors such as waste, water & sustainable agriculture are also large, despite having a lower profile.

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Executive summary

- The green economy is an increasingly important part of addressing environmental objectives and its data, a key part of investors sustainable investment tool kit.
- With the development of multiple new green taxonomies at the national level broad, it is widely accepted that granular datasets are going to be key in their implementation.
- One of the main challenges is taking the step from defining taxonomies to the generation of company level data, where the level of disclosure is low. FTSE Russell Green Revenues 2.0 (“GR 2.0”) addresses these issues providing investors with a broad range of end use.
- The data shows the green economy is represented by more than 3,000 global listed companies, which is a \$4 trillion market capitalization opportunity—an equivalent of over 5% of the total listed equity market.
- The green economy has grown faster than the overall equity market. This growth will need to accelerate if the world is to meet the investment levels outlined to achieve the objective of keeping global warming within 2 degrees.
- The green economy is both diversified by company size and geography, although certain areas such as Europe and Japan are more exposed. From an industry perspective, almost two thirds of the green economy come from utilities, technology and industrial goods and services.
- Within the GR 2.0 data, energy management & efficiency represents a third of the green economy, providing solutions to multiple environmental issues. Renewable energy is one of the highest profile areas of the green economy, but other areas such as water, pollution control or sustainable food & agriculture are less discussed, but also very important.
- In the rapidly evolving world of green products and services, we expect the market to continue to grow, and new activities develop. The GR 2.0 data set will help investors analyze the opportunity, their exposure to it and look for potential winners and losers.

Green economy in focus, new taxonomies but a lack of granular data.

The green economy is large— 3,000 companies, \$4 trillion investment opportunity, 5-6% of the global equity market.

Energy efficiency is 33% of the green economy.

The green economy will rapidly evolve over the coming years.

Section 1: Defining and measuring the green economy

Importance of the green economy

The green economy has been increasing in focus in recent years as global plans to address climate change and other environmental issues gather momentum, with the green economy providing the products and services essential for delivering these plans.

We all know that the green economy is the future,”
Antonio Guterres, UN Secretary-General, 28/3/19

The role of investors in mobilizing climate finance is critical and both clients and regulators are increasingly looking to financial institutions to deploy investment in the green economy. Given the size of budgets which are going towards green investment (e.g., the EU Green Deal), the green economy is also an important segment for investors looking for growth. Calls for a green-focused recovery and the acceleration of industries in transition further define its importance.

Taxonomies

What constitutes a green product or service is under increasing scrutiny as multiple national jurisdictions are developing green taxonomies. To date, the EU green taxonomy is the most advanced, but the UK, China, Japan and Malaysia are also involved in developing their own taxonomies. While their focus differs to some degree, the fundamental driver of mobilizing climate finance is the same.

Numerous countries are developing their own green taxonomies.

The definition of what is the green economy is complicated by the range of different factors, which can define “green”:

- Products and services, which are used to deliver solutions to mitigate environmental issues (e.g. solar power or high efficiency products);
- Companies whose internal operations are such that they produce products with lower environmental footprints than the rest of the industry (this can apply to any products or services from cement to smartphones);
- Industries in transition (typically dirtier industries assessing participants transition of their operations to lower environmental footprints);
- Involvement/netting off of dirtier activities (e.g. “significant environmental harm” in the companies’ operations) or combining with broader sustainability issues such as social and development.

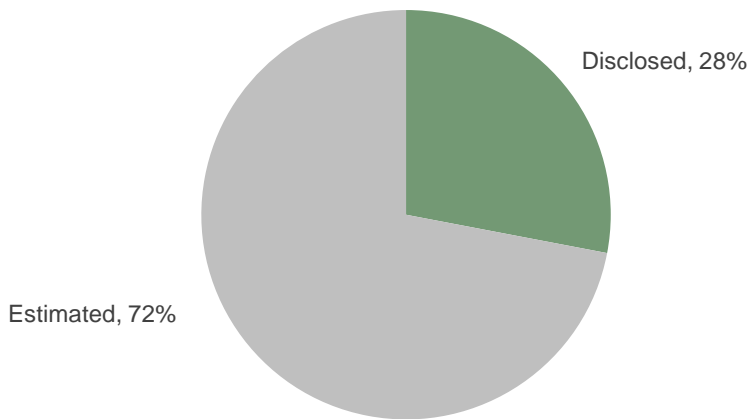
While these are important issues, the wider the range of factors, the harder the measurement challenge, and the less focus on the green economy of green products and services.

Data challenges

While much focus has been placed on green taxonomies, the largest challenge in measuring the size of the green economy is translating the definition into data. This is primarily due to the lack of disclosure of green products and services, or insufficient granularity in the conventional disclosures to calculate a number. This problem is similar to other areas of sustainability, such as carbon emissions, and is slowly being addressed by regulatory and voluntary disclosure initiatives. However, until these are fully in place globally, it is necessary to augment disclosed data with direct engagement and estimates to produce consistent global datasets.

Measuring green economy exposure is challenging, and there is a lack of consistent, granular data.

Figure 1: Disclosed versus Estimated Green Economy Size



Corporate disclosure of green revenue exposure is limited

Source: FTSE Russell, December 2018.

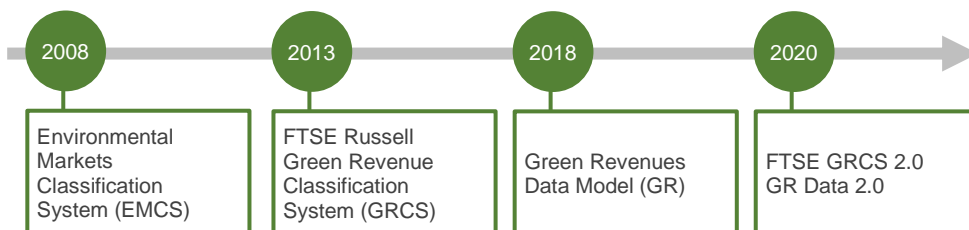
As can be seen from figure 1, disclosure is particularly low with regards to the green economy. Only 28% of the green economy is derived from green revenue data directly disclosed from companies (both publicly disclosed and direct engagement). The remainder relies on estimates, although many of these are based on additional disclosed non-revenue data.

