

An introduction to green finance

LEARNING OBJECTIVES

On completion of this chapter you should be able to:

- Define green finance, and distinguish between green finance and related terms.
- Describe the typical characteristics of green finance approaches.
- Describe the challenges and opportunities for green finance.
- Describe the UN Sustainable Development Goals.
- Outline the development of the green finance sector globally.

Green finance is a growing phenomenon, with the global transition to a low-carbon economy estimated to require approximately \$6 trillion per year for the foreseeable future.¹ For the finance sector, this is not only a commercial opportunity, but also fulfils a valuable social purpose by demonstrating commitment to participating in the transition to a low-carbon, more sustainable world. In this introductory chapter, we explore the dimensions of green finance and compare it to concepts such as sustainable finance and climate finance. We also introduce the UN Sustainable Development Goals, and briefly explore their links with green finance.

Green finance, sustainable finance and related terms

Green finance is one of a number of terms that are used to label activities related to the two-way interaction between the environment and finance and investment. Related terms include: responsible banking and responsible investment; environmental, social and governance (ESG); sustainable finance; and climate finance.

These terms are often treated synonymously, but there are differences in their scope, particularly whether they include social and governance issues:

Environmental issues relate to the quality and functioning of the natural environment and natural systems including: biodiversity loss; greenhouse gas emissions, renewable energy, energy efficiency, natural resource depletion or pollution; waste management; ozone depletion; changes in land use; ocean acidification and changes to the nitrogen and phosphorus cycles.

Social issues relate to the rights, well-being and interests of people and communities including human rights, labour standards, health and safety, relations with local communities, activities in conflict zones, health and access to medicine, consumer protection; and controversial weapons.

Economic issues relate to investee impacts on economic conditions at local, national, and global levels. Performance areas include direct financial performance and risk, and indirect impacts such as through employment, supply chains, and provision of infrastructure.

Governance issues relate to the management of investee entities. Issues include: board structure, size, diversity, skills and independence; executive pay; shareholder rights; stakeholder interaction; disclosure of information; business ethics; bribery and corruption; internal controls and risk management; and, in general, issues dealing with the relationship between a company's management, its board, its shareholders and its other stakeholders.²

Approaches that embrace the full range of these issues are more likely to be termed sustainable finance, responsible banking and/or responsible investment, whereas those that only focus on environmental issues are more likely to be termed green finance. Where the concern is only with preventing or responding to climate change, the term climate finance may be used. Climate finance is also used specifically to refer to the UN climate change negotiations (the Paris Climate Agreement) and the provision of aid from developed countries to developing countries to help with climate change mitigation and climate adaptation.

QUICK QUESTION

What do you see as the main differences between sustainable finance and green finance?

Advocates for a sustainable finance approach argue that it's not possible to separate the environment from society: society depends on the environment for its existence, and human society has a major impact on the environment. Many of today's most pressing environmental issues impact disproportionately on those with the fewest resources, in both high-income and low-income countries, and the need to improve standards of living and reduce inequality cannot be separated from the need to protect our environment. In 2015, the United Nations defined and adopted the Sustainable Development Goals (SDGs) to encourage governments, business and civil society to tackle these wider issues of sustainability. The SDGs are explained in more detail below.

A sustainable financial system is one that creates, values and transacts financial assets in ways that shape real wealth to serve the long-term needs of an inclusive, environmentally sustainable economy.³

Defining green finance

This book, initially written to support the Chartered Banker Institute's **Certificate in Green and Sustainable Finance**, is focused on green finance. Although the term is increasingly used by multinational bodies, governments, central banks and regulators, banks, investment funds, insurers and other financial institutions, finance professionals, academics and consumers, there is no single, agreed definition of what constitutes green finance. It can refer to some or all of: green products and services offered by financial institutions (eg green bonds), identifying and managing environmental and climate risks, organizational strategies, organizations themselves, investment sectors, industry initiatives and policy and regulatory instruments. This list is by no means exhaustive; as the green finance sector grows and

becomes more mainstream, more and more activities are being promoted as green. Assessing the extent to which activities are truly green and avoiding greenwashing is a major theme of this book, and is covered in depth in subsequent chapters.

Some working definitions of green finance in the national and international context include:

G20 Green Finance Study Group: ‘Financing of investments that provide environmental benefits in the broader context of environmentally sustainable development. These environmental benefits include, for example, reductions in air, water and land pollution, reductions in greenhouse gas (GHG) emissions, improved energy efficiency while utilizing existing natural resources, as well as mitigation of and adaptation to climate change and their co-benefits.’⁴

Organisation for Economic Co-operation and Development (OECD): Green finance is finance for ‘achieving economic growth while reducing pollution and greenhouse gas emissions, minimizing waste and improving efficiency in the use of natural resources’.⁵

European Banking Federation: ‘Green Finance includes, but is not limited to:

- a. environmental aspects (pollution, greenhouse gas emissions, biodiversity, water or air quality issues); and
- b. climate change-related aspects (energy efficiency, renewable energies, prevention and mitigation of climate change-connected severe events).⁶

China State Council Guidelines for Establishing the Green Financial System: ‘Financial services for economic activities that improve the environment remediation, address climate change, and enhance efficiency of resource utilization. These economic activities include the financing, operation and risk management for projects in areas such as environmental protection, energy savings, clean energy, green transportation, and green buildings.’⁷

Government of Germany: ‘Green finance is a strategic approach to incorporate the financial sector in the transformation process towards low-carbon and resource-efficient economies, and in the context of adaptation to climate change.’⁸

UK Green Finance Initiative: ‘Funding any means of reducing carbon emissions or raising resource efficiency... It incorporates green crowdfunding for small-scale, community schemes right up to green bond issuance for major infrastructure projects or corporate energy-efficiency schemes.’

QUICK QUESTION

What are the main similarities and differences between these definitions?

While these definitions all differ in their emphasis, they generally share some or all of the following elements:

- The role of finance in allocating capital for wider, more sustainable purposes, including mitigating the impacts of climate change.
- A focus on the use of investment to either benefit the environment or reduce harm.
- A concern to manage environmental risks, including climate risks facing the finance sector and society as a whole. Climate-related financial risks can be classed as physical, transition (including stranded asset) and liability risks, which we introduce in Chapter 3 and explore in more detail in Chapter 5.
- A recognition of the policies and infrastructure required to enable green finance, which we explore in Chapter 3.
- A broader context of sustainable development and/or economic growth, which we explore throughout this book.
- Examples of products, services, sectors and projects that may be supported by green finance, which we detail in Chapters 6 to 11.

