SUSTAINABLE MARKET STRATEGIES

SMS Circular Economy Enablers Thematic Classification

A transparent investment framework for identifying and assessing the relative impact of companies that are making a substantial contribution to "The Transition to a Circular Economy" objective of the EU Taxonomy.

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1. Introduction

Since 2018, SMS has been leveraging its decades of experience in sustainable investing and climate and environmental policy to develop a proprietary, forward-looking analytical framework that focuses on the impact potential of companies and their role in the "high-care, low-carbon" economy of tomorrow.

In 2020, SMS decided to build upon its extensive analytical work to create a transparent investment framework for identifying and scoring publicly listed companies that are developing and applying innovative and impactful solutions to tackle the world's most pressing climatic and environmental challenges. The result was the creation of the **SMS Environmental Impact Opportunities Thematic Classification** which launched in April 2021.

Building on this initial work and further research conducted between the period from May 2021 to October 2022, we launched the **SMS Circular Economy Enablers Thematic Classification** in November 2022.

2. About Us

SMS Financial Technologies Inc ("**Sustainable Market Strategies**" or "**SMS**") is an independent sustainability intelligence firm that provides thematic research and market insights to a global audience of asset owners, investment managers and public policy decision makers.

Our research caters to portfolio managers, sustainability teams and C-suite executives in the investment, regulatory and policy space. Our publications are news and data-driven and provide in-depth sustainable investment strategies across all asset classes. We also support our clients through bespoke projects at the nexus of thematic research and investment strategy.

Since its creation in 2018, SMS has published over 200 investment research notes on sustainable investment themes, analysing the technological, strategic and financial potential of over 1,000 public and private companies in order to find the winners of the transition to a more sustainable economy currently underway.

Our world-class team brings together extensive experience in capital markets, investment research, money management, economics, policy, academic research and sustainable investing.

The company is headquartered in Montreal, Canada.

FÉLIX A. BOUDREAULT, M.ENG., MBA
Managing Partner

Sustainability / ESG Research / Quantitative Finance / Policy

Félix-A. Boudreault is an engineer-MBA with close to 20 years of professional experience in energy, environmental policy and sustainable finance. After working in Africa for a few years, Félix joined Environment and Climate Change Canada where he was Director of International Climate Change Negotiation and Chief of Staff to the Deputy Minister. Between 2015 and 2018, Félix worked for think tanks, private companies and international organizations such as the OECD and IFC.

LENKA MARTINEK
Managing Partner

Global Macro Research / Investment Strategy

Lenka is an investment strategist with over 20 years of professional experience in research and capital markets. Lenka worked for 15 years as a strategist for BCA Research, the leading provider of independent global macro investment research. She then worked as a portfolio manager in the CIO office of one of Canada's largest pension funds. She holds a bachelor's degree in economics and a master's in management and sustainable development at HEC Montréal.

FRANÇOIS BOUTIN-DUFRESNE
Managing Partner

Strategy / Macro and ESG Research / Policy

François is an economist and investment strategist with almost 20 years of international experience in policy-making, capital markets, sustainable finance and development finance. He held roles at the International Monetary Fund, the Government of Canada and, most recently, in capital markets. He is currently affiliated with HEC Montréal, where he teaches economics and finance at MBA/Executive levels. A father of four, François is an avid cyclist and outdoorsman.

FRANÇOIS BOURDON, FSA, CFA, PRM
Managing Partner

Investment / Risk Management / Alternative Investments

François is an investor and investment team leader with a vast experience in multiple asset classes ranging from fixed income and equities to absolute return and hedge fund strategies. As the former Global CIO of Fiera Capital, Canada's largest independent asset manager, he also developed private and public alternative strategies in real estate, infrastructure, agriculture, commodities and more recently, impact investing.

3. Circular Economy — A Prerequisite for Climate Neutrality

There is a carrying biocapacity for human life on the planet. We can measure it through the life-sustaining resources that Earth can provide us each year. Currently, our ecological footprint is about one and a half times our Earth's biocapacity. By 2050, it is expected that an equivalent of three Earths will be needed to sustain our way of life. Global consumption of virgin materials such as biomass, metals and minerals is expected to double over the next 40 years.[1] Meanwhile, our annual waste generation is expected to jump 70% by 2050.[2] Our insatiable demand for Earth's natural resources is untenable and our throwaway economy now poses a threat to our planet's very future. In order to avoid climate breakdown, we must act now – and swiftly. Rethinking the way we produce, consume and exchange, therefore, is now a critical step in our course to achieving a more circular economy and, in turn, a more sustainable world.

3.1 What is a circular economy?

A circular economy is one which intends to 'design waste out'. In fact, a circular economy is based on the principle that there is no such thing as waste at all. To achieve circularity, products must be designed to last (and good quality materials must be used too) and then optimised for a cycle of disassembly and reuse that makes it easier to transform and renew them. A circular system distinguishes itself from the activities of disposal and recycling, where large amounts of energy and labour are lost and waste simply ends up being buried in the ground or incinerated. The goal of a circular economy is to preserve and enhance the world's natural capital by controlling the supply of its finite stocks and balancing renewable resource flows.

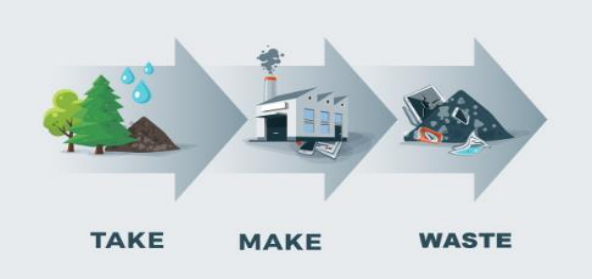
> ***"In our current economy, we take materials from the Earth, make products from them, and eventually throw them away as waste – the process is linear. In a circular economy, by contrast, we stop waste being produced in the first place."*** — Ellen McArthur Foundation

It helps to compare a circular economy with a linear economy. A linear economy follows a **"Take-Make-Waste"** model, which means that raw materials are collected, transformed into products and then used until their end-of-life and finally discarded as waste. In a linear system, value is created by producing and selling as many products as possible.

- **Take**: New (virgin) raw materials are extracted. This process often involves significant energy and results in the emission of greenhouse gases and the degradation of the natural environment from which the raw materials are extracted.
- **Make**: Raw materials are then transformed into products that are used for a finite period. Energy is dispensed and waste by-products are accumulated (including further greenhouse gas emissions) during this phase.
- **Waste**: Products are finally discarded as waste at the end of their useful life (where further greenhouse gas emissions and pollution are released at the disposal stage).