Green Revenues 2.0

FTSE Russell and the London Stock Exchange Group have a long history in the development of taxonomies of green products and services, and their application in data and investment products.

FTSE Russell has been measuring the green economy since 2008

Figure 2: History of FTSE Green Classification Systems and Investment



Source: FTSE Russell.

In 2008, FTSE launched the Environmental Markets Classification Systems, which focused on the companies most exposed to the green economy. It also launched the Environmental Markets Index Series and the formation of the Environmental Markets Governance Committee (now the Green Industries Committee). In 2013, the Green Revenues Classification System was launched and focused on analyzing the broader global equity market for green economy exposure. In 2018, the process of further developing the Green Revenues process to a new generation of data (“GR 2.0”) began and the report ‘Investing in the global green economy; busting common myths’ was published based on an initial set of GR 2.0 data. In 2020, the GR 2.0 dataset was published, focusing on three main areas of enhancement:

- A new, more granular taxonomy based on a broad range of green products and services, exposed to seven environmental objectives, as shown in figure 3.

Figure 3: Green Revenues 2.0 Classification System

ENERGY GENERATION [EG] 19	ENERGY MANAGEMENT AND EFFICIENCY [EM] 13	ENERGY EQUIPMENT [EQ] 22	ENVIRONMENTAL RESOURCES [ER] 11	ENVIRONMENTAL SUPPORT SERVICES [ES] 5	
Bio Fuels Cogeneration Fossil Fuels Geothermal Hydro Nuclear Ocean & Tidal Solar Waste to Energy Wind	Buildings & Property (Integrated) Controls Energy Management Logistics & Support Industrial Processes IT Processes Lighting Power Storage Smart & Efficient Grids Sustainable Property Operator	Bio Fuels Cogeneration Equipment Fossil Fuels (Integrated) Fuel Cells Geothermal Hydro Nuclear Ocean & Tidal Solar Waste to Energy Wind	Advanced & Light Materials Key Raw Minerals & Metals Recyclable Products & Materials	Environmental Consultancies Finance & Investment Smart City Design & Engineering	
FOOD & AGRICULTURE [FA] 17	TRANSPORT EQUIPMENT [TE] 12	TRANSPORT SOLUTIONS [TS] 9	WASTE & POLLUTION CONTROL [WP] 15	WATER INFRASTRUCTURE & TECHNOLOGY [WI] 10	
Agriculture Aquaculture Land Erosion Logistics Food Safety, Efficient Processing & Sustainable Packaging Sustainable Plantations	Aviation Railways Road Vehicles Shipping	Railways Operator Road Vehicles Video Conferencing	Cleaner Power Decontamination Services & Devices Environmental Testing & Gas Sensing Particles & Emission Reduction Devices Recycling Equipment Recycling Services Waste Management	Advanced Irrigation Systems & Devices Desalination Flood Control Meteorological Solutions Natural Disaster Response Water Infrastructure Water Treatment Water Utilities	
			10 SECTORS	64 SUBSECTORS	133 MICRO SECTORS

GR 2.0 uses a broad green taxonomy, covering similar objective to the EU, three tiers of “greenness” and an estimation process to cover the lack of disclosure

Source: FTSE Russell.

- Three tiers of “greenness” of the activities (at the activity level, rather than the company level), based on the level of net environmental benefits across seven environmental objectives, to aid investors in navigating the green economy and assist in index inclusion.

Tier 1	Tier 2	Tier 3
<p>Clear & significant</p> <p>Micro sector examples</p> <ul style="list-style-type: none"> • Solar • Recyclable products & Materials • Waste management 	<p>Net positive</p> <p>Micro sector examples</p> <ul style="list-style-type: none"> • Flood control • Cloud computing • Smart city design & Engineering 	<p>Limited</p> <p>Micro sector examples</p> <ul style="list-style-type: none"> • Nuclear • Bio fuels • Key raw material and minerals

Source: FTSE Russell.

- The development of estimated green revenue exposure for all of the companies, which do not disclose this data based on additional non-revenue disclosures and modeling of available data at the industry sub-sector level.

Uses of green economy data

GR 2.0 data has the potential to be used in multiple ways including:

- reporting exposure to the green economy
- developing passive funds and indexes, either dedicated to the green economy or broader climate Sustainable Investment (SI) focus
- an input into active funds, particularly dedicated green funds, for universe creation, idea generation, etc.
- part of the SI process for broader generalist funds
- a tool to analyze the market for green and climate finance

Section 2: Size of the green economy

Measures of size

Sizing new markets is always challenging, particularly where definitions are evolving and full disclosure is lacking. Traditional measures of industrial sectors, such as the FTSE Industry Classification Benchmark (ICB), tend to underestimate the size of the green economy. There are five sub-sectors that are focused on the green economy, but much of the market is hidden within other sectors such as industrials, utilities or technology. Therefore, using ICB would measure the green economy as 1% of market cap—a significant underestimate.

In GR 2.0, discussed in the previous section, a specific green taxonomy is used to identify these hidden activities and split out the revenues, where they are only a minority of the company's activities.

Out of the 16,000 analyzed, 2,951 companies were found to generate revenues from green products and services, representing 16% of the companies and 19% of the total market cap. However, many only have a small percentage of their revenues coming from green products and services. Therefore, a “GR-weighted market cap”¹ is used to take this into account. Using this approach results in a green economy which is 5.4% of market cap or US\$4.3 trillion.