Countries including Brazil and China have developed taxonomies that seek to define what a green product, service or outcome is, and is not. In 2017, the **European Union's (EU) High-Level Expert Group on Sustainable Finance** commissioned a study to consider different definitions of and approaches to defining green and sustainable finance.⁹ In March 2018, the study's recommendations were incorporated into the EU's Action Plan: Financing Sustainable Growth, which established a Technical Expert Group (TEG) on sustainable finance to develop:

- an EU Taxonomy (classification system) to determine whether an economic activity is environmentally sustainable;
- an EU Green Bond Standard;
- benchmarks for low carbon investment strategies; and
- guidance to improve corporate disclosure of climate-related information.

The development of the EU Taxonomy for Sustainable Activities is seen by many as the most important and, potentially, far-reaching activity in the Action Plan. It is intended that the classification system – which will define and provide examples for what is green – will be embedded in EU law and provide a framework for many other features of the Action Plan. The Taxonomy will be used, for example, to determine which investments will qualify as being green in the context of the proposed EU Green Bond Standard; bonds that finance cleaner coal that are currently labelled as green by some issuers would be unlikely to qualify once this is introduced. Given the EU's reach and influence, the development, publication and implementation of the Taxonomy is likely to have a significant global impact in the coming year and, over time, lead to the harmonization of definitions of green finance.

For the purpose of this book, however, we require a definition of green finance that combines aspects of the above and will be generally acceptable. For the Chartered Banker Institute, green finance encompasses the finance sector's strategic approach to meeting the challenges of climate change and the transition to a low-carbon world.

Green finance is, therefore:

any financial initiative, process, product or service that is designed to protect the natural environment and support the transition to a sustainable, low-carbon world; and/or manage climate-related and other environmental risks impacting finance and investment.

This is a broad definition that acknowledges the different dimensions of the concept of green finance, while retaining an overarching focus on enhancing and sustaining the natural environment, and managing current and future environmental risks – particularly, but not exclusively, climate change. It highlights and recognizes the two-way nature of the relationship. Finance and investment can help or harm the environment, while the environment can also positively or negatively impact the performance of investments and financial services firms.

Mitigation and adaptation

Green finance supports projects and activities that aim to reduce greenhouse gas emissions and the rate of climate change (**climate change mitigation**) and to improve resilience to the effects of climate change (**climate change adaptation**). Climate change mitigation activities seek to address the causes of climate change, for example by funding renewable energy systems to reduce

carbon emissions, or cleaner transport systems. Climate change adaptation activities address the impacts of climate change, both those that are already visible (eg measures to reduce coastal community flooding caused by rising sea levels) and those that are anticipated as a result of global warming (eg developing new agricultural crops and techniques to reduce water use and vulnerability to higher temperatures).

To date, the majority of green finance funding has tended to support climate change mitigation projects and activities. The Climate Policy Initiative reported that, of the \$455 billion of climate finance in 2016, only an estimated \$22 billion was focused on adaptation projects and activities.¹⁰ Whilst there is inevitably some crossover between mitigation and adaptation projects (eg new, greener infrastructure may be sited further away from coastlines), and there is a lack of consistent reporting on mitigation versus adaptation, it is clear that the latter is currently underfunded. More recently, however, major green finance institutions, particularly the Multilateral Development Banks (MDBs), are placing much greater emphasis on climate change adaptation, with the World Bank committing to an equal weighting of mitigation and adaptation project finance in its most recent 2021 to 2025 strategic plan. This is covered in more detail in Chapter 8.

The dimensions of green finance

The breadth of the term green finance means that it can be used to refer to specific green financial products and services (eg green bonds, green loans), including those designed to both directly benefit the environment and to manage environmental risks, to organizational approaches and to industry sectors. In this book, we cover all of these, and briefly introduce them below.

Green finance products and services

Green finance covers a wide range of financial products and services, which can be broadly divided into banking, investment and insurance products. Examples of these include green bonds, green-tagged loans, green investment funds and climate risk insurance. We explore the different types of green finance products in more detail in Chapters 6 to 11.

But what makes a financial product green? In many cases the green aspect of the product relates to the asset, such as investments in clean energy projects or reforestation. In other cases, the features of the product are designed to encourage or reward environmentally friendly activity, such as mortgages

that are discounted in line with a property's energy efficiency, or investment that links the sustainable management of resources with funding limits or collateral requirements.

Other products labelled green may not be universally accepted as such, for example:

- financial products (eg credit cards) that offer a donation to environmental protection work in reward for a certain level of spend;
- financial products that respond to an environmental issue (such as flood insurance) but do not seek to address the causes of this issue (such as climate change);
- financial products that minimize the environmental impacts of the provider's operations (such as using recycled paper) or offset the customer's normal activities (such as the carbon emissions generated by air travel).

Such products raise the question of where the boundary lies in terms of green finance. We explore this in more detail in subsequent chapters. For now, however, note that, from our definition of green finance above, it is clear that the core of the product, service or organization should be green and that the focus should be on protecting or improving natural systems, and managing environmental (physical, transition and liability) risks. These, and other key risks associated with green finance, are covered in more detail in Chapter 5.

Green finance as an organizational approach

QUICK QUESTION

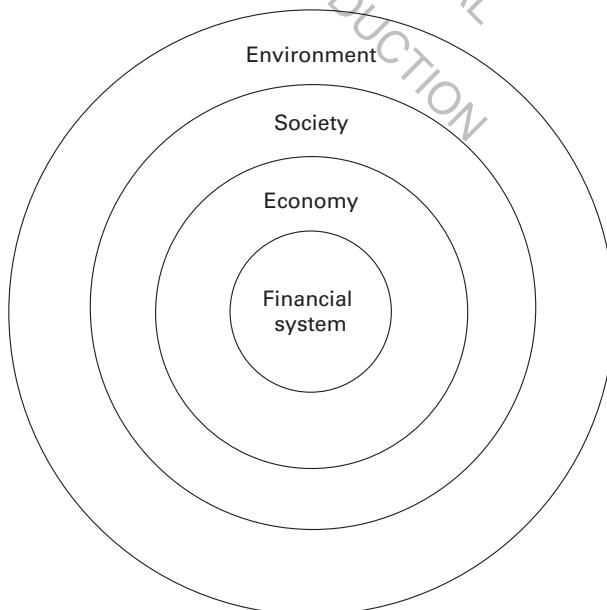
Give examples of some financial services firms that have adopted green finance as an organizational approach.