[1] European Union, "Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and The Committee of The Regions: A New Circular Economy Action Plan for a cleaner and more competitive Europe", 2020. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN

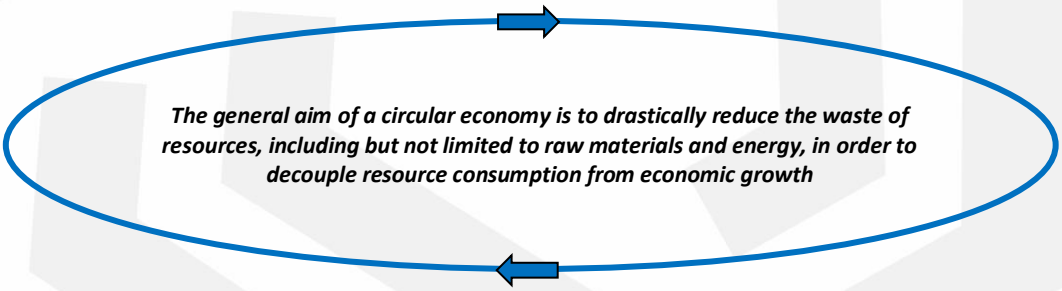
[2] Ibid



Source: Towardszerowaste.gov.sg

3.2 Advancing our society towards more circular business models

Today, our economic systems are predominantly linear. In the past century, as we have scaled these systems, our utilisation rates of raw materials have exploded. In the last 50 years alone, we have more than tripled our raw material use.[3] Moreover, an estimated 90% of what we currently take from Earth currently goes to waste, with just 8.6% recycled.[4] Transitioning to a truly circular economy, therefore, requires urgent and large-scale action. Not just from all parts of government but also from society at large. National and local governments need to create the overarching supportive framework for the transition to a circular economy which combines a strong consumer-focused educational and public lobbying campaign with new rules and incentives for businesses. Such new circularity frameworks will encourage consumers to make more sustainability-driven choices that compel a more sustainability-driven response from businesses who will be motivated to incorporate far greater circularity within their business models. The good news is that we are already heading in the right direction.



Circular business models promote economic systems where the value of products, materials and other resources is maintained for as long as possible. Resources that no longer have usefulness in one economic activity become inputs into another. In this way circular business models progressively seek to decouple economic activities from the consumption of Earth's finite resources, reducing dependency on virgin raw materials and exposure to resource price volatility while providing new business opportunities. These business models seek to build more resilient and durable incentive systems that are good for both productivity and the planet. For citizens, circular business models provide high quality, functional and safe products, which are efficient and affordable, last longer and are designed for reuse, repair and high-quality recycling.

In contrast to the linear economy's "Take-Make-Waste" model, the circular economy enforces a **"Make-Use-Recycle" model**. In this context, however, "Recycle" does not just refer to the industrial act of recycling but is intended to refer to a number of **"Value-Recovery" models** including Reuse, Repair, Refurbish, Remanufacture, Repurpose *and* Recycle.

[3] Circular Online, "Report: 'Throwaway global economy' is fuelling climate change", January 2022. Available at: https://www.circularonline.co.uk/news/report-throwaway-global-economy-is-fuelling-climate-change/
[4] Ibid

Source: IADB.org

4. The Role of Finance and the EU Taxonomy in the Circular Economy

4.1 Foreword

Financial markets, through the deployment and reallocation of capital, can play a significant role in addressing today's environmental challenges. Many market participants now acknowledge that environmental risks and social risks *are* financial risks. Using the theory of efficient allocation of resources, this should lead to significant inflows into sustainability-focused businesses in the years ahead.

Why was the EU Taxonomy created?

By passing the Green Deal in 2019, the European Union (EU) set the course for more sustainable investments, for example in areas like renewable energy, biodiversity or circular economy. The goal is to reach a climate-neutral economy in the EU by 2050, with a reduction of 55% already implemented in 2030. To achieve these climate goals, the Green Deal includes an investment plan of 1 trillion euros over the next 10 years. Despite this huge investment, the EU depends also on the support of the private sector to achieve the Paris climate agreement.

The EU Taxonomy for Sustainable Activities (the "**EU Taxonomy**")[5] and the Sustainable Finance Disclosure Regulation ("**SFDR"**)[6] are implemented to ensure equal competition and legal certainty for all companies operating within the EU. Both regulations follow the objective of the Green Deal and have the following key goals:

1. Reorientation of capital flows with a focus on sustainable investments
2. Establishing sustainability as a component of risk management
3. Promoting/encouraging long-term investment and economic activity

Combined, the EU Taxonomy and SFDR will accelerate Europe's transition to a low-carbon economy by promoting transparency and accountability, boosting green investment and reducing 'greenwashing' in the investment industry.

[5] Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088. Available at: https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en
[6] Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector. Available at: https://eur-lex.europa.eu/eli/reg/2019/2088/oj

What exactly is the EU Taxonomy?

The EU Taxonomy regulation describes a framework to classify "green" or "sustainable" economic activities executed in the EU. Previously, there was no clear definition of green, sustainable or environmentally friendly economic activity. The EU Taxonomy regulation creates a clear framework for the concept of sustainability, exactly defining when a company or enterprise is operating sustainably or environmentally friendly. Compared to their competitors, these companies stand out positively and thus should benefit from higher investments. Thereby, the legislation aims to reward and promote environmentally friendly business practices and technologies. The focus lays on the following six environmental objectives:

Box 1: The Six Environmental Objectives of the EU Taxonomy

1. CLIMATE CHANGE MITIGATION
2. CLIMATE CHANGE ADAPTATION
3. THE SUSTAINABLE USE AND PROTECTION OF WATER AND MARINE RESOURCES
4. **THE TRANSITION TO A CIRCULAR ECONOMY**
5. POLLUTION PREVENTION AND CONTROL
6. THE PROTECTION AND RESTORATION OF BIODIVERSITY AND ECOSYSTEMS

As one of the six environmental objectives of the EU Taxonomy, **The Transition to a Circular Economy** has its own set of screening criteria for determining which economic activities make a substantial contribution to the realisation of the objective. Accordingly, the transition to a circular economy is a hugely significant pillar of the European Green Deal.

In June 2021, the European Commission adopted the delegated act for the Technical Screening Criteria ("**TSC**") for the first two environmental objectives of the EU Taxonomy ("Climate Change Mitigation" and "Climate Change Adaptation") which started applying from 1 January 2022.

