

Green Economy



OVERVIEW

Welcome to our educational manual on green economy, green businesses, startups, and green jobs. This manual explores the relationship between these interconnected concepts and provides practical insights for companies and entrepreneurs looking to embrace sustainability. A green economy integrates environmental considerations into economic decision-making, promoting a circular economy and resource efficiency. Green business focuses on sustainability, reducing emissions, conserving resources, and attracting eco-conscious consumers. Green entrepreneurship is on the rise, with startups addressing environmental challenges and seizing opportunities in renewable energy, eco-friendly manufacturing, and sustainable agriculture. The manual highlights inspiring examples of successful green businesses. Additionally, it explores the growing demand for green jobs, spanning renewable energy, energy efficiency, waste management, sustainable transportation, and green construction. By understanding these connections, we can contribute to a more sustainable future. Let's embark on this journey together, unlocking the potential of the green economy.

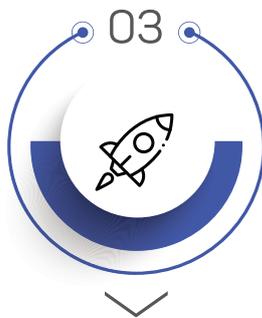
ROADMAP



Green Economy



Green Bussines



Green Entrepreneurship



Green Jobs

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GREEN ECONOMY

Definition

As the world transforms with the evolution of technology, climate, politics, and economy, there are interconnected practices that positively balance environmental and social goals for the good of nature, citizens, and businesses. Leading the way is the green economy, an economic model that prioritizes the success of human well-being and social equity while reducing environmental risks and ecological scarcity. But what is the meaning of a green economy? The definition of green economy is the practice of sustainable development through the support of public and private investment to create infrastructure that fosters social and environmental sustainability. The importance of a green economy is that it encourages economies to become more sustainable and low-carbon, and ensures that natural assets continue to provide the resources and environmental services for our continued wellbeing.

A: Five Principles for Economic Transformation:

An Inclusive Green Economy (IGE) is a thriving economy that delivers the linked economic, social, and environmental outcomes sought by the SDGs and the Paris Agreement. It follows five key principles, each of which draws on important precedents in international policy, and which together can guide economic reform in diverse contexts.



1. The Wellbeing Principle

(The economy enables all people to create and enjoy prosperity)

- The green economy is people-centered. Its purpose is to create genuine, shared prosperity.
- It focuses on growing wealth that will support wellbeing.
- This wealth is not merely financial but includes the full range of human, social, physical, and natural capital.
- It prioritizes investment and access to the sustainable natural systems, infrastructure, knowledge, and education needed for all people to prosper.
- It offers opportunities for green and decent livelihoods, enterprises, and jobs.
- It is built on collective action for public goods, yet is based on individual choices.



2. The Justice Principle

(The economy promotes equity within and between generations)

- The green economy is inclusive and nondiscriminatory. It shares decision-making, benefits, and costs fairly; avoids elite capture; and especially supports women's empowerment.
- It promotes the equitable distribution of opportunity and outcome, reducing disparities between people, while also giving sufficient space for wildlife and wilderness.
- It takes a long-term perspective on the economy, creating wealth and resilience that serve the interests of future citizens, while also acting urgently to tackle today's multi-dimensional poverty and injustice.
- It is based on solidarity and social justice, strengthening trust and social ties, and supporting human rights, the rights of workers, indigenous peoples, and minorities, and the right to sustainable development.
- It promotes the empowerment of Micro-Small-Medium Enterprises (MSMEs), social enterprises, and sustainable livelihoods.
- It seeks a fast and fair transition and covers its costs – leaving no one behind, enabling vulnerable groups to be agents of transition, and innovating in social protection and reskilling.



3. The Planetary Boundaries Principle

(The economy safeguards, restores, and invests in nature)

- An inclusive green economy recognizes and nurtures nature's diverse values –functional values of providing goods and services that underpin the economy, nature's cultural values that underpin societies, and nature's ecological values that underpin all of life itself.
- It acknowledges the limited substitutability of natural capital with other capitals, employing the precautionary principle to avoid loss of critical natural capital and breaching ecological limits, including climate stability.
- It invests in protecting, growing, and restoring biodiversity, soil, water, air, climate, and other natural systems.
- It is innovative in managing natural systems, informed by their properties such as circularity, and aligning with local community livelihoods based on biodiversity and natural systems.