Green finance principles can be applied not just at a product or individual process level, but also across an entire financial services organization. For some such organizations, such as Ecology Building Society, Naturesave Insurance or Banca Etica, environmental sustainability has been central to their strategy, culture and decision-making for many years. A growing number of large mainstream financial institutions are also incorporating green finance principles into some or all of their activities and this trend has been accelerating, particularly after the Paris Climate Agreement was signed

in December 2015 (see Chapter 2). The development of the UN's Principles for Responsible Banking in 2018 also encourages financial institutions to incorporate green and sustainable finance principles into their strategies and activities and link their business plans to societal goals as expressed in the UN Sustainable Development Goals and the Paris Agreement. The Principles for Responsible Banking are similar in many respects to the well-established UN-supported Principles for Responsible Investment (see Chapter 3) that have encouraged and supported many institutions in embedding green and sustainable finance principles into their investment and related activities.

This whole-organization approach to green finance is rooted in an understanding that the financial system both serves and relies on the economy, which itself serves society and is embedded in the environment. Such an embedded approach means that business decisions take into account not only the financial implications of the decision, but also the implications for the wider economy, society and the environment. This mindset can influence every area of the business, from operations and staff recruitment and development to investment strategy, product design and pricing, risk management, marketing and financial management. We explore green finance as a strategic approach further in later chapters.

Figure 1.1 The embedded approach to green finance



CASE STUDY

Ecology Building Society¹¹

Ecology Building Society is dedicated to building a greener society by providing mortgages for properties and projects that respect the environment. It was established in 1981 by a group of pioneering founder members who wanted to help finance environmental building renovations and support sustainable development. By the end of 2018, its assets had reached nearly £180 million and net profit was just over £1 million. As a mutual, any surpluses are used for the benefit of the Society's members, which number nearly 10,000.

The Society's Memorandum states that its purpose is 'making loans which are secured on residential property and are funded substantially by its members... To promote, in carrying on any business or other activity, ecological policies designed to protect or enhance the environment in accordance with the principles of sustainable development.'

Ecology's mortgages incentivize lower-carbon lifestyles through a series of C-Change mortgage discounts linked to the energy efficiency of each property. Mortgage decisions are made on an individual basis, with careful consideration of the potential environmental benefits and impacts of each project.

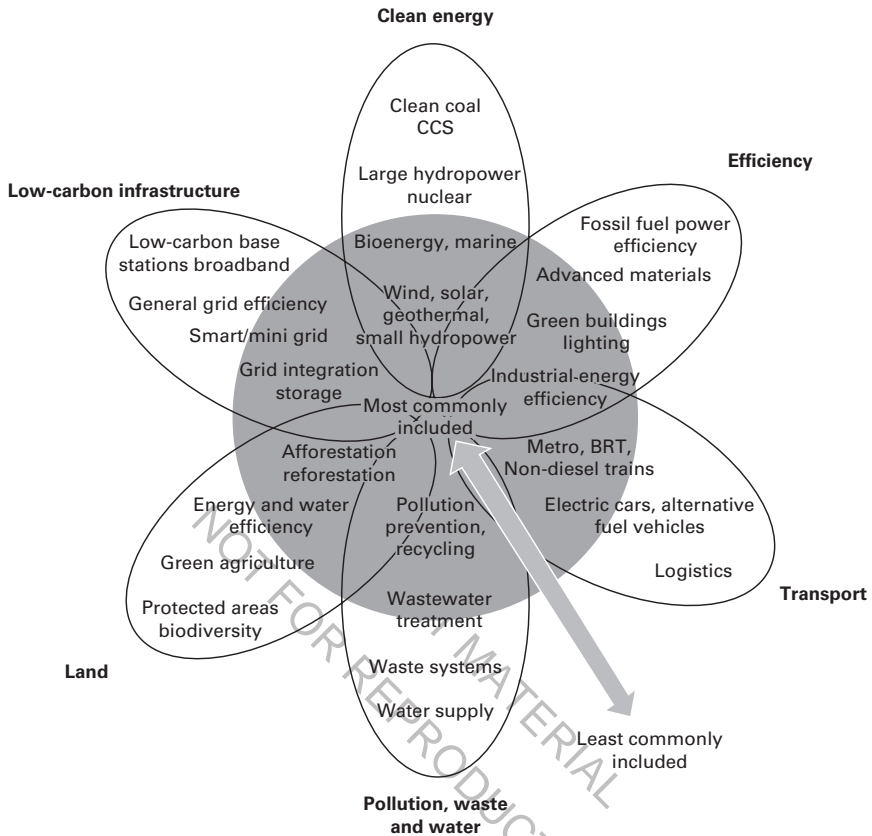
Ecology's HQ building is designed to have an airtight structure, high levels of insulation and low energy requirements. Wherever possible, materials used in the building are from renewable sources, recycled or low toxicity. All of Ecology's electricity is sourced from renewables and it has offset the carbon emissions generated since it began in 1981.

Green industry sectors

QUICK QUESTION

Which industry (ie non-finance) sectors would you currently associate with green finance?

Most definitions of green finance focus on its role in directing investment towards green sectors – those that protect or enhance the environment. Some sectors are more universally accepted as green than others, as shown in Figure 1.2.

Figure 1.2 Commonly included green technologies

SOURCE UNEP Inquiry into the Design of a Sustainable Financial System. <https://unepinquiry.org/>

Areas that are usually accepted as green with little controversy include renewable energy production, distribution and storage, energy efficiency in domestic and industrial buildings, green transport, recycling, pollution prevention, water conservation and forestation. Areas that are more contested or infrequently cited include carbon capture and storage (CCS), nuclear energy and fossil fuel efficiency.

Finance can support green areas in a number of ways, for example by providing green bond financing or long-term loans for new renewable energy projects; by providing green mortgages that link repayments to home energy efficiency improvements; or by providing venture capital for innovative new storage technologies. Sometimes projects may have competing environmental and social impacts, and this can often lead to controversial financing decisions. New battery storage technologies, for example, may support the growth of solar or wind energy by providing the means to store

and deliver power when weather conditions would not normally allow this, but may require the mining of rare minerals, causing significant environmental damage and social harm.