In March 2022, the Platform on Sustainable Finance (the "**PSF**")[7], a permanent expert group mandated by the European Commission to assist them in developing its sustainable finance policies, published its draft recommendations for the TSC for the four remaining environmental objectives of the EU Taxonomy, which included "The Transition to a Circular Economy" objective.

At the time of writing, the European Commission has not yet formally adopted the **TSC** for "The Transition to a Circular Economy" objective. However, it is anticipated that the current version of the TSC for "The Transition to a Circular Economy" as proposed by the PSF to the European Commission in March 2022 will be adopted in their current form. This was the case with the TSC for the first two environmental objectives which were adopted in full by the European Commission.

Importantly, however, the PSF has, in the draft TSC for "The Transition to a Circular Economy" objective, highlighted that "*due to resources, workload and time available, it was considered that the PSF would only be able to address up to about 20 economic activities per environmental objective in*

[7] European Commission, "Platform on Sustainable Finance", 2022. Available at: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/overview-sustainable-finance/platform-sustainable-finance_en

the first phase of the work."[8] The PSF notes that some sectors, including Batteries and Vehicles, are currently omitted from the draft TSC. The PSF states that this is due to the potential overlap and conflict with the previously adopted TSC for Climate Change Mitigation and Climate Change Adaptation. Accordingly, the draft TSC for "The Transition to a Circular Economy" objective are not to be considered as exhaustive or complete; rather they are the first iteration of a work in progress. The PSF is expected to release and propose that the European Commission adopts, further iterations of the TSC in the future to capture economic activities not currently covered by the draft TSC and to resolve any overlap and conflicts across all six environmental objectives.

Given the incomplete status of the TSC for "The Transition to a Circular Economy" objective, we (SMS) have, for the purposes of defining the SMS Circular Economy Enablers Thematic Classification, proposed a number of economic activities for inclusion which address the key product value chains and economic activities (such as "Batteries and Vehicles" and "Packaging") that are currently omitted from the TSC but which we expect will be progressively added to the TSC in future iterations. To assist with this, we have extrapolated from the various studies and reports that have been published by the European Commission (and other leading independent bodies championing the transition to a circular economy in recent years), particularly the European Commission's "Circular Economy Action Plan" 2020, while we wait for further iterations of the TSC to be released. The various studies and reports are referenced below.

4.2 "Categorisation System for the Circular Economy" – May 2020

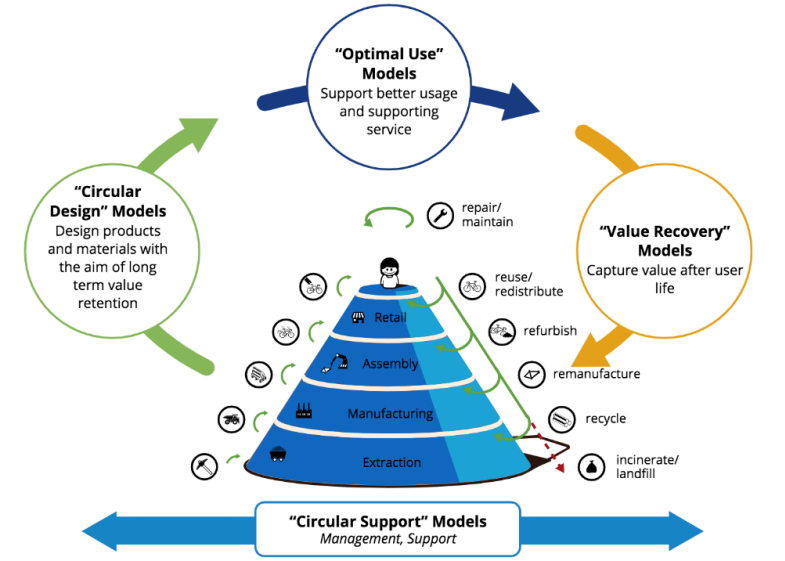
In May 2020, the European Commission's Circular Economy Financing Expert Group published the "Categorisation System for the Circular Economy" which was designed to be a sector-agnostic circular economy categorisation system for defining categories of activities substantially contributing to a circular economy. The Categorisation System for the Circular Economy was an important inspiration for the current draft TSC for "The Transition to a Circular Economy" objective proposed by the PSF in March 2022. It followed a previously published report in March 2019 by the Circular Economy Financing Expert Group entitled *"Accelerating the transition to the Circular Economy"*[9], providing recommendations on how to improve access to finance for circular economy projects. One of the challenges identified in the March 2019 report related to a lack of a common, foundational approach to defining circular economy activities, which the Categorisation System for the Circular Economy from May 2020 addressed in depth.

The Categorisation System for the Circular Economy from May 2020 is organised into four high-level category stages. These category stages align with the Value Hill Business Model Tool[10] developed by Circle Economy as per the diagram illustration below.

[8] Platform on Sustainable Finance, Part A: Methodological report, March 2022, See Section 2.3 ("Prioritised economic activities"). Available at: https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/220330-sustainable-finance-platform-finance-report-remaining-environmental-objectives-taxonomy_en.pdf

[9] European Commission, "ACCELERATING THE TRANSITION TO THE CIRCULAR ECONOMY", 2019. Available at: https://ec.europa.eu/info/sites/info/files/research_and_innovation/knowledge_publications_tools_and_data/documents/accelerating_circular_economy_032019.pdf

[10] Achterberg, E., Hinfelaar, J., Bocken, N. The value hill business model tool: identifying gaps and opportunities in a circular network, 2018. Available at: https://docplayer.net/86718304-The-value-hill-business-model-tool-identifying-gaps-and-opportunities-in-a-circular-network.html



Source: Value Hill Business Model Tool

Each of the four category stages can be subsequently broken down into 14 specific circular business models as laid out hereunder:

Circular Design Models:

1. 1.a Design and production of products and assets that enable circular economy strategies, through e.g. (i) increased resource efficiency, durability, functionality, modularity, upgradability, easy disassembly and repair; (ii) use of materials that are recyclable or compostable
2. 1.b Development and deployment of process technologies that enable circular economy strategies
3. 1.c Development and sustainable production of new materials (including bio-based materials) that are reusable, recyclable or compostable
4. 1.d Substitution or substantial reduction of substances of concern in materials, products and assets to enable circular economy strategies
5. 1.e Substitution of virgin materials with secondary raw materials and by-products

Optimal Use Models:

6. 2.a Reuse, repair, refurbishing, repurposing and remanufacturing of end-of-life or redundant products, movable assets and their components that would otherwise be discarded
7. 2.b Refurbishment and repurposing of end-of-design life or redundant immovable assets (buildings/infrastructure/facilities)
8. 2.c Product-as-a-service, reuse and sharing models based on, inter alia, leasing, pay-per-use, subscription or deposit return schemes, that enable circular economy strategies
9. 2.d Rehabilitation of degraded land to return to useful state and remediation of abandoned or underutilised brownfield sites in preparation for redevelopment

Value Recovery Models:

10. 3.a Separate collection and reverse logistics of wastes as well as redundant products, parts and materials enabling circular value retention and recovery strategies
11. 3.b Recovery of materials from waste in preparation for circular value retention and recovery strategies (excluding feedstock covered under 3.c)
12. 3.c Recovery and valorisation of biomass waste and residues as food, feed, nutrients, fertilisers, bio-based materials or chemical feedstock

13. 3.d Reuse/recycling of wastewater

Circular Support Models:

14. 4.a Development/deployment of tools, applications and services enabling circular economy strategies

The Categorisation System for the Circular Economy also establishes the "**R Strategies and Principles Hierarchy**". This is a hierarchy that is designed to illustrate the preferred order of actions to a circular economy (see Box 2). For example, an R1 strategy is a more impactful than an R5 strategy, which in turn is more impactful than an R7 strategy and so on.

Box 2: R Strategies and Principles Hierarchy

R1: Refuse: Make product redundant by abandoning its function or by offering the same function by a radically different (e.g. digital) product or service
R2: Rethink: Make product use more intensive (e.g. through product-as-a service, reuse and sharing models or by putting multi-functional products on the market)
R3: Reduce: Increase efficiency in product manufacture or use by consuming fewer natural resources and materials
R4: Reuse: Reuse of a product which is still in good condition and fulfils its original function (and is not waste) for the same purpose for which it was conceived
R5: Repair: Repair and maintenance of a defective product so that it can be used with its original function
R6: Refurbish: Restore an old product and bring it up to date (to specified quality level)
R7: Remanufacture: Use parts of a discarded product in a new product with the same function (and as-new condition)
R8: Repurpose: Use a redundant product or its parts in a new product with a different function
R9: Recycle: Recover materials from waste to be reprocessed into new products, materials or substances whether for the original or other purposes. Includes the reprocessing of organic material but does not include energy recovery

4.3 "Circular Economy Action Plan" – March 2020[11]

The first circular economy action plan was adopted by the European Commission in 2015. The plan included measures to help stimulate Europe's transition to a more circular economy, boost global competitiveness, foster sustainable economic growth and generate new jobs. The plan established concrete and ambitious actions, with measures covering whole lifecycles: from production and consumption to waste management, a revised legislative proposal on waste and the development of a market for secondary raw materials. On 4 March 2019, the European Commission adopted a comprehensive report on the implementation of the action plan.

The European Commission adopted a new and more detailed action plan in March 2020 (the "**Circular Economy Action Plan 2020**"). This more detailed plan is a fundamental part of the European Green Deal. This plan includes 35 actions and establishes a pathway for the transition to a circular economy by reducing pressure on natural resources, creating sustainable growth and jobs, achieving the EU's 2050 climate neutrality target and bringing to an end biodiversity loss. It identifies initiatives along the entire lifecycle of products: from promoting eco-design and circular methods to encouraging sustainable consumption, preventing waste and reducing resource usage.

[11] European Commission, "New circular economy action plan", 2020. Available at: https://ec.europa.eu/environment/pdf/circular-economy/new_circular_economy_action_plan.pdf

The Circular Economy Action Plan 2020 also identifies 7 "Key Product Value Chains" where the need to transition towards greater circularity is highest and where urgent, comprehensive and coordinated actions are needed.

1. **Electronics and ICT[12]:** Electrical and electronic equipment continues to be one of the fastest growing waste streams in the EU and the world, with current annual growth rates of 2%. It is estimated that less than 40% of electronic waste is recycled in the EU.[13]
2. **Batteries and Vehicles:** Sustainable batteries and vehicles underpin the mobility of the future. However, rapid progress is needed to enhance the sustainability of the emerging battery value chain for electro-mobility and boost the circular potential of all batteries.
3. **Packaging:** The amount of materials used for packaging is growing continuously and in 2017 packaging waste in Europe reached a record – 173kg per inhabitant, the highest level ever.
4. **Plastics:** Plastic accumulating in our oceans and on our beaches has become a global crisis. Plastic can be found in swirling convergences that make up about 40% of the world's ocean surfaces. At current rates plastic is expected to outweigh all the fish in the sea by 2050.
5. **Textiles:** Textiles are the fourth highest-pressure category for the use of primary raw materials and water, after food, housing and transport and fifth for greenhouse gas emissions. It is estimated that less than 1% of all textiles worldwide are recycled into new textiles.[14]
6. **Construction and Buildings:** The built environment has a significant impact on many sectors of the economy, on local jobs and quality of life. It requires vast amounts of resources and accounts for about 50% of all extracted material. The construction sector is responsible for over 35% of the EU's total waste generation.[15]
7. **Food, Water and Nutrients:** The circular economy can significantly reduce the negative impacts of resource extraction and use on the environment and contribute to restoring biodiversity and natural capital. Biological resources are a key input to the economy and will play an even more important role in the future.

The practical application of circularity is still in its infancy. Accordingly, we anticipate that the activities within the aforementioned value chains will evolve and expand as we transition to a more circular economy.

4.4 "Development of the EU Sustainable Finance Taxonomy – A framework for defining substantial contribution for environmental objectives 3-6" – March 2022[16]

The European Commission's Joint Research Centre (JRC) report entitled "*Development of the EU Sustainable Finance Taxonomy – A framework for defining substantial contribution for environmental objectives 3-6*" (the "**JRC Report**") is a key input in the development of the TSC for the four remaining environmental objectives defined in the EU Taxonomy, one of which is "The Transition to a Circular Economy" objective. The JRC Report proposes a methodological, step-by-step framework for drafting criteria for economic activities that substantially contribute to an environmental objective: from identification of the type of substantial contribution the economic activity can make, selection of the most suitable approach for drafting the TSC and setting an expected ambition level in order to consider a contribution substantial. The JRC Report then unpacks how this framework can be applied to each of the four environmental objectives.