4. The Efficiency and Sufficiency Principle

(The economy is geared to support sustainable consumption as well as sustainable production)

- An inclusive green economy is low-carbon, resource-conserving, diverse and circular. It embraces new models of economic development that enable economic growth without raising resource consumption and that reduce negative social and environmental impacts.
- It recognizes there must be a significant global shift to limit consumption of natural resources to physically sustainable levels if we are to decarbonize economies and remain within planetary boundaries.
- It recognizes a 'social floor' of basic goods and services consumption that is essential to meet people's well-being and dignity, as well as unacceptable 'peaks' of consumption.
- It aligns prices, subsidies, and incentives with true costs to society, through mechanisms where the 'polluter pays' and/or where benefits accrue to those who deliver inclusive green outcomes.



5. The Good Governance

(The economy is guided by integrated, accountable, and resilient institutions)

- An inclusive green economy is evidence-based – its norms and institutions are interdisciplinary, deploying both sound science and economy along with local knowledge for adaptive strategy.
- It is supported by institutions that are integrated, collaborative, and coherent – horizontally across sectors and vertically across governance levels – and with adequate capacity to meet their respective roles in effective, efficient, and accountable ways
- It requires public participation, prior informed consent, social dialogue, transparency, democratic accountability, and freedom from vested interests in all institutions – public, private, and civil society – so that enlightened leadership is complemented by societal demand.
- It promotes devolved decision-making for local economies and management of natural systems while maintaining strong common, centralized standards, procedures, and compliance systems.
- It builds a financial system to deliver well-being and sustainability, set up in ways that safely serve the interests of society.



B: Priorities

Activities to understand green economy needs and potentials

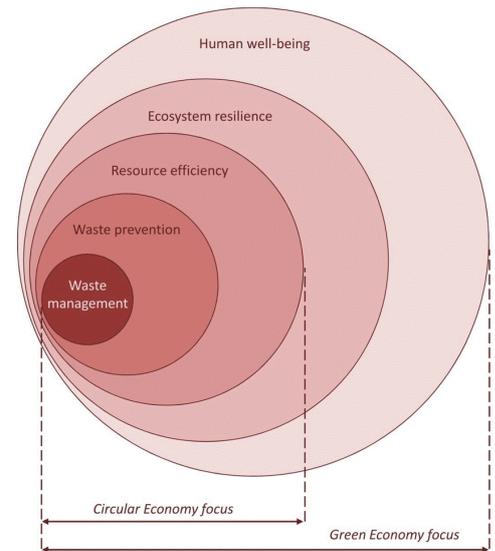
- 1- **Diagnosis:** Scope a country's green economy assets – its natural, social, human, physical, and financial capital – and their values for people, economy, and planet; the ways that economic development, inclusion, and sustainability have been pursued to date nationally and in key sectors; particular policies, institutions, and initiatives that already work for inclusive and integrated outcomes; the barriers (e.g. political, attitudinal, capacity and technical); and the challenges (e.g. balancing winners and losers, handling systemic risks and stranded assets).
- 2- **Awareness-raising:** Invest in communications, education, and political and social interactions, so that stakeholders are aware of the diagnosis in terms that are meaningful to them – notably the problems of the brown economy and the potential of a green economy for lifestyles and investment.
- 3- **Dialogue:** Convene stakeholders to contribute to the diagnosis as above, to co-create vision and objectives for a (national) green economy, to scope feasible transition pathways, and to generate shared commitment and effective partnerships.
- 4- **Empowerment and capacity development:** Enable often-marginalized stakeholders as well as diverse green economy leaders, champions, institutions, and alliances to have a strong voice in dialogue, to mobilize and develop their capacity through suitable means including South-South learning.