Finance can also play a role in encouraging and incentivizing firms or industry sectors to decarbonize by divesting, or threatening to divest, from firms or sectors perceived as damaging the environment. One of the better-known examples is Climate Action 100+, a group of investors managing over \$47 trillion that seeks to engage systemically important greenhouse gas emitters in order to encourage them to shift resources to clean and/or cleaner energy, thus supporting the goals of the Paris Climate Agreement.¹² In 2018, Royal Dutch Shell agreed to set short- and long-term carbon emissions targets linked to executive remuneration – the first of the large oil companies to do so. Shell aims to reduce its Net Carbon Footprint by approximately 50 per cent by 2050 and by approximately 20 per cent by 2035 as an interim step.¹³ Earlier in the year, Shell had announced that divestment should be considered a material risk to its business. The divestment movement, and the decarbonization of investment portfolios, is covered in more detail in Chapter 9.

The challenges and opportunities for green finance

In later chapters, we will see how a range of man-made environmental issues affects our world, including climate change, habitat and biodiversity loss, air and water pollution, deforestation, soil erosion and water shortages. Overcoming these challenges, and supporting the transition to a sustainable, low-carbon world, requires very substantial capital. Estimates of the investment needed to achieve different (and sometimes overlapping) green objectives vary, and are presented in Table 1.1.

Table 1.1 Financing needs to achieve sustainability goals

Finance need*	Global investment required	Source of finance
To implement 'sustainable growth'	\$0.5–1.5 trillion a year by 2020 \$3–10 trillion a year by 2050	World Business Council for Sustainable Development (2010)
To achieve the Sustainable Development Goals (SDGs)	Incremental financing needs of \$1.4 trillion in low- and lower-middle-income countries by 2030	United Nations Association – UK (2016)

(continued)

Table 1.1 (Continued)

Finance need*	Global investment required	Source of finance
To achieve global sustainable development and climate objectives	\$90 trillion in the next 15 years	G20
To meet the below 2°C target of the Paris Agreement	\$65 trillion by 2035	International Energy Agency (IEA) (2014)
To transform global energy generation and simultaneously meet emission targets	\$79 trillion by 2050 or \$1.6 trillion per year	UN World Economic and Social Survey (2011) and Global Energy Assessment, World Economic Forum (2013)
To fully fund nations' green infrastructure requirements between now and 2030	\$6 trillion per year	New Climate Economy (Sept 2016)
To deliver new renewable electric power generation to 2025	\$6.9 trillion for business-as-usual scenario \$12.1 trillion for 2°C or below scenario requirements	Bloomberg New Energy Finance (2016)
To complete developed to developing country flows for climate change adaptation and mitigation	\$100 billion per year by 2020	UNFCCC (2010) Cancún decisions

SOURCE UK Green Finance Initiative

NOTES* These are different scopes of action and not an additive list.

Whichever figures are chosen (and for the purposes of this book we use the \$6 trillion per year figure used by the G20 and New Climate Economy¹⁴), these are very substantial amounts. The scale of investment required means that public funds alone will not be sufficient. The financial services sector therefore has a key role to play in mobilizing and directing private capital to support the necessary transition to a low-carbon world; it is estimated that up to 80 per cent of the funds required will need to come from private sources.

At the moment, however, finance often contributes to environmental problems, such as climate change and habitat destruction, rather than financing environmental solutions. For example:¹⁵

- Between 2014 and 2016, thirty-seven of the biggest global banks provided a total of \$57.92 billion for coal mining and \$74.71 billion for coal power.

- From 2010 to 2015, large producers and traders of tropical agricultural products accused of significant deforestation received nearly \$50 billion in loans and more than \$20 billion through share and bond issues.

QUICK QUESTION

Why might financial decision-making not take environmental goals into account?

Our current financial system has three key characteristics that can contribute to environmental problems, rather than offer solutions:

- a bias towards short-termism in decision-making;
- a narrow focus on profit and shareholders;
- a failure to address externalities.

Short-termism

The time horizons in which financial institutions make decisions are often too short to consider the longer-term environmental effects of an investment or activity. This short-termism is intensified by the pressure to deliver positive, often quarterly results for shareholders. Short-termism can discourage financial institutions from investing in sectors that offer long-term value rather than short-term gain, and encourage them to discount the long-term risks of their activities, which often include environmental risks. Regulatory pressures to enhance liquidity can also dissuade financial institutions from offering products designed to build value over the long term.

The impacts of short-termism demonstrate the link between time horizons and different types of risk and reward. What might in the short term look productive, because of its immediate revenue potential, can in the long term be unproductive and unprofitable, because of its negative environmental impacts.

What constitutes **productive** cannot be independent of a project's environmental and socio-economic impact because there are often trade-offs between short-term profits and long-term impact. What might appear to be a profitable project over a given time period could have negative impacts that might only become apparent in the longer term.¹⁶

Short-termism has particularly significant implications for responding to the climate challenge. While the worst impacts of climate change will most likely be felt by future generations, the measures needed to avoid catastrophic climate change and its impact on individuals, communities and the financial system are required urgently. This has been recognized by the Bank of England as an issue that may have significant effects on financial stability.

MARK CARNEY ON 'THE TRAGEDY OF THE HORIZON'¹⁷

The challenges currently posed by climate change pale in significance compared with what might come... So why isn't more being done to address it?

Climate change is the **Tragedy of the Horizon**.

We don't need an army of actuaries to tell us that the catastrophic impacts of climate change will be felt beyond the traditional horizons of most actors – imposing a cost on future generations that the current generation has no direct incentive to fix.

That means beyond:

- - the **business cycle**;
- - the **political cycle**; and
- - the **horizon of technocratic authorities**, like central banks, who are bound by their mandates.

The horizon for monetary policy extends out to 2–3 years. For financial stability it is a bit longer, but typically only to the outer boundaries of the credit cycle – about a decade.

In other words, once climate change becomes a defining issue for financial stability, it may already be too late.

Narrow focus

Since the 1960s and the growth of the Chicago School of economics, the main purpose and role of business has been viewed by many as being to maximize returns to its shareholders. This idea has had a powerful effect on the conduct of business and approaches to the regulation of firms and to the economy as a whole. It is also a key assumption in many economic models used to inform policy.

This view of the role of business does not have a strict basis in company law, however. Like many powerful ideas, the focus on maximizing shareholder value is based on a certain subjective worldview. Others argue that the purpose of business should be much broader than simply maximizing shareholder return. As the economist Julie Nelson states:

Case law has established that directors and managers of corporations have a fiduciary duty (duty of loyalty of care) to the corporation. This is often interpreted as requiring them to maximize returns to shareholders. Yet, if you look at the actual descriptions of the duties of directors, what you find is a requirement that they must act 'in a manner... reasonably believed to be in the best interests of the corporation'... [I]t does not specify that the corporation is the shareholders only, nor that serving the 'interests of the corporation' means maximizing profit...