[12] ICT stands for Information Communications Technology.
[13] European Commission, "New circular economy action plan", 2020. Available at: https://ec.europa.eu/environment/pdf/circular-economy/new_circular_economy_action_plan.pdf
[14] Ellen McArthur Foundation's "A New Textiles Economy", 2017.
[15] Eurostat data for 2016.
[16] European Commission, "Development of the EU Sustainable Finance Taxonomy – A framework for defining substantial contribution for environmental objectives 3-6", 2022. Available at: https://publications.jrc.ec.europa.eu/repository/handle/JRC126045

Moreover, the framework prescribed in the JRC Report has already shown itself to be successfully implementable in the work of the PSF, detailed in Section 4.5 below. Accordingly, the framework was implemented in its entirety as part of a collaboration between the PSF and the JRC.

4.5 "Report with recommendations on technical screening criteria for the four remaining environmental objectives of the EU taxonomy" and corresponding "Annex" – March 2022

At the time of writing, the most recent publications from the EU are the PSF's "Report with recommendations on technical screening criteria for the four remaining environmental objectives of the EU taxonomy" (the "**Report**")[17] and the corresponding "Annex to the report with recommendations on technical screening criteria for the four remaining environmental objectives of the EU taxonomy" (the "**Annex**")[18] containing the draft TSC for the four remaining environmental objectives, including for "The Transition to a Circular Economy" objective (together, the "**Draft EU Taxonomy**").

As the foregoing documents have been developed specifically for the sustainable finance agenda and EU Taxonomy in the context of "The Transition to a Circular Economy" objective, we (SMS) have mapped the **7 Key Product Value Chains** of the Circular Economy Action Plan 2020 described in Section 4.3 above to the TSC contained in the Draft EU Taxonomy.[19]

The Draft EU Taxonomy identifies the following **11 "priority activities"** that make a *"substantial contribution*" to "The Transition to a Circular Economy" objective:

1. Manufacture of rubber and plastic products
2. Manufacture of computer, electronic and optical products
3. Manufacture of electrical equipment
4. Manufacture of textiles
5. Manufacture of wearing apparel
6. Construction of buildings
7. Manufacture of leather and related products
8. Manufacture of food products
9. Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
10. Civil engineering
11. Manufacture of chemicals and chemical products

In addition, the PSF states that *"the above-mentioned activities need to be complemented by activities that do not have significant impact but significantly contribute to directly improving the state of the environment (i.e. healing the environment)"*. In this context, the PSF sets out the following **8 "additional activities directly improving the state of the environment":**

12. Water collection, treatment and supply
13. Sewerage
14. Waste collection, treatment and disposal activities; materials recovery

[17] European Commission, "Platform on Sustainable Finance's report with recommendations on technical screening criteria for the four remaining environmental objectives of the EU taxonomy", March 2022. Available at: https://ec.europa.eu/info/files/220330-sustainable-finance-platform-finance-report-remaining-environmental-objectives-taxonomy_en

[18] European Commission, "Annex to the Platform on Sustainable Finance's report with recommendations on technical screening criteria for the four remaining environmental objectives of the EU taxonomy", March 2022. Available at: https://ec.europa.eu/info/files/220330-sustainable-finance-platform-finance-report-remaining-environmental-objectives-taxonomy-annex_en

[19] As outlined at Section 4 above, given the incompleteness of the TSC for "The Transition to a Circular Economy" objective, we (SMS) have, for the purpose of defining our Circular Economy Enablers Thematic Classification, proposed a number of additional economic activities for inclusion which address some of the sectors and economic activities such as batteries and vehicles and mining that are currently omitted from the draft TSC but which we expect will be included in the near future.

15. Remediation activities and other waste management services
16. Repair of fabricated metal products, machinery and equipment
17. Maintenance and repair of motor vehicles
18. (Sale), maintenance and repair of motorcycles and related parts and accessories
19. Repair of computers and personal and household goods

There is a large overlap between the **19 economic activities** above and the **7 Key Product Value Chains** of the Circular Economy Action Plan 2020. Set out below is a mapping table highlighting the overlap and indicating any notable divergences.

A large number of companies are assigned to both a Key Product Value Chain of the Circular Economy Action Plan 2020 and one of the 19 economic activities identified within the Draft EU Taxonomy.

7 "Key Product Value Chains" from the Circular Economy Action Plan 2020	**11 "priority activities" and 8 "additional activities directly improving the state of the environment" from the Draft EU Taxonomy for "The Transition to a Circular Economy" objective**
1. Electronics and ICT	2. Manufacture of computer, electronic and optical products 3. Manufacture of electrical equipment 19. Repair of computers and personal and household goods
2. Batteries and Vehicles	17. Maintenance and repair of motor vehicles 18. (Sale), maintenance and repair of motorcycles and related parts and accessories *N.B. the PSF acknowledges in the Draft EU Taxonomy that it has not yet properly considered Batteries and Vehicles due to potential conflicts with the "Climate Change Mitigation" objective. However, the PSF states that it intends to address this Key Product Value Chain in the future.*
3. Packaging	Not covered
4. Plastics	1. Manufacture of rubber and plastic products
5. Textiles	4. Manufacture of textiles 5. Manufacture of wearing apparel 7. Manufacture of leather and related products
6. Construction and Buildings	6. Construction of buildings 10. Civil engineering 16. Repair of fabricated metal products, machinery and equipment
7. Food, Water and Nutrients	8. Manufacture of food products 12. Water collection, treatment and supply 13. Sewerage
	9. Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials 11. Manufacture of chemicals and chemical products *N.B. The above economic activities are not related to the 7 Key Product Value Chains of the Circular Economy Action Plan 2020 but are captured in the Draft EU Taxonomy's list of 11 priority activities making a substantial contribution to "The Transition to a Circular Economy" objective.*

	14. Waste collection, treatment and disposal activities; materials recovery 15. Remediation activities and other waste management services *N.B. The above economic activities are neither related to the 7 Key Product Value Chains of the Circular Economy Action Plan 2020 nor captured in the Draft EU Taxonomy's list of 11 priority activities making a substantial contribution to "The Transition to a Circular Economy" objective but are captured in the Draft EU Taxonomy's 8 additional activities directly improving the state of the environment.*

5. SMS Circular Economy Enablers Thematic Classification

5.1 Introduction

The SMS Circular Economy Enablers Thematic Classification ("**Thematic Classification**") is a transparent and forward-looking classification framework which has been designed to identify and assess the relative impact of publicly listed companies that are making a substantial contribution to "The Transition to a Circular Economy" objective of the EU Taxonomy, either through their own enabling Circular Products and Services or through Enabling Products and Services that support (i.e. enable) other companies (i.e. industry practitioners) to enhance circularity within their own business models. The Thematic Classification prioritises companies contributing to circularity within the key product value chains (sectors) where the need to transition towards greater circularity is highest and where urgent, comprehensive and coordinated actions are needed.