Activities to innovate and scope solutions

5. **Social protection:** Prepare the parameters of a fast and fair transition in consultation with affected stakeholders – fairly meeting the reskilling and safety-net needs of those who bear costs or risks, and avoiding elite capture.
6. **Best practices 'catalog':** Promote current and 'within-reach' best practices for inclusive green economic activities e.g. natural resource management, industrial policy, small enterprises, livelihoods, and within government and business – to create interest and upscale them.
7. **Finance 'catalog':** Scope the finance sources and mechanisms available in-country that are aligned with inclusive green economy principles – and those that perpetuate the brown economy – and align these with identified finance needs.
8. **Social protection:** Prepare the parameters of a fast and fair transition in consultation with affected stakeholders – fairly meeting the reskilling and safety-net needs of those who bear costs or risks, and avoiding elite capture.
9. **Policy, legal, and fiscal change:** Prepare a roadmap of stepwise reforms that will best raise public support; e.g. triggering a shift away from penalizing 'goods' like jobs and incomes, towards 'bad' like subsidies that create environmental and social externalities.
10. **Investment prospectus:** Scope, from all the above, the resource requirements; and make business cases for investment by public, private, and community bodies in identified priorities (notably natural capital protection, management and restoration, and sustainable infrastructure).

Green economy vs. circular economy

If a green economy is defined as interconnected economic activities that promote global-scale sustainable development, poverty eradication, environmental protection, and eco-efficiency and low-carbon development, the circular economy is a regenerative development strategy for economic growth that focuses on restoration, use of renewables, and elimination of toxic chemicals and waste through the superior design of materials, products, systems, and business models. They are bound by the common goal of reconciling environmental, economic, and social goals.



Examples of Green Economy

Green economy examples, in terms of actions taken by people in their everyday lives, include:

Choosing local, “zero-kilometer” agricultural produce made following organic methods (without the use of chemical pesticides and fertilizers, for example);

- Making use of sustainable mobility - like electric scooters and cars - instead of fossil-fuel-powered alternatives;
- Electrifying cooking, by replacing gas stoves with electric ranges;
- Avoiding taking cars and scooters whenever possible and using public transport in their stead;
- Recycling lithium batteries, whose production requires environment-damaging extraction of cobalt and lithium;
- Making lifestyle choices that can help decrease energy use, like keeping air conditioners set at higher temperatures in summer.
- The same can be said for businesses and industry. In this case, virtuous examples of green economy behavior include:
 - Developing and implementing productive systems that use energy as efficiently as possible;
 - Investing in and using low-carbon, renewable energy sources to power factories and machinery;
 - Recycle as much as possible and use recycled packaging for product distribution;
 - Simplifying the end-of-life management of the product cycle.

UAE Efforts Towards Green Economy

The UAE attaches great importance to protecting the environment in its development policy. It has adopted this approach since 2012 by launching the 'UAE Green Growth Strategy', to transform the national economy into a green economy that adopts modern technologies, knowledge, and innovation in addition to reducing carbon emissions. The UAE has announced that the green and digital economy will become the starting point in the UAE for recovery after the COVID-19 pandemic.

The UAE's wise leadership considers the green economy a tool to control economic growth and direct it towards sustainable development. It also focuses on protecting the environment, climate, natural resources and improving quality of life. The UAE has won international leadership positions in the competitiveness indicators of the energy sector in general, and clean energy in particular, after seven international references agreed to classify it among the top 10 countries in the world with 18 sector-specific indicators in 2020.

The UAE is a leading country in adopting effective policies such as the economic diversity policy which focuses on a green economy and diversifying energy sources. This is through capacity building in clean and renewable energy, enhancing energy efficiency, transport, and sustainable urban planning. The UAE was also at the forefront of regional countries in climate change policies since the Paris Agreement. In the beginning, it was committed to increasing its clean energy capacity to 24% by 2021. Later, this increased to 50% by 2050.