Data nuances

- This data relies on estimates for the companies, which do not disclose their green revenues. Using disclosed data, the green economy would be only 2% of market cap— again a significant underestimate.
- This approach uses the “investability-weighted” market cap, which identifies the green economy investment opportunity accessible to investors, but taking the total market cap would give \$5 trillion.
- Within the broad range of activities in the GR 2.0 taxonomy, Tier-3 are more controversial and have a lower level of ‘greenness’. However, these represent only 8% of the green economy.
- We have used market capitalization measures to identify the green economy investment opportunity, however using revenues instead of market cap gives similar results—US\$3.4 trillion of total green revenues represents 5% of global listed revenues.

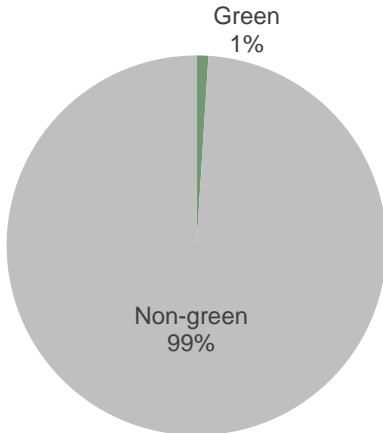
There are many potential ways to calculate the size of the green economy.

We believe the ‘GR-weighted market cap’ gives the best assessment of the size. US\$4.3 trillion of investment opportunity, 5.4% of global listed equity market

¹ Market capitalization of company multiplied by the green revenues percentage.

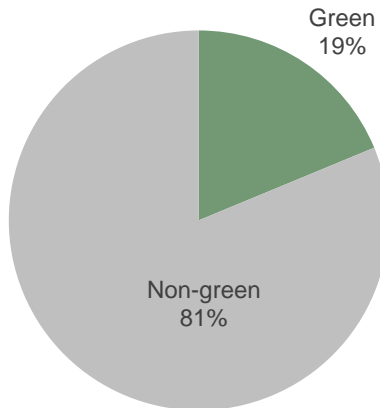
Figure 4: Measuring the size of the green economy: some examples of different angles

Green ICB Subsectors Mkt Cap



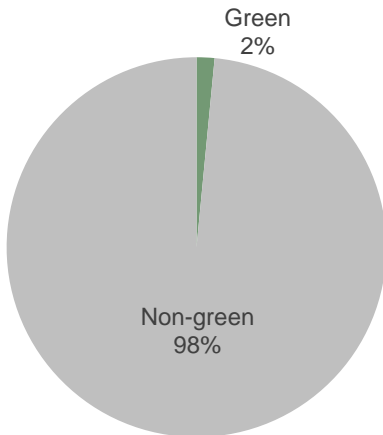
1% or US\$0.75 trillion
(an underestimate)

Total GR Company Mkt Cap



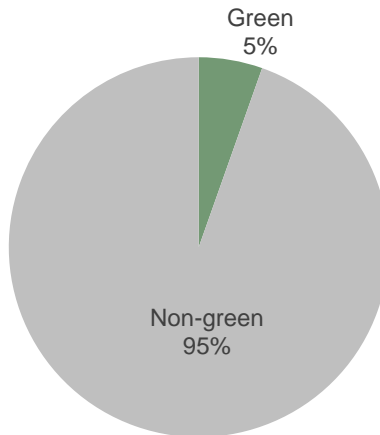
19% or US\$24 trillion
(an overestimate)

Disclosed GR-Weighted Mkt Cap



2% or US\$1.2 trillion
(an underestimate)

GR-Weighted Mkt Cap



US\$4.3 trillion

Source: FTSE Russell December 2018.

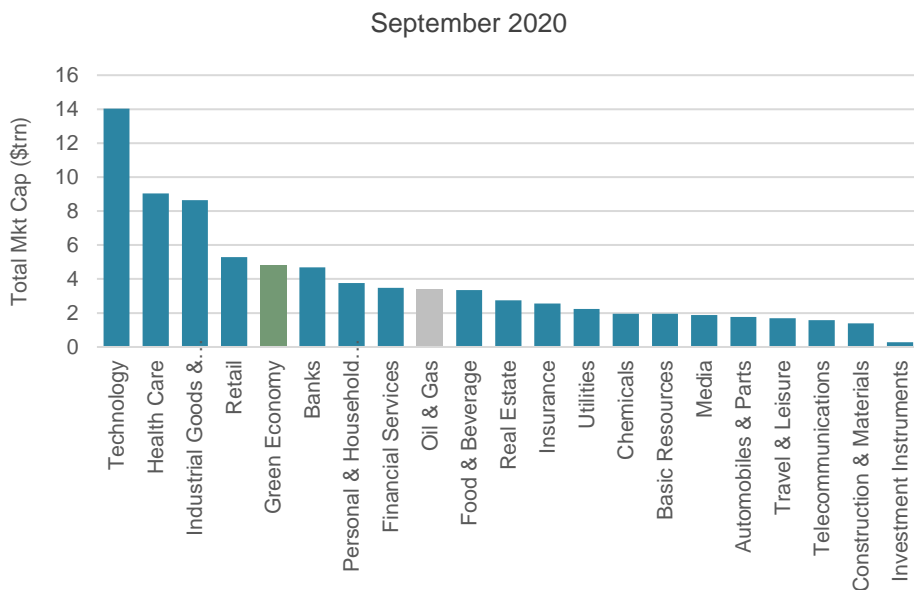
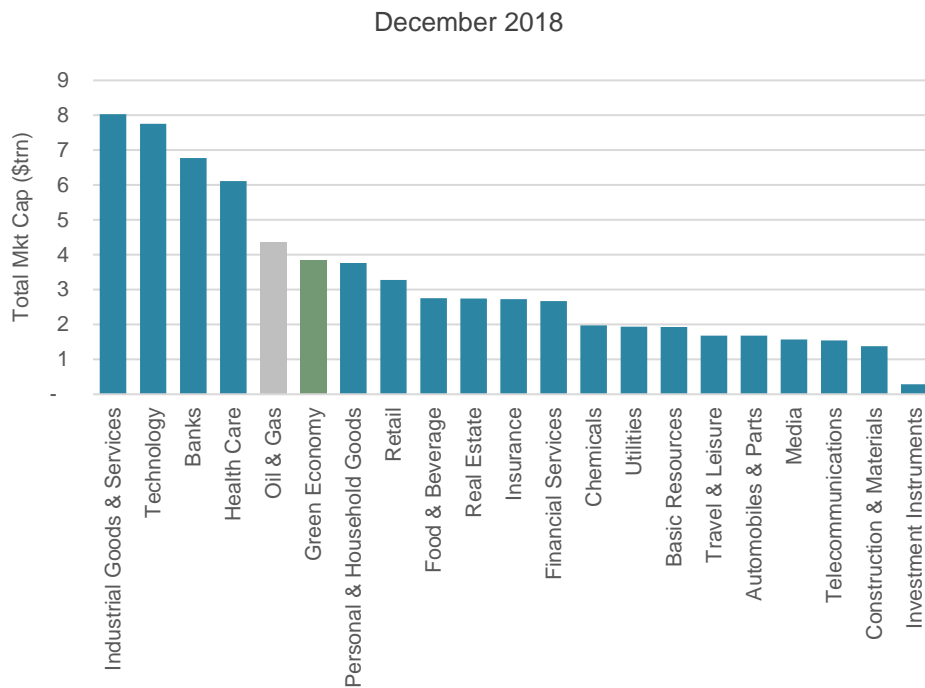
Relative size of the green economy