To be eligible for consideration, a company must be involved in either:

1. **Circular Products and Services – i.e. the direct provision of enabling products or services that are circular in nature and/or directly contribute to an improvement in the state of the natural environment** including (i) the **Circular Design and Production** of products predominantly using recycled or otherwise wasted materials (e.g. the production of paper and packaging from recycled materials or the production of biogas from wasted organic material); (ii) services that intensify and optimise the **Circular Use** of individual products and assets (e.g. product leasing services); and/or (iii) **Circular Value Recovery** services (e.g. remanufacturing, recycling and waste management services); or

2. **Enabling Products and Services – i.e. activities that support (i.e. enable) other companies (i.e. industry practitioners) to enhance circularity within their own business models** by allowing them to (i) improve the **Circular Design and Production** of their own products and materials with the aim of retaining long-term value and reducing waste; (ii) extend the life of or intensify and optimise the **Circular Use** of their own products or assets by customers during the use phase and/or the use of materials by the company itself during the use-phase; and/or (iii) enhance the **Circular Value Recovery** potential of their own products in the after-use phase.

The Thematic Classification **does not seek** to capture industry practitioners who are simply enhancing circularity within their own business models.

The result of the classification process is the SMS Circular Economy Enablers Stock Universe ("**Stock Universe**") which includes publicly listed companies that have been thematically categorised by SMS

across the various sectors of the Thematic Classification and assigned a Circular Enablers Score reflecting the 9 "R" Strategies of the Circular Economy Hierarchy.

Companies must have a minimum free-float market capitalisation of USD 150 million to be eligible for consideration in the Stock Universe.

5.2 Classification Methodology

The objective of the Thematic Classification is to identify and assess the relative impact of companies that are making a substantial contribution to "The Transition to a Circular Economy" objective, either through their own Circular Products and Services or through Enabling Products and Services that support (i.e. enable) other companies (i.e. industry practitioners) to enhance circularity within their own business models.

5.2.1 Classification within the relevant Circular Economy Stage

The first dimension of the Thematic Classification involves assigning each company a Level 1 Classification of either (a) Circular Products and Services or (b) Enabling Products and Services and then subsequently assigning a Level 2 Classification within one of the four Circular Economy Stages as follows:

Level 1 Classification	**Level 2 Classification – Circular Economy Stage**
1. **Circular Products and Services** – the direct provision of enabling products and services that are circular in nature and/or directly contribute to an improvement in the state of the natural environment	**1.** **Circular Design and Production**: **1.1.** **Own Performance activities:** The design and production of products predominantly using recycled or otherwise wasted materials *(e.g. the production of paper and packaging from recycled materials or the production of biogas from wasted organic material)* with the aim of minimising raw material extraction and use during production. **1.2.** **Supporting/Enabling activities:** Products and services that support/enable other companies (i.e. industry practitioners) to improve the circular design and production of their own products and materials with the aim of retaining long-term value and reducing waste, promoting dematerialisation by making parts and materials redundant or replacing them altogether or replacing them with radically different products or services.
2. **Enabling Products and Services** – activities that support (i.e. enable) other companies (i.e. industry practitioners) to enhance circularity within their own business models	**2.** **Circular Use**: **2.1.** **Own Performance activities:** Services that intensify and optimise the use of individual products or assets *(e.g. product leasing services)* with the aim of retaining resource value and reducing the need for raw material extraction and resulting waste.

	2.2. Supporting/Enabling activities: Products and services that support/enable other companies (i.e. industry practitioners) to extend the life of and intensify/optimise the use of their own products and assets by customers during the use phase and/or the use of materials by the company itself during the use phase with the aim of retaining resource value and reducing waste to help improve usage and supporting service.
	3. Circular Value Recovery: **3.1. Own Performance activities:** Value recovery services *(e.g. remanufacturing, recycling and waste management services).* **3.2. Supporting/Enabling activities:** Products and services that support/enable other companies (i.e. industry practitioners) to enhance the value recovery potential of their own products in the after-use phase and/or to recapture value from otherwise wasted materials in the after-use phase that might be capable of being used by the company.
	4. Circular Support: Products or services that support/enable other companies (i.e. industry practitioners) with respect to stages 1 to 3 above *(e.g. enabling digital tools and applications, education and awareness-raising programmes and advisory services to support circular economy strategies and business models of other companies (i.e. industry practitioners).*

5.2.2 Classification within the Key Product Value Chains / Economic Activities

The second dimension of the Thematic Classification involves assessing which product value chains (sectors) that a company is contributing to in terms of circularity.

Given that certain product value chains have a substantially higher *Take-Make-Waste* impact on the environment than others, the relevant product value chains (sectors) that a company is contributing to in terms of circularity is crucial to determining the overall contribution to the transition to a circular economy (i.e. the level of impact) that it is having.

Accordingly, a company must, through its Circular Products and Services or Enabling Products and Services, be making a substantial contribution to circularity within one or more of the key product value chains / economic activities identified below in order to be eligible for consideration:

1. A company will be included if it is involved in Circular Products and Services or Enabling Products and Services within one of the **7 Key Product Value Chains** of the Circular Economy Action Plan 2020, even if a particular product value chain is not currently identified in the 11 "priority activities" by the Draft EU Taxonomy for "The Transition to a Circular Economy" objective.

   As noted at Section 4.1 (*Foreword*) above, the Circular Economy Action Plan 2020 includes two high impact product value chains ("Batteries and Vehicles" and "Packaging") that are not yet identified as "priority activities" for "The Transition to a Circular Economy" objective within the Draft EU Taxonomy due to the potential overlap and conflict with the previously adopted TSC for the "Climate Change Mitigation" and "Climate Change Adaptation" objectives. Accordingly, the draft TSC for "The Transition to a Circular Economy" objective are not to be considered as exhaustive or complete; rather they are the first iteration of a work in progress, as acknowledged by the PSF in the Draft EU Taxonomy.