The transition to a greener economy – sectoral review

Renewable energy

As early as 2007 the UAE took its first initial steps towards a more sustainable economy, albeit in a rather scattered manner with the development of isolated projects here and there. The Bee'ah waste management company started operating the 30 MW Sharjah Thermal waste-to-energy gasification plant in the Emirate of Sharjah. Then in 2009, the Abu Dhabi-based Masdar Institute built the country's first solar-powered plant; it is a 10MW solar PV power plant dedicated to supplying the required electricity to the iconic environmentally-friendly Masdar City which was built between 2008 and 2010. The UAE Vision 2021 launched by His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai in 2010, was the inflection point that inspired the important green developments that followed in subsequent years in a more coordinated manner. In 2013 the Emirate of Dubai made public its intention to build the largest solar park in the world in phases: the Mohammed bin Rashid Al-Maktoum (MBR) solar park (Phase I) started operation that year with a total of 15MW of PV installed capacity. It was also in 2013 that Masdar built in Abu Dhabi Shams 1 with a total of 100MW, another solar power plant much larger than the previous one and using different technology, namely solar thermal power. In 2015 ambitious goals were established in the renewables arena in Dubai in line with the Paris Agreement: a 7 percent share of clean energy in Dubai's total power output by 2020, 25 percent by 2030, and 75 percent by 2050. Clear vision, strong government leadership, the lowest bidding prices, and excellent meteorological conditions are the enabling conditions for the proliferation of renewable energy projects in the UAE, particularly solar energy.



Some developments followed, driven by the government, and nowadays renewable energy is enjoying massive potential in the UAE. The Dubai Electricity and Water Authority (DEWA) is leading the way with, so far, total planned capacity for MBR Solar Park of 1,500 MW by 2020 and 5,000 MW by 2030, along with a plan for hydropower in the Hatta mountains, the plant is expected to start operating by 2022. The share of the Clean Energy contribution was 0.54 per cent in 2017 as reported by the Ministry of Energy and Industry. Official employment figures in renewables are not available. Up until the reported date projects had been rather small, therefore probably not contributing significantly to the total workforce in the UAE. However, as more tenders were floated and awarded, American, Spanish, French, and Saudi renewable energy companies opened regional offices in the UAE. The renewable sector has taken a while to take off in the UAE, but it is expected that employment in renewables will increase very quickly during the coming years, given the UAE’s goal of renewables penetration. It is important to note that much of the temporary employment generated in this area is linked to the construction phase of the projects. However, given the increased interest in renewables across the MENA region and the establishment of regional offices in the UAE as a potential hub for renewable energy companies, this temporary employment may become permanent through increasing the mobility of workers. On the other hand, Operation and Maintenance (O&M) jobs are permanent and are expected to increase as renewable energy plants enter the operation phase.

An evaluation of building energy efficiency retrofit investment for the UAE

RETROFIT PROGRAM	INVESTMENT LEVEL 1 (BASIC RETROFIT: LIGHTING AND WEATHERIZATION)		INVESTMENT LEVEL 2 (STANDARD RETROFIT: LEVEL 1 WITH A/C AND INSULATION)		INVESTMENT LEVEL 3 (DEEP RETROFIT: LEVEL 2 WITH WINDOWS AND CONTROLS)	
	Residential building stock	Total building stock	Residential building stock	Total building stock	Residential building stock	Total building stock
Total Investments Required (USD Bn)	0.13	2.0	1.25	10.7	2.5	21.4
Avoided Electricity Consumption (GWh/year)	2,660	7,550	7,650	21,700	16,600	47,200
Value of Avoided Electricity Consumption \$0.05–\$0.15/kWh (USD Billion/year)	0.13-0.4	0.4-1.1	0.4-1.2	1.1-3.3	0.8-2.4	2.4-7.1
Avoided Electricity Consumption (MW/year)	500	1,400	1,450	4,000	3,100	8,000
Value of Avoided Electricity (USD Billion)	0.6	1.7	1.8	4.8	3.7	10.6
Investment Simple Payback Period \$0.05–\$0.15/kWh (Years)	0	0.3-0.8	0	1.8-5.4	0	1.5-4.5
Jobs Created (per year for a 10-year period)	300	900	1,000	2,500	2,000	5,600
Reduced Carbon Emissions (Million Metric Ton/year)	1.60	4.568	4.633	13.134	10.071	28.553