It is my tribe, economists, who are the source of this fixation with *maximization*... While legislators and judges have... generally been rather vague about the purpose(s) of business, mainstream economists have been vociferous in popularizing the idea that firms have a single, simple, and (conveniently!) quantifiable goal.¹⁸

If financial institutions make decisions based on maximizing shareholder returns as the sole motivation, there is a high risk that such decisions may lead to unintended consequences, including damage to the environment. This may happen in three ways:

- Only financial risk and reward is considered, and so environmental damage is not considered relevant to the decision.
- Those who are affected by the environmental consequences of an investment are not shareholders, and so are not counted as relevant to the decision.
- A focus on profit maximization combines with short-termism, and so the impact of environmental damage on future profits is not considered relevant to the decision.

The implications of a profit maximization approach are not always apparent, because they are cumulative (eg pollution of water caused by the release

of industrial chemicals) or not immediately visible (eg climate change caused by the burning of fossil fuels). Industrial accidents and environmental disasters, such as a major oil spillage, however, can bring the dangers of profit maximization to the fore.

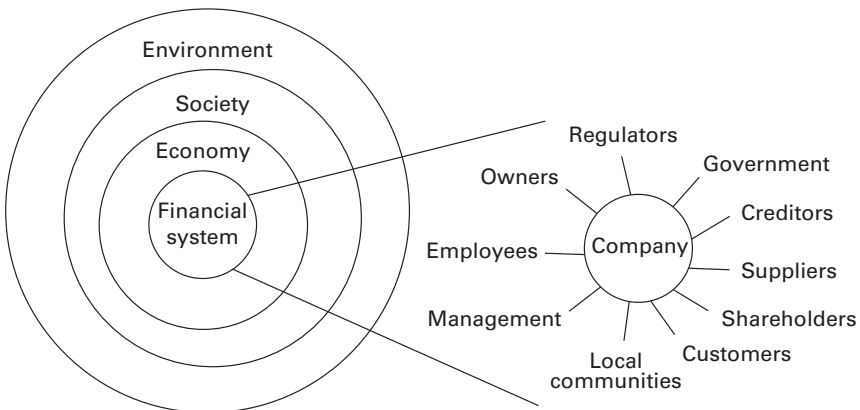
More recently, there have been calls for businesses (including financial institutions) to move to a stakeholder value approach. The stakeholder value approach sees the role of business as generating value for all of the stakeholders it serves, including its customers, employees, suppliers, shareholders and the wider community. Some even argue that future generations should be considered as a key stakeholder group, and this has particularly important implications for longer-term environmental issues such as climate change.

A stakeholder value approach has parallels with the embedded model of the financial system we saw in Figure 1.1, in that a financial institution is embedded in society and serves not only its shareholders, but also a wide range of different actors within and beyond the financial system (Figure 1.3).

QUICK QUESTION

Who are the key stakeholders for your organization? Be as specific as possible.

Figure 1.3 The stakeholder value approach



Externalities

Externalities is the term economists use when they talk about the side effects – or in the positive case, the spillover effects – of a business's operations. They're the impacts that a business has on its broader milieu, either directly or indirectly, but is not obliged to pay for or otherwise take into account in its decision-making.¹⁹

Imagine a factory produces waste chemicals that slowly drain into a local stream. Downstream, the water gradually becomes unfit for consumption and uninhabitable for aquatic life. Yet the cost of cleaning up the river does not, in many cases, fall to the factory. This is because the factory treats the pollution as an externality – something that is external to its decision-making because the costs are hidden or borne by someone else (in this case, probably, the local community or environment agency).

Externalities are not necessarily negative, however: investing in green public transport systems, for example, can enhance the health of the local community by encouraging them to walk or cycle more.

Externalities mean that when financial institutions assess the risks and rewards of a decision using criteria rooted in maximizing shareholder returns, other factors, including environmental costs, are often not considered. This leads to investment in sectors and projects that generate pollution, carbon emissions, habitat destruction, and other environmental damage. Externalities are linked to a short-term focus (since many environmental effects are not apparent in the short term) and profit maximization (since damage that does not directly affect profits is discounted). Failure to consider externalities may also contribute to the risk of investing in assets that may subsequently become substantially impaired or stranded, as we shall see in later chapters.

Negative externalities may be addressed through enhanced measurement and quantification of climate-related and other environmental impacts, regulation to prevent the most harmful activities, taxes to fund environmental protection and restoration, and public pressure for companies to internalize the cost of their externalities. The identification, measurement and disclosure of climate-related financial risks is a major focus for global regulators. The work and impact of the global Task Force on Climate-related Financial Disclosures (TCFD) in this regard is discussed in Chapter 5.

Opportunities for financial services organizations of a green approach

A green approach to finance can help financial institutions, and the financial system overall, to overcome the challenges of short-termism, narrow focus and externalities, potentially leading to a range of positive outcomes for the organization, its customers, staff, supply chain and other partners – and for our planet as a whole. As we shall see throughout this book, there is a wide range of benefits for institutions adopting a green finance approach, including:

- Reputation and relationships:
 - Enhanced reputation and credibility – helping to demonstrate finance’s social purpose and reconnecting banks and society.
 - Stronger, values-based relationships with governments, communities, customers, investors, partners and suppliers.
- Markets:
 - Access to new markets – including new partnerships with governments and communities.
 - Opportunity to improve competitive position and attract new customers through differentiation.
 - Opportunity to develop and market innovative green products and services.
 - Greater resilience to market disruption caused by climate change.
- Operations:
 - Opportunity to decrease risk across portfolios, by avoiding concentration in areas of high environmental risk (such as fossil fuels).
 - Greater resilience to the operational impact of climate change.
 - Increased valuation through resilience planning.
 - More efficient operations, including energy efficiency, resource minimization and reuse, reduced water usage, and adoption of new technologies.
- Regulatory:
 - Potentially lower capital weightings for green assets and higher weightings for ‘brown’ assets.
 - Preparedness for regulatory and policy changes (eg increased disclosure, stress testing, including climate change scenarios).