   Therefore, for the purposes of this Thematic Classification, we consider companies involved in Circular Products and Services or Enabling Products and Services within the "Batteries and Vehicles" or "Packaging" value chains as eligible for inclusion in the Thematic Classification and Stock Universe as a way of bridging the current coverage gaps of the Draft EU Taxonomy whilst the PSF continues to work on adding the economic activities not currently covered by the draft TSC and resolving any overlap and conflicts across all six environmental objectives.

2. A company will also be included if it is involved in Circular Products and Services or Enabling Products and Services within one of the **11 "priority activities"** identified by the Draft EU Taxonomy as making a "*substantial contribution*" to "The Transition to a Circular Economy" objective or within one of the **8 "additional activities directly improving the state of the environment"** identified by the Draft EU Taxonomy "*that do not have significant impact but significantly contribute to directly improving the state of the environment (i.e. healing the environment)."*

   A company will be included even if the relevant "priority activities" or additional "activities directly improving the state of the environment" that it is contributing to through its Own Circular Activities or Circular-Enabling Activities are not related to one of the **7 Key Product Value Chains** of the Circular Economy Action Plan 2020. Notably, this currently captures two of the "priority activities ("9. Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials" and "11. Manufacture of chemicals and chemical products") and two of the "additional activities directly improving the state of the environment" (14. Waste collection, treatment and disposal activities; materials recovery and 15. Remediation activities and other waste management services).

As indicated in the mapping table at Section 4.5 above, there is a huge amount of overlap between the **7 Key Product Value Chains** of the Circular Economy Action Plan 2020 and the 19 economic activities of the Draft EU Taxonomy (comprised of 11 "priority activities" and 8 "additional activities directly improving the state of the environment"). Accordingly, a large proportion of companies in the Stock Universe are assigned to both a Key Product Value Chain of the Circular Economy Action Plan 2020 and one of the 19 economic activities of the Draft EU Taxonomy.

5.3 Circular Enablers Score

Once classified in accordance with the above, each company within the Stock Universe is assigned a Circular Enablers Score. The Circular Enablers Score is a ranking assigned to each company in the Stock Universe based on its circular contribution (as assessed by reference to the company's position and relationship to the "R" Strategies of the Circular Economy Hierarchy) and its financial strength (as assessed by SMS).

$$CircularEnablersScore = \frac{1}{2}(CircularContributionScore) + \frac{1}{2}(FinancialStrengthScore)$$

5.3.1 Circular Contribution Score

Part 1: Determining each company's Circular Revenue Score by assessing its thematic purity – Calculation based on weighted average revenue purity

Each company is assessed for its economic exposure (i.e. relevance) to each of the 9 "R" Strategies of the Circular Economy Hierarchy set out in the table below, which is determined by reference to the proportion of its revenue that is attributable to each of the 9 "R" Strategies.

Set out below are the 9 "R" Strategies and an indication of the sliding scale of weights attributable to each "R" Strategy. Each "R" Strategy is assigned a weight based on its position in the Circular Economy Hierarchy (see table below) which reflects the extent of its potential impact on the "The Transition to a Circular Economy" objective. The higher the position of a company's revenue in the Circular Economy Hierarchy, the higher its impact potential on the objective. Correspondingly, the lower the position of a company's revenue in the Circular Economy Hierarchy, the lower its impact potential on the objective.

Each company is first given a Circular Revenue Score by reference to the proportion of its revenue that is attributable to each "R" Strategy. It is common that companies derive revenue from multiple "R" Strategies which means that each company will be given an overall weighted average Circular Revenue Score that reflects its mix of revenue from each of the relevant "R" Strategies and the corresponding weights of each of the relevant "R" Strategies in the Circular Economy Hierarchy.

For example, a Company A that derives 100% of its revenue from R9: Recycle will receive a lower Circular Revenue Score than a Company B that derives 50% of its revenue from R3: Reduce and 50% of its revenue from R9: Recycle. In this example, Company A would receive a Circular Revenue Score = 100*(100%*65%) = 65.0, whilst Company B would receive a Circular Revenue Score = 100*[(50%*90%)+(50%*65%)] = 77.5.

The "R" Strategies of the Circular Economy Hierarchy	Weight applied to associated revenue	Degree of impact
R1: Refuse: Make product redundant by abandoning its function or by offering the same function by a radically different (e.g. digital) product or service	100%	Most impactful  Least impactful
R2: Rethink: Make product use more intensive (e.g. through product-as-a service, reuse and sharing models or by putting multi-functional products on the market)	95%	
R3: Reduce: Increase efficiency in product manufacture or use by consuming fewer natural resources and materials	90%	
R4: Reuse: Reuse of a product which is still in good condition and fulfils its original function (and is not waste) for the same purpose for which it was conceived	85%	
R5: Repair: Repair and maintenance of a defective product so it can be used with its original function	80%	
R6: Refurbish: Restore an old product and bring it up to date (to specified quality level)	80%	
R7: Remanufacture: Use parts of a discarded product in a new product with the same function (and as-new-condition)	75%	
R8: Repurpose: Use a redundant product or its parts in a new product with different function	70%	
R9: Recycle: Recover materials from waste to be reprocessed into new products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery [N.B. SMS applies one exception to the above in the context of recycling of materials that are critical to the green transition (such as metals and minerals in batteries). Companies that are involved in the recycling of such materials are considered to be considerably more impactful than companies involved in the recycling of less critical materials and materials that will eventually be phased out of use (like plastics).]	65% (85% for critical materials)	

Part 2: Determining each company's Circular Contribution Score by assessing the materiality of its contribution – Direct, Indirect or Unrelated to the primary linear economy issues in the relevant Key Product Value Chain or Priority Activity

One further assessment that is made with respect to each company's exposure to the "R" Strategies is in determining whether its economic activity ***directly*** tackles the ***primary*** linear economy challenges identified for circularity improvement in the 7 Key Product Value Chains of the Circular Economy Action Plan 2020 and the 11 Priority Activities of the Draft EU Taxonomy. For example, extreme material usage and waste comprises the primary linear economy challenges within the "Construction and Buildings" Key Product Value Chain. So a company that is leasing construction equipment (e.g. cranes) is not tackling the primary linear economy challenge presented by that Key Product Value Chain because it is not tackling the waste of used building materials. However, that company still belongs in the universe.

Accordingly, where a company's economic activities are determined to be ***directly*** related to the primary issues identified for circularity improvement in one of the 7 Key Product Value Chains or one of the 11 Priority Activities, the company receives 20 bonus points. Where a company's activities are determined to be ***indirectly*** related to the primary issues identified for circularity improvement in one of the 7 Key Product Value Chains or one of the 11 Priority Activities, the company receives 10 bonus points. Where a company's activities are determined to be ***unrelated*** to the primary issues identified for circularity improvement in one of the Key Product Value Chains or one 11 Priority Activities, the company receives 0 bonus points.