The green economy, if seen as a conventional industrial sector, would represent a major sector in its own right. Figure 5 shows the green economy alongside other ICB Supersectors. Using the data from 2018, the green economy remains slightly smaller than the oil & gas sector, similar to its position in the previous green economy report. However, the fall in the oil price in early 2020 has reduced the size of the oil & gas sector to ~3% of the market, meaning that the green economy is today materially bigger.

Based on the latest full year of data the green economy would be the seventh largest ICB Supersector.

Based on this data it remains behind the size of the Oil & Gas super sector

Figure 5: Global Green Economy versus ICB Supersector



The green economy has performed well in 2020 and using the latest (end September) market cap data it is now the fifth largest super sector, nearly US\$5 trillion and materially larger than the oil & gas Supersector.

Notes: GR-weighted market cap after investability weighting December 2018, September 2020.

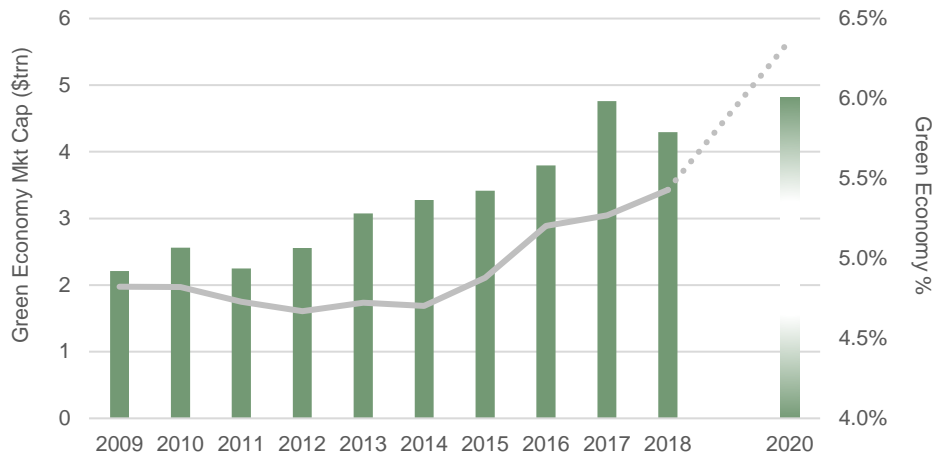
Source: FTSE Russell, December 2018 and September 2020.

Growth of the green economy

The green economy has grown from US\$2 trillion in 2009 to US\$4 trillion in 2018, an annualized growth rate of 8%. The fall in the size from 2017 to 2018 was driven by the broader equity market fall in December 2018 due to concerns over US and China trade relations. However, the green economy has grown faster than the broader equity market, particularly since 2015—seeing its percentage of the market steadily growing.

The green economy has grown both in size and percentage of the market.

Figure 6: Growth of the Global Green Economy, 2009-2020



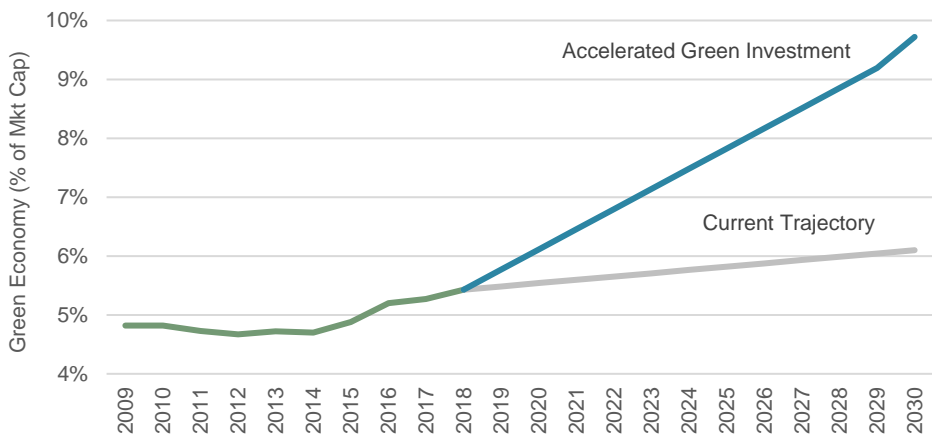
Notes: GR-weighted market cap before investability weighting. GR 2.0 estimates 2016 to 2018, 2016 to 2009 extrapolated using disclosed GR percentages and disclosed maximum and minimum ranges. 2020 calculated using September 2020 market caps

Sources: FTSE Russell, September 2020

While the green economy is growing, both in absolute terms and relative to the market, it is still not at the level which would reflect the needed investment to fully achieve global environmental objectives, in particular limiting global warming to two degrees. This is reflected in the global efforts to mobilize greater investment in climate finance, such as the EU Green Deal. Figure 7 shows that, making simple assumptions about the market, that to achieve the investment figures in line with the levels needed to achieve climate goals would increase the size of the green economy to around 10% of the market.