- Customers:
 - Managing changing customer preferences, leading to new product and service opportunities.
 - Longer-term, less transactional relationships with customers based on values rather than price.
 - Greater satisfaction – the feel-good factor.
- Staff:
 - Greater ability to attract and retain younger generations who see sustainable values as an important part of their personal and working lives.
 - Greater staff satisfaction and employee engagement from enhanced sense of purpose
 - Enhanced working environments.
- Partners and supply chains:
 - Increased resilience of the supply chain (less affected by environmental issues).
 - Incentives for partners to enhance the sustainability of their own operations and supply chains.
 - Longer-term relationships with suppliers based on shared purpose and values.

The UN Sustainable Development Goals

As we discussed earlier in this chapter, a broader approach to sustainable finance and development encompasses, but goes beyond green finance to include issues of economic and social equality and justice. Some argue that economic, social and environmental issues are inextricably linked, and that genuine sustainable development (ie meeting the needs of the present without compromising the ability of future generations to meet their own needs) is impossible without considering these wider aspects.

The UN Sustainable Development Goals (SDGs) were defined and adopted by 193 countries in 2015 to encourage governments, business and civil society to tackle these wider issues of sustainability. The 17 Goals are shown in Table 1.2. They set out what the UN perceives as the major economic, environmental and social challenges faced by our world. As can be seen, these go beyond the challenges of climate change mitigation and adaptation, and

support of the transition to a low-carbon world addressed by green finance, in that green finance principles and practice are wholly aligned to the holistic approach to sustainability promoted by the SDGs. As we shall see throughout this book, there are many overlaps, for example a Sustainability Bond may support a range of project outcomes aligned to the SDGs, including a range of climate change adaptation and mitigation measures.

Table 1.2 The 17 United Nations Sustainable Development Goals

Goal 1	End poverty in all its forms everywhere
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3	Ensure healthy lives and promote well-being for all at all ages
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5	Achieve gender equality and empower all women and girls
Goal 6	Ensure availability and sustainable management of water and sanitation for all
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10	Reduce inequality within and among countries
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12	Ensure sustainable consumption and production patterns
Goal 13	Take urgent action to combat climate change and its impacts
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17	Strengthen the means of implementation and revitalize the global partnership for sustainable development

The 17 SDGs, with a deadline of 2030, are not legally binding, but countries, business and others are expected to take ownership of the goals and establish national or other frameworks for achieving them. For example:

- In Scotland, the new National Performance Framework, published by the Scottish Government in 2018, incorporates the SDGs in a ‘vision for national well-being’ in Scotland.
- Carlsberg’s ‘Together Towards ZERO’ programme seeks to significantly improve the organization’s sustainability to enhance business performance and reduce impact on the environment and society. Carlsberg focuses its efforts on seven SDGs where it believes it can have the greatest impact: 3, 6, 7, 8, 12, 13 and 17.
- ANZ (Australia and New Zealand Banking Group Limited) has developed an SDG Bond Framework and will issue bonds where proceeds will contribute to SDGs 3, 4, 6, 7, 9, 11 and 12.

QUICK QUESTION

Which of the SDGs are most relevant, in your view, for the finance sector?

As with supporting the transition to a low-carbon world, substantial investment will be required to achieve the SDGs in full, most of which will need to come from the private rather than the public sector. A key challenge cited by the UN is how to mobilize capital to achieve these goals.

Achieving and financing the SDGs will require a shift in business models, both in financial services institutions and business more broadly, including a deeper recognition of the investment chain connecting the finance sector with broad issues of sustainability.

Financial institutions can support the achievement of the SDGs in a number of ways:

- 1 Ensuring investment decisions incorporate, as a minimum, environmental, social and governance factors, or, more preferably, linking desired investment outcomes with the SDGs.
- 2 Explicitly aligning definitions of fiduciary duty with sustainable development.
- 3 Engaging with companies they hold a stake in, either individually or as part of a coalition.
- 4 Providing debt finance for SDG solutions.

- 5 Promoting access to finance for individual entrepreneurs and small enterprises seeking to achieve the SDGs.
- 6 Developing innovative financial products and processes that allow people to invest in line with the SDGs, reduce the costs of doing so, and strengthen governance where needed.
- 7 Ensuring that their operations and wider business activities support, rather than detract from, the achievement of the SDGs.

CASE STUDY

Triodos and the triple bottom line²⁰

Triodos Bank is a global pioneer in sustainable banking, using the power of finance to support projects that benefit people and the planet. Its approach is based on the fundamental belief that economic activity can and should have a positive impact on society, the environment and culture. Triodos values people, planet and profit – the triple bottom line – and takes all three into account in its strategy, structure, lending and culture.

Founded in 1980, Triodos is overseen by a supervisory board and its shares are administered by a separate Foundation, both of which aim to balance the needs of all of Triodos' stakeholders. It has branches in the Netherlands, UK, Germany, Spain and Belgium, and in 2018 had assets under management of €15.5 billion.

Triodos only lends to organizations that create real social, environmental and cultural value – charities, social businesses, community projects and environmental initiatives. As part of the application review process, Triodos applies its own strict social and environmental lending criteria, and publishes a full list of all the organizations it lends to.

Forty per cent of its loans are in the environmental sector; by the end of 2018 it was financing 513 projects, contributing to a generating capacity of 3,800 MW of energy – enough to avoid 2.9 million tonnes of CO₂ emissions. It also financed 35,000 hectares of organic farmland and 30,000 hectares of nature and conservation land across Europe.

Green finance today

Green finance is a fast-growing sector that will continue to grow rapidly and will in time become part of the mainstream of finance.

As we saw above, there is a wide range of estimates for the costs of the transition to a low-carbon world, requiring very substantial investment for many years, until at least 2050. Using the figures from the G20 and New Climate Economy quoted above, approximately \$6 trillion per year will be required, with some two thirds of this needing to be deployed in developing countries. According to the Climate Policy Initiative, however, approximately \$500 billion of investment in climate change mitigation and adaptation was deployed in 2017. There is, therefore, a very substantial investment gap, and the major part of investment opportunity (estimated at some 80 per cent of the total) will need to come from the private sector in the coming years. It is unsurprising, therefore, that the green finance market is growing quickly, and the pace of policy and regulatory development advances at a similar pace.