Where applicable, bonus points are added to each company's Circular Revenue Score to determine each company's Circular Contribution Score. The Circular Contribution Scores for all companies are normalised to a notionally common scale out of 100 and presented as part of the Thematic Classification and Stock Universe.

Where companies do not segment/report their revenue to the level of granularity needed to allow an objective mapping to the different "R" Strategies purely by reference to their public disclosures, a combination of tools is used to arrive at the best estimate for the company. These tools include FactSet's RBICS Revenue module, Refinitiv Eikon's Financial and ESG modules and Bloomberg's Financial Analysis, Company Classification Browser and EU Taxonomy modules. In addition, any estimation of a company's relevant revenue is compared with those published by environmental NGOs and think tanks such as Corporate Knights and As You Sow, amongst others.

The current toolkit for determining companies' circular revenue is likely to evolve and grow over time as the availability of specific circular revenue data becomes more widespread, enabled by the companies themselves who will be under pressure from investors, ESG data vendors and new accounting standards and regulation alike to segment and report their circular revenue more explicitly.

5.3.2 Financial Strength Score

Following assessment of each company's Circular Contribution Score, each company is assessed for its financial strength by reference to the rules-based methodology below.

The Financial Strength Score is a proprietary indicator used to assess the financial characteristics of a company.

The score is broken down into the following sub-components:

- Profitability ratios:
    - EBITDA Margin (Earnings Before Interest, Taxes, Depreciation, and Amortization Margin)
    - Net Margin
    - ROA (Return on Assets)
    - ROE (Return on Equity)
    - ROE to P/B (ROE to Price to Book)
- Growth ratios:
    - Sales Growth
    - Sales Growth Past 3Y (Sales Growth Past 3 Years)
    - EPS Growth (Earnings Per Share Growth)
    - EPS Growth Past 3Y (Earnings Per Share Growth Rate Past 3 Years)

- Valuation ratios:
    - P/E (Price-to-Earnings) and Future P/E
    - P/Sales (Price to Sales)
    - P/B (Price to Book)
    - Price to Tangible Book Ratio
    - P/CF (Price to Cash Flow)
- Leverage ratios
    - Total D/E (Total Debt-to-Equity)
    - Current Ratio
    - Quick Ratio
    - EBIT Interest Cover

The sub-components are normalised at the company level against the world equity market. Sub-components are each worth between 2.5% and 10% of the total score. The scores of each sub-component are then added up to obtain each company's Financial Strength Score (0-100).

A detailed breakdown of how the Financial Strength Score is computed with company examples is provided on the SMS website: www.sustainablemarketstrategies.com/en/thematic/

5.4 Included and Excluded Activities

It is worth noting that the PSF is still developing its recommendations for "enabling activities" that support objectives 3-6, including "The Transition to a Circular Economy" objective. We have already sought to capture what we believe to be the substantive enabling activities for the circular economy within the "Enabling Products and Services" classification described in Section 5.2.2 above, however, once the PSF's recommendations with respect to enabling activities are published, we shall conduct a thorough review to identify any relevant enabling activities that we have not already captured within the Thematic Classification and Stock Universe.

Whilst the following economic activities are often described in Circular Economy literature and included in Circular Economy investment products, we **do not** consider these economic activities to be **substantially contributing** to the environmental objective of The Transition to a Circular Economy. Accordingly, any companies' revenue attributable to these particular activities are excluded from the Circular Revenue Score calculation.

1. **Waste Management**: The activities of collecting and disposing of waste in landfills. These activities, when carried out properly, can be considered a best practice in the context of a *linear economy* but does not contribute to the circular economy.

2. **Waste-to-Energy**: The process of generating energy in the form of electricity and/or heat from the primary treatment of waste. Although they provide a partial alternative to landfilling and waste management at the very end of a product lifecycle, they may actually hamper the development of the real circular economy. Specifically, they may discourage waste prevention and recycling (and actually encourage the greater generation of non-recyclable waste) if upstream consumers and corporations believe that both non-recyclable and recyclable waste can be used as feedstock for waste-to-energy programs.

3. **First Generation Biofuels**: First generation biofuels, such as corn-based bioethanol, are not considered to be a sustainable activity since they are produced from crops that can also be used for food or feed.

6. Data Sources

To conduct our own research, we leverage both public sources and subscription-based datasets. Public sources consist of datasets provided by companies through their periodic reports (annual, semi-annual and quarterly reports), company presentations or official earnings conference call transcripts. We also engage directly with companies where clarification is needed with respect to publicly available disclosures. We also regularly consult with several environmental non-governmental organisations' websites including Corporate Knights' Global 100 ranking[20] and As You Sow's Carbon Clean 200 ranking[21].

Our subscription-based datasets include:

- FactSet's RBICS revenue categorisation module
- Refinitiv Eikon's Financial and ESG Modules
- CSRHub's ESG database
- Bloomberg's Financial, ESG and EU Taxonomy modules

It should be noted that our list of subscription-based datasets is not static. We expect this list to evolve and grow as newer and more specialised datasets become available.

7. Review Frequency

The Stock Universe is reviewed and updated on a semi-annual basis in June and December of each year. During each semi-annual review session, new companies and existing companies are reviewed, classified and scored in accordance with the methodology described in this document.

8. Governance

The Thematic Classification is maintained by Sustainable Market Strategies.

Please note that we do not accept payments from companies or other third parties to include their companies in the Stock Universe.

If a company or prospective company (or professional advisor acting on behalf of the company) wishes to challenge its inclusion status, classification or score, supporting evidence must be sent to thematic@sustainablemarketstrategies.com. The reason for proposing the change to the company's inclusion status, classification or score must be stated and documentary evidence supporting the claim must be provided. In considering the claim, SMS reserves the right to only take into account publicly available information.

Any adjustments resulting from a change in a company's inclusion status, classification or score will be effective in line with the next scheduled semi-annual review. Under certain circumstances, SMS reserves the right to use discretion to effect the change sooner.

[20] Corporate Knights, 2022. Available at: https://www.corporateknights.com/rankings/global-100-rankings/2022-global-100-rankings/
[21] As You Sow, 2022. Available at: https://www.asyousow.org/report-page/2022-clean200