However, to achieve global climate goals the growth of the green economy will need to accelerate.

Figure 7: Potential Future Growth Trajectory



Notes: Current trajectory estimate based on extrapolation of average growth rate from 2009 to 2018. Accelerated green investment estimate based on hitting assumed \$90trn of green investment over 15 years run rate by 2030 generating an additional US\$6n of green revenues per annum. Assume one times price to sales ratio and 3% growth for the rest of the market.

Source: FTSE Russell, December 2018.

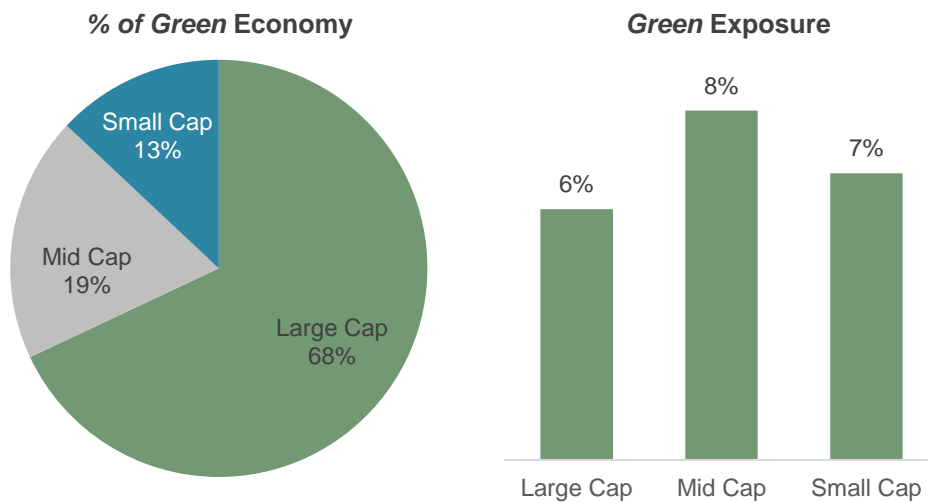
Section 3: Diversification of the green economy

Echoing the main message of the [previous report](#), the GR 2.0 data reinforces the fact that the green economy should not be thought of as limited in size, small cap dominated, lacking diversification or underperforming. Rather it is substantial, growing, diversified, multifaceted, global and outperforming.

The green economy and climate have become important corporate topics in the boardrooms of the world's largest companies. As a result, many large cap companies are now involved in green products and services. They make up 68% of the total green economy, despite green revenues representing only a small percentage of their total—a fact that is often missed when only looking at companies that have very high exposure to green products and services.

The green economy is a broad, diversified investment opportunity.

Figure 8: Green Economy by Issuer Size



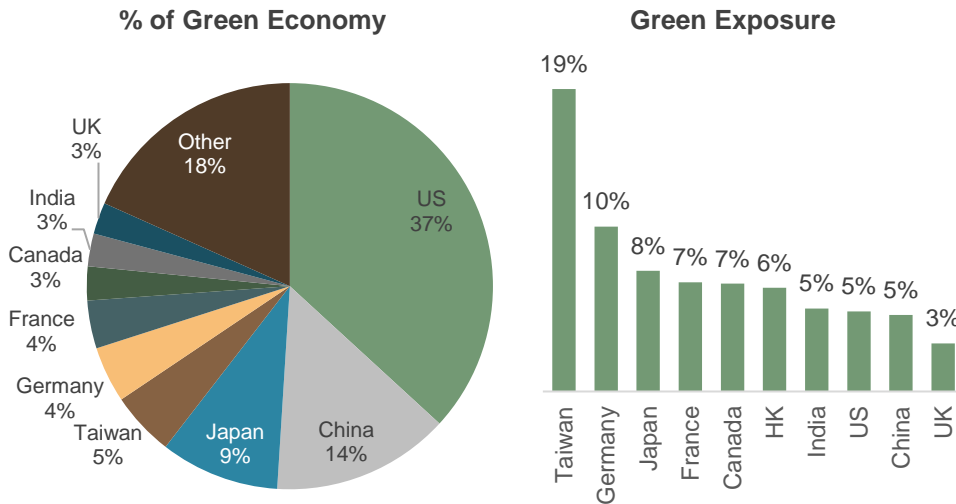
Notes. Company size as defined by FTSE Russell in the FTSE Global Equity Index Series on a region relative basis.

Source: FTSE Russell, December 2018.

The green economy is also diverse across countries. The US and China represent the two largest areas of the market, in line with the size of the global equity market, however, their combined exposure to the green economy is only at the global average of 5%. By contrast, Japan and European countries such as, Germany and France, have high levels of green exposure. The exposure to the green economy can also be influenced by factors such as large individual companies (as is the case in Taiwan), or if other sectors are particularly large (as is the case in the UK).

The US and China are broadly at the global green economy average, while European countries and Japan have a higher exposure to the green economy.