Recent market developments

- The World Economic Forum's *The Global Risks Report 2019* lists three climate risks (extreme weather, environmental policy (Paris Agreement) failure and natural disasters) in the top five global risks, as assessed by a large panel of global business, public sector, academic and civil society leaders.²¹
- The green bond market had grown to approximately \$167 billion by 2018, a slight (3 per cent) increase on the previous year, according to data from the Climate Bonds Initiative, with issuers including sovereign states, multilateral development banks, municipalities and corporates.
- Countries are beginning to issue sovereign green bonds, with the first issued by Poland in 2016 and subsequently followed by France (with the largest issue of \$7 billion), Fiji, Nigeria, Indonesia and Belgium.
- The US was the largest issuer of green bonds globally in 2018 (\$34.1 billion) with China the second largest (\$30.9 billion).
- Indonesia issued the first sovereign green sukuk in US dollars in March 2018, raising US\$1.25 billion, following the launch of the first green sukuk by Malaysia the previous year.
- The European Investment Bank provided more than €19.6 billion to green finance projects in 2017, nearly 30 per cent of its total financing.
- The Asian Development Bank announced that it will invest \$80 billion from 2019 to 2030 to combat climate change.
- Green mortgages are now available in countries including the US, UK, Sweden and Australia, with National Australia Bank issuing the world's first Residential Mortgage-Backed Securitization, including a certified

green tranche of AUD 300 million, meeting criteria for low-carbon residential buildings.

- Climate Action 100+ investors manage over \$47 trillion of assets.
- Sustainable, responsible or ethical investing now accounts for approximately 26 per cent of assets under management globally (almost \$23 trillion) according to the Global Sustainable Investment Alliance (GSIA).
- Assets under management in ESG funds worldwide rose in 2018 to \$1.05 trillion, increasing from \$655 billion in 2012. BlackRock, the world's largest asset manager, launched a range of exchange-traded funds (ETFs) that invest based on ESG criteria in October 2018.
- 59 green finance centres (2018) are identified in the Global Green Finance Index survey, rising from 47 the previous year.
- 92 per cent of the world's largest banks are members of the UNEP Finance Initiative.

Recent regulatory and policy developments

- The UN launched its draft Principles for Responsible Banking in November 2018, supported initially by 28 banks representing more than \$17 trillion in assets.
- In March 2018 the EU published the Action Plan: Financing Sustainable Growth, which saw the development of the EU Taxonomy for Sustainable Activities.
- As of September 2018, 513 organizations had expressed their support for the Task Force on Climate-related Financial Disclosures (TCFD) recommendations for consistent, climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers and other stakeholders.
- In December 2018, the US Alliance for Sustainable Finance (USASF) was launched by 15 large banks and asset managers, aiming to identify and streamline existing climate-finance initiatives, encourage greater transparency across climate-related financial risks and opportunities, and encourage more capital for sustainable investments.
- 400 global asset managers representing \$32 trillion in assets launched the Investor Agenda in September 2018 to support investors as they scale up investments tackling climate change, and to showcase the actions some investors are already taking to improve their climate-related decision-making and risk reporting.

- The development of a national green finance system for China has been publicly endorsed by President Xi and the State Council, supported by 220 of China's largest financial institutions, representing nearly 75 per cent of China's assets under management.
- The People's Bank of China has incorporated green bonds and green loans into Macro-Prudential Assessments, and in June 2018 announced an expansion of the Medium-term Lending Facility to include green loans and green bonds.
- The Bank of England has announced that it is considering the inclusion of the impact of climate change in its UK bank stress tests 'exploratory scenario' in 2019.

As can be seen, green finance is growing rapidly, and there are very significant commercial opportunities for banks, investment funds, insurers and other financial services organizations to support the transition to a low-carbon world. Despite rapid growth in recent years, however, there is still a very substantial investment gap. The scale of the challenge is beyond that of public finances alone, and, given the commitments made by the majority of national governments, a significant increase in support from the financial services sector is required to achieve the objectives set. The scale of the challenge and speed of response required has grown since the announcement of the 2015 Paris Agreement target of limiting global warming to less than 2 degrees, which would require reducing emissions to net zero by 2070, along with the October 2018 Intergovernmental Panel on Climate Change (IPCC) report recommending limiting global temperature rises to 1.5 degrees.

This is not only a commercial opportunity for the financial services sector, however. Importantly, it is also an opportunity for the sector to demonstrate its social purpose, by playing a key role in the transition to a low-carbon economy and a more sustainable world. By supporting activities, organizations and industries that can mitigate climate change and help individuals and communities adapt to the effects of climate change, financial services organizations can help solve some of the world's, and local communities', greatest challenges.

International and national institutions, and financial services firms large and small, have key roles to play in addressing these challenges and supporting the transition to a low-carbon world. Individual finance professionals also have a vital role. As we will explore in Chapter 12, change is ultimately led by individuals, and the changes needed to embed and mainstream green finance principles and practice within financial services requires finance professionals with the relevant knowledge and skills to be

able to develop and deploy products, services and tools that can mobilize capital to support the transition. Enhancing the role of the individual Green and Sustainable Finance Professional, and developing a global network of Green and Sustainable Finance Professionals, is key to mainstreaming green finance.

There is a long way to go before green finance achieves the mainstream scale and effectiveness necessary to address our biggest environmental challenges. Banks and investors still provide significant amounts of funding to environmentally destructive activities, including the burning of fossil fuels, that are contributing to potentially catastrophic climate change. In the next chapter we will explore the scale of such environmental challenges, the science underpinning climate change and the connections between these and the financial sector.

QUICK QUESTION

What might be the key barriers to green finance becoming more widespread?

Key concepts

In this chapter we considered:

- the various definitions of green finance, and the difference between green finance and related terms;
- some of the typical characteristics of green finance approaches;
- the challenges and opportunities for green finance;
- the UN Sustainable Development Goals (SDGs), and their links with green finance;
- some indicators of the development of the green finance sector in the UK and globally.

Now go back through this chapter and make sure you fully understand each point.

Review

There is no fixed definition of green finance, but most definitions focus on the role of the financial system in supporting the environment, preventing environmental damage and managing environmental risks.

Green finance is one of a number of terms that are used to label the broad area of finance that aims to protect or enhance the environment. There is an important difference between the scope of the terms: for example, sustainable finance considers not just environmental but also social, economic and governance issues. Advocates for a sustainable finance approach argue that it is not possible to separate the environment from society.

For the purpose of this book, we define green finance as ‘any financial initiative, process, product or service that is designed to protect the natural environment and support the transition to a sustainable, low-carbon world; and/or manage climate-related and other environmental risks impacting finance and investment’. This is a broad definition that focuses on enhancing and sustaining the natural environment, and managing current and future environmental risks.