New green(er) buildings and SMART cities

The UAE is ranked amongst the top 10 countries to hold LEED (Leadership in Energy and Environmental Design) certifications outside the United States¹⁴ and it represents a green building success in the Middle East. The trend is for this path to continue. As an example, DEWA's new headquarters is under construction which will be the tallest, largest, and smartest government Zero-Energy Building (ZEB) in the world. Similarly, Abu Dhabi developed the Estidama Guidelines as a building design methodology for constructing and operating buildings and communities more sustainably in the Emirate. In addition, several smart residential areas have been created in the last few years. A few examples that might sound familiar internationally are Masdar City in Abu Dhabi and Sustainable City in Dubai. The first relies on solar energy and other renewable energy sources and hosts the headquarters of IRENA (International Renewable Energy Agency); it is the base for the Masdar Institute of Science and Technology and a hub for clean-technology companies. The second, being a residential area is the first operational net-zero-energy city in Dubai. It includes 500 villas, 89 apartments, and a commercial area. The development is a carfree area powered by solar energy, built with UV-reflective paint to reduce the thermal heat gain inside the houses and many other environmentally-friendly features. The above examples show the increasing UAE interest in green design and construction, international certifications such as LEED and BREEAM playing an important role in employability as well as Estidama in Abu Dhabi.

Greener Transportation

Greener transportation is a major focus for Dubai's government. The Dubai Green Mobility strategy encourages the use of sustainable transport and electric vehicles. The Dubai Supreme Council of Energy issued a directive in 2016 to all government organizations to the effect that between 2016 and 2020 at least 2 percent of their vehicle purchases must be of hybrid or electric vehicles. This target will then increase to 10 percent by 2030. In addition, a large part of today's taxi fleet in Dubai is hybrid and government plans aim at 50 percent of the taxi fleet being hybrid by 2021. The first section of the Dubai metro was inaugurated in 2009. Since then a total of 75 km have been delivered. Accurate employment numbers are not available, but the media indicate that as early as 2008 there were 24,000 engineers, technicians, and workers involved in the construction of the project, as well as 105 sub-contractors.¹⁵ The Roads and Transport Authority announced that in September 2017 the total number of passengers to have used it had cleared the 1 billion mark. In addition, light rail tracks have been in operation since 2014. Expansion plans include 400 km of metro lines and 268 km of tram lines. However, for the moment the only extension under construction is the 15 km link to the EXPO 2020 site, along with seven new stations to be completed by 2020. This has driven employment demand in the last couple of years for electrical, mechanical, and civil engineers, project managers with previous railway experience, and other railway specialists such as track engineers. It remains to be seen whether these new jobs will be sustained in the future as construction sections are completed. Further investment in stages may help in that regard. Nevertheless, once construction is finished, additional permanent O&M jobs will be created.

Water Management

One of the major environmental challenges to the UAE's economy is, and will continue to be, the issue of water resources. Average precipitation ranges from 8 to 15 days per year. In the absence of freshwater supply, desalination, and wastewater reclamation are some of the critical means of ensuring water availability in the UAE.¹⁶ At the moment desalination is done through Combined Cycle CoGeneration which is considered more efficient. Local governments are adopting a clear strategy to ensure that by 2030 100 percent of desalinated water will be produced by a mix of clean energy that uses both renewable energy and waste heat. Employment in this area is limited to individuals working for the local water authorities who are the entities in charge of the generation, distribution, and commercialization of water. More efficient water conservation technologies are planned to be explored by the UAE to sustain its economy.

District Cooling

Air-conditioning accounts for a significant share of energy consumption, given the UAE's harsh climate. Comprehensive infrastructure investments are being undertaken to move towards district cooling vis-à-vis decentralized cooling to improve efficiency.¹⁷ District cooling is one of the nine strategic pillars for achieving power savings, with the government aiming at 40 percent market penetration for district cooling. According to RSB's Dubai Market Share and Efficiency Study, district cooling's share of the overall cooling market is currently 18 percent. Hence if investment continues more green employment in this area will be created.

Waste management

The UAE generates more than 6.5 million tonnes of waste per annum. Per capita waste generation is around 1.2-1.3 kilograms per day, one of the highest rates in the world.¹⁸ A recent policy launched in 2018 aims at recycling 75 percent of municipal solid waste generated. The Ministry of Economy (MOE) in its annual statistical report¹⁹ indicates that for the year 2015, some 500 workers belonged to the waste management industry. Surprisingly, even though the sector is currently rather small, employment quantification has been undertaken and the sector is considered a separate sector in its own right. The recent policy developments may exacerbate the need for skilled professionals in the waste management arena.