Figure 9: Green Economy by Country



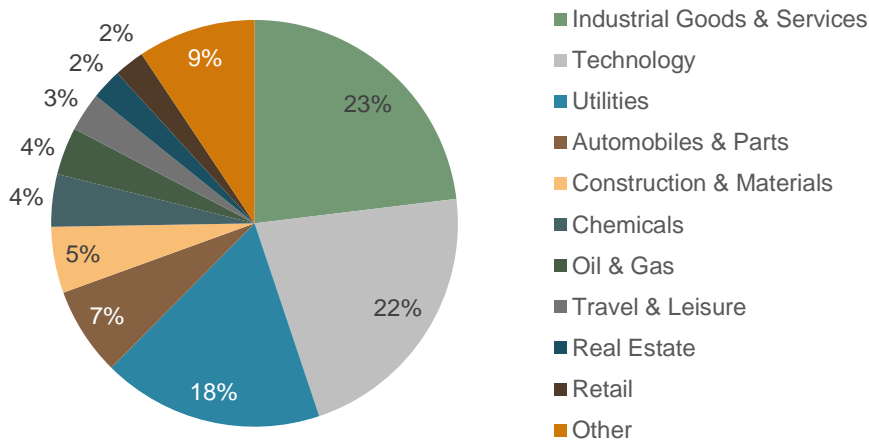
Notes. By country of domicile of listed company.

Source: FTSE Russell, December 2018.

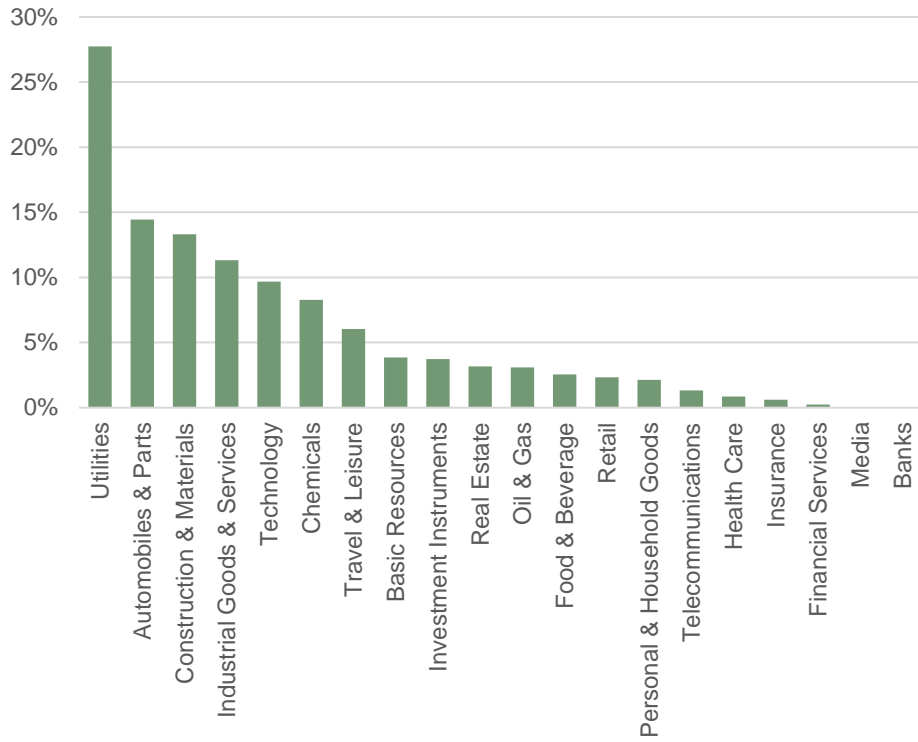
The green economy is relatively concentrated by ICB Supersectors, with Industrial goods & services, technology and utilities representing 63%. This is markedly different from the broader global equity market, with limited exposure to some large industries (i.e., financials and health care).

The green economy is less diversified by ICB Supersectors. Almost two thirds are in the industrials, technology and utilities.

Figure 10: Green Economy by ICB Supersector



Green Exposure by ICB Supersector

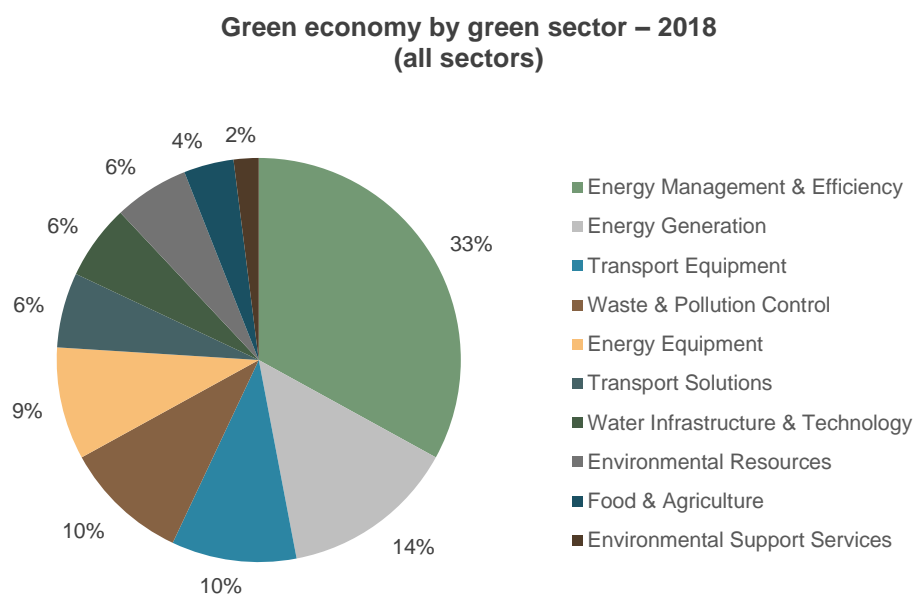


Source: FTSE Russell, December 2018.