Green finance products and services include those that channel capital to those green industry sectors that design products and services in order to reward environmentally friendly activity, and that support the effective management of physical and transition risks. The most commonly cited green industry sectors include renewable energy production, distribution and storage, energy efficiency in domestic and industrial buildings, green transport, recycling, pollution prevention, water conservation, agriculture, aquaculture and forestry.

Green finance supports both climate change mitigation and adaptation projects and activities. The former seek to address the causes of climate change, for example by funding renewable energy systems, while climate change adaptation activities address the impacts of climate change, for example measures to reduce coastal community flooding caused by rising sea levels.

Green finance can also be a whole-organization approach, driving strategy, culture and business processes throughout a financial services firm. This is often tied to an environmentally focused corporate mission and an understanding of the financial sector as embedded in the economy, society and the environment. At present, however, the financial sector as a whole is not green. Institutions still provide significant amounts of funding to environmentally destructive activities, including the burning of fossil fuels. Our current

financial system has three key characteristics that tend to contribute to environmental problems:

- a bias towards short-termism in decision-making;
- a narrow focus on profit and shareholders;
- a failure to address externalities.

Supporting the transition to a sustainable, low-carbon world requires very substantial capital. Estimates of the investment needed vary, but a figure of \$6 trillion per year has been suggested by the G20 and New Climate Economy. The scale of investment required means that public funds alone will not be sufficient. The financial services sector has a key role to play in mobilizing and directing private capital to support the transition; it is estimated that up to 80 per cent of the funds required will need to come from private sources.

The UN Sustainable Development Goals (SDGs) set out the major environmental, social and economic challenges faced by our world. These go beyond the challenges of climate change mitigation and adaptation, and supporting the transition to a low-carbon world in that green finance principles and practice are wholly aligned to the holistic approach to sustainability promoted by the SDGs.

Green finance is a growing global phenomenon and represents a very significant opportunity for the financial services sector. This is not only a commercial opportunity, but also an opportunity for the sector to demonstrate its social purpose, by playing a key role in the transition to a low-carbon, more sustainable world.

Glossary

Afforestation/reforestation: Afforestation means the establishment of forests where previously they did not exist, while reforestation means the re-establishment of forests where they previously existed, either through direct planting or natural growth.

Biodiversity: The full range of ecosystems, species and gene pools in the environment – the full variety of plant and animal life on earth.

Biodiversity and habitat protection: Biodiversity protection aims to preserve the full range of ecosystems, species and gene pools in the environment – the full variety of life on earth. Habitat protection aims to conserve, protect and restore the natural environments that sustain these plants and animals.

Climate change adaptation: Projects and activities that aim to improve resilience to the effects of climate change.

Climate change mitigation: Projects and activities that aim to reduce greenhouse gas emissions and the rate of climate change.

De-carbonization: Reducing the amount of carbon (eg carbon dioxide or methane) emitted from an agricultural, industrial or other process.

Divestment: The opposite of an investment, eg selling rather than buying an asset such as shares in a firm.

Embedded approach: An approach that sees the financial system as embedded in the economy, society and the environment.

Emissions reduction and capture: Emission reduction technologies aim to reduce the CO₂ produced by energy generation, transport and industrial processes. Emissions capture tends to refer to carbon capture and storage (CCS) – technology to capture CO₂ emissions produced in electricity generation and industrial processes.

Energy distribution: Most energy is distributed through a grid (an interconnected network for transmitting power). Green energy distribution tends to focus on the integration of renewable energy into the main grid, distributed generation, microgrids (running separately from the main grid), and smart grids that detect and react to changes in energy usage.

Energy efficiency: Energy efficiency means reducing the amount of energy that is required to provide a product or service, and is often applied to buildings (domestic, commercial and industrial), appliances and vehicles.

Energy storage: Renewable energy storage is key to enabling an increase in the take-up and efficiency of renewables, and can include mechanical storage (eg pumped water), batteries and thermal energy storage.

Fossil fuels: Fuel that is formed from the decayed remains of plants or animals, such as coal and oil.

Green buildings: Green buildings are designed, built and used in a way that is energy efficient, minimizes the use of resources and water, encourages biodiversity and provides a healthy indoor environment.

Green finance: Any financial initiative, process, product or service that is designed to protect the natural environment and support the transition to a sustainable, low-carbon world; and/or manage climate-related and other environmental risks impacting finance and investment.

Green transport: Green transport minimizes CO₂ and other harmful emissions, uses renewable energy, is energy-efficient and supports sustainable communities. The term can refer to public transport systems and infrastructure and private vehicles.

Greenwashing: Making false, misleading or unsubstantiated claims about the positive environmental impact of a product, service or activity.

Intergovernmental Panel on Climate Change (IPCC): The United Nations body that assesses the science related to climate change. The IPCC provides regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.

- Net carbon footprint:** Total greenhouse gas emissions associated with the production, processing and consumption of products and services, offset by activities to mitigate emissions, such as carbon capture and storage.
- Paris Climate Agreement:** In December 2015 countries agreed to combat climate change and to accelerate and intensify the actions and investments needed to support the transition to a low-carbon world. The Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise in the 21st century below 2°C above pre-industrial levels and to pursue greater efforts to limit the temperature increase to 1.5°C. The Agreement entered into force in November 2016, after countries accounting in total for at least 55% of total global greenhouse gas emissions ratified the Agreement.
- Pollution control:** Pollution control aims to reduce or avoid the release of harmful substances into the environment, including the air, water and soil. Pollution can also be defined by the type of pollutant, including plastic pollution and thermal pollution.
- Renewable energy:** Renewable energy comes from a source that is not depleted when it is used, or is naturally replenished within a human timescale. This includes solar, wind, geothermal, tidal, wave, hydroelectric and biomass power.
- Renewable energy:** Energy that comes from a source that is not depleted when it is used, or is naturally replenished within a human timescale.
- Stakeholder value approach:** An approach that sees the role of business as generating value for all the stakeholders it serves.
- Tragedy of the horizon:** The mismatch between business, political and regulatory cycles, and the timescale needed to prevent climate change impacting on financial stability.
- UN Sustainable Development Goals:** 17 objectives agreed by 193 countries in 2015 to address the major environmental, social and economic challenges of our time.
- Waste reduction and management:** Waste reduction aims to minimize the amount of waste produced by individuals, households and organizations, including through resource efficiency and reuse. Waste management involves the collection, treatment, recycling, reprocessing and disposal of waste.
- Water conservation:** Water conservation aims to sustainably manage freshwater resources and prevent water pollution in nearby lakes, rivers and local watersheds.

Notes

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