Green Business



GREEN BUSINESS

Definition

Green businesses, also called sustainable businesses, seek to balance profit with the health of the planet. Green businesses incorporate principles of sustainability into their business decisions to reduce their negative impacts on the global or local environment. They do this by selling environmentally friendly products or by greening their processes to make them more environmentally sustainable. In light of the imminent threat of climate change to our planet, green businesses endeavor to reduce their greenhouse gas emissions. More than 90% of CEOs say that sustainability is fundamental to success.

A green business will typically do any or all of the following:

- Incorporate principles of sustainability into its business decisions and actively monitor them.
- Pay staff a fair wage for the work they do and ensure that they can maintain a good work-life balance.
- Distribute benefits equitably across the value chain.
- Maximize the social benefits of the business (e.g., by employing marginalized groups). Some businesses set up foundations to assist with this – but a sustainable business doesn't confine its social activities just to charitable donations – it looks for every opportunity to increase the social benefits of the business in its day-to-day operations.
- Supply environmentally friendly and/or local products and services that replace demand for non-green or imported products and services.
- Help its community become more sustainable (e.g., by reducing energy use or water use, or reducing waste or pollution).
- Make efforts to reduce resource use (energy, water, materials), and replenish, enhance, or substitute an environmental resource that is used by the business (e.g., replanting trees, enhancing soil fertility, using renewable energy).
- Make an enduring commitment to environmental principles in its business operations. These will often be detailed in a publicly available and regularly updated Sustainability or Environmental Policy.



How can a green business become more environmentally friendly?

One of the first things a business can do to become more environmentally friendly is to conduct an environmental impact assessment. This will help to identify areas where the industry can reduce its use of resources such as water and energy and minimize waste. Based on the assessment results, a company can implement changes such as upgrading energy-efficient lighting and appliances, using renewable energy sources and implementing recycling and composting programs.

In addition to operational changes, a business can become more environmentally friendly by sourcing materials and products from environmentally responsible suppliers. This might include choosing suppliers that use sustainable production methods or sourcing materials from recycled sources.

Another way a business can become more environmentally friendly is to support environmental causes through charitable donations and partnerships. This can help to raise awareness about critical environmental issues and show the company's commitment to sustainability.

How can a green business become more environmentally friendly?

There are several benefits to being a green business, which is a company that operates in an environmentally sustainable manner. These benefits can be divided into three main categories: financial, reputational, and social.

Financial benefits of being a green business:

1. **Reduced operating costs:** By conserving resources such as water and energy, a green business can reduce its operating costs.
2. **Increased efficiency:** Implementing sustainability measures can help a business become more efficient, leading to cost savings.
3. **Government incentives:** Many governments offer incentives to businesses that adopt sustainable practices, such as tax breaks and grants.

Reputational benefits of being a green business:

1. **Improved reputation:** A company seen as environmentally responsible is likely to be viewed more favorably by customers, investors, and other stakeholders.
2. **Increased customer loyalty:** Many consumers are willing to pay a premium for products and services that are environmentally friendly.
3. **Increased employee retention:** A company with a solid commitment to sustainability is often seen as a more desirable place to work, which can help improve employee retention.

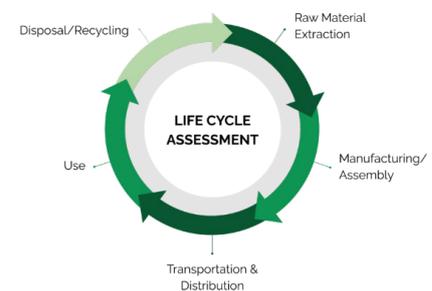
Social benefits of being a green business:

1. **Environmental protection:** By operating sustainably, a green business can help protect the environment and contribute to a more sustainable future.
1. **Community engagement:** Many green businesses support environmental causes and engage with their local communities, which can help build positive relationships.