Section 4: Granularity of green sectors

The green economy is in reality a diverse set of activities at different points of the value chains, providing solutions to various environmental objectives. It is not just about renewable energy and climate change. Energy management and efficiency is the largest sector, with a representation of 33% of the green economy. This reflects the importance of efficiency in mitigating climate change and other environmental issues in a range of end markets (e.g., buildings, industry and IT, to name a few). Renewable energy generation and equipment are a large, critical and economic part of the power generation sector. They remain large parts of the green economy, making up the second and fifth biggest sectors. However, there are also multiple other sectors of a similar size, such as waste and pollution, water, sustainable agriculture, which, although equally important, are often overlooked.

Figure 11: Global Green Economy by Green Sector



A third of the green economy is in energy efficiency.

Taking a broad view of “green” is key given the smaller, but vitally important segments such as waste, pollution, water and food & agriculture.

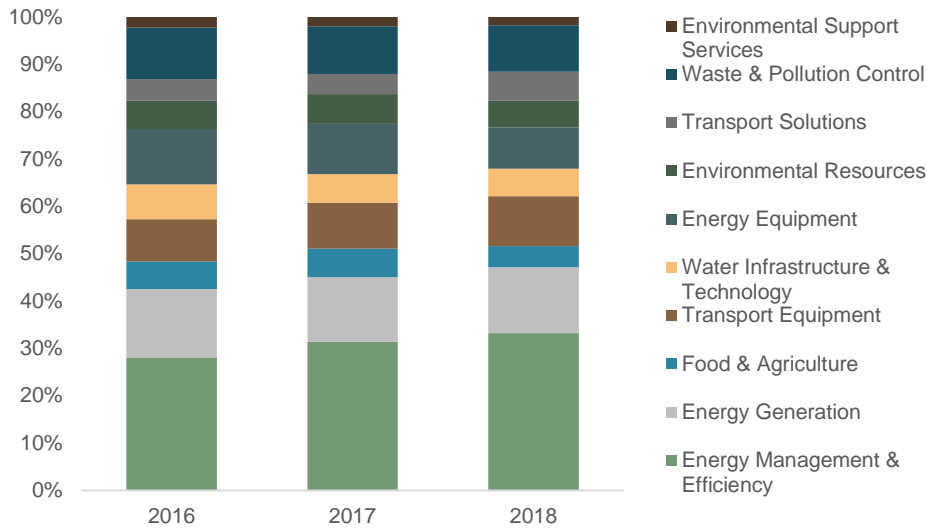
Notes: GR-weighted market cap December 2018.

Source: FTSE Russell, December 2018.

In addition to addressing a broad range of environmental objectives, it is also important to address the full range of the value chain involved in these green products and services. This is particularly true for the listed equity market. For example, the electric vehicle market can range from the lithium producers, battery manufacturers, power electronics manufacturers to the actual electric vehicle manufacturers themselves (and even beyond to smart city solutions managing traffic).

Despite the growth over the years, the make-up of the green economy is relatively stable.

Figure 12: Green economy breakdown by year

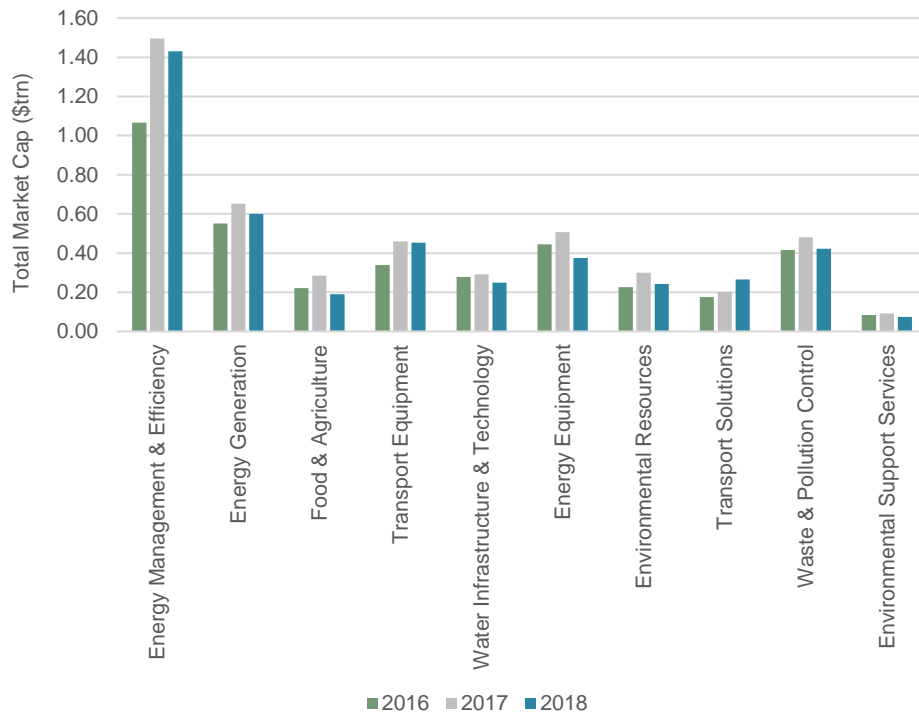


Notes: GR-weighted market cap, December 2018.

Source: FTSE Russell, December 2018.

However, we are starting to see growth of select sub-sectors, which reflect the growth of new activities such as energy efficiency and efficient IT, recycling, electric vehicles etc.

Figure 13: Growth Rates of Selected Green Sectors



Notes: GR-weighted market cap, December 2018.

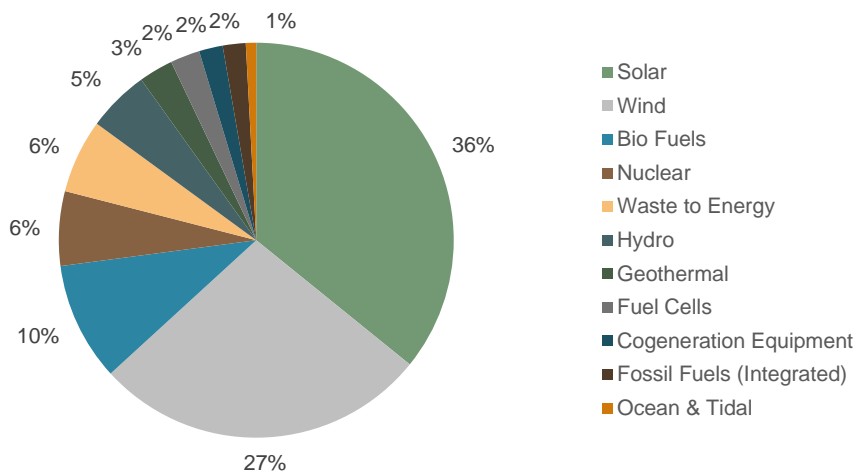
Source: FTSE Russell, December 2018.

Drilling down to micro sectors can help explain the different parts of the green economy. For instance, looking at the renewable energy equipment market, there are different technologies in the market, with solar being the largest. However, in the water market, the different parts of the value chain, such as the water utilities, water treatment technologies and water infrastructure equipment and construction, can be observed. This can help investors build effective green portfolios as these varied parts of the market can also provide unique investment characteristics and the green investors can develop a diversified portfolio, in the same way they can from different traditional industry sectors.

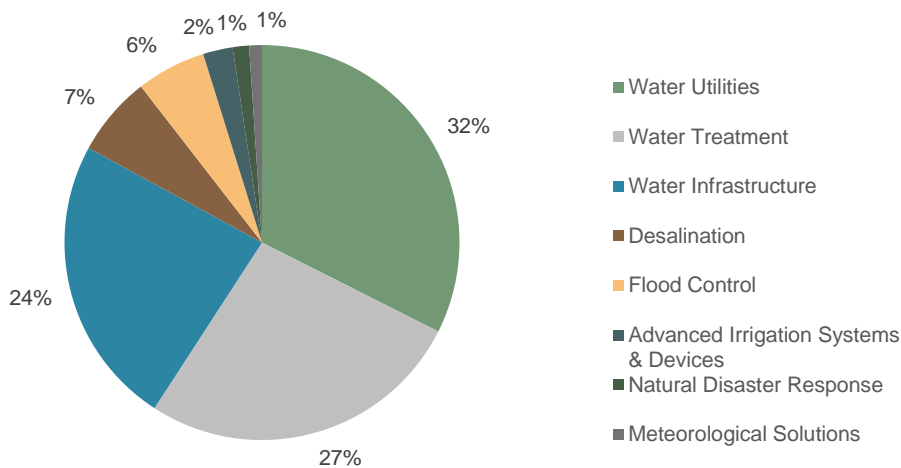
Granularity is important to increase the understanding of the green economy.

Figure 14: Sub-Sector Breakdown of Renewable Energy Equipment & Water Sectors

Breakdown of the Energy Equipment Sector



Breakdown of the Water Infrastructure & Technology Sector



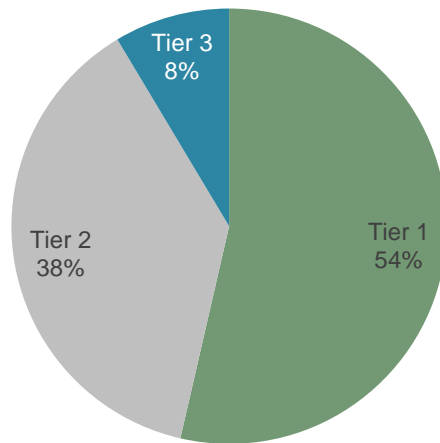
Notes: GR-weighted market cap, December 2018.

Source: FTSE Russell, December 2018.

In addition to individual activities, the green economy has been segmented into three tiers of “greenness” to help investors navigate it. Tier-3 includes more controversial activities, such as nuclear power or environmental resource mining, which have significant environmental risks alongside benefits, and are often omitted from evaluations of the green economy. However, this is a relatively small part of the market at ~8%. Differentiating between levels of greenness is very hard to do, particularly given relatively incomparable environmental objectives. Activities are separated between those which give the strongest environmental benefits within one or more objectives, Tier-1, from those which provide more modest benefits, Tier-2. Figure 15 shows Tier-1 as the largest segment, but both Tier-1 and 2 are much larger than Tier-3.

GR 2.0 uses tiers to assess different levels of “greenness.” Tier-3 includes activities with more marginal levels of net benefit which are often omitted from green investment strategies, but represent only a small part of the green economy.

Figure 15: Global Green Economy by Tier



Notes: GR-weighted market cap, December 2018.

Sources: FTSE Russell December 2018.

Section 5: Conclusion

The green economy is vital to addressing climate change and other environmental challenges, and will become an increasingly more important part of the global economy.

At US\$4 trillion, and 5% of global equity markets, the green economy is already large, diverse and integrated within the broader economy. Investors should not think of it as a niche that needs to be addressed differently to the rest of the investment universe. Rather, they should think of the green economy as an attractive investment opportunity with added sustainability benefits. Having grown at 8% per annum over the last nine years, it is already expanding faster than the broader equity market, but to achieve global environmental objectives, this will need to accelerate.

As focus increases on the green economy, national taxonomies are developed, climate targets and technologies evolve, and corporate disclosure improves, one of the challenges will remain consistent data sets. FTSE Russell's Green Revenue 2.0 data model addresses the key ongoing challenges of green revenues data, taxonomy, granularity and disclosure.

The FTSE GR 2.0 data model puts real, bottom-up company data alongside the top-down measures of taxonomies and environmental objectives, allowing quantitative analysis of the green economy. It identifies the largest opportunities, such as energy management and efficiency (one third of the green economy), as well as often overlooked areas such water, waste or sustainable agriculture. It can help to identify investment opportunities and companies with exposure to key green economy trends.

The data provides an important source to analyze the green economy, benchmark portfolios and examine the impact of various taxonomies.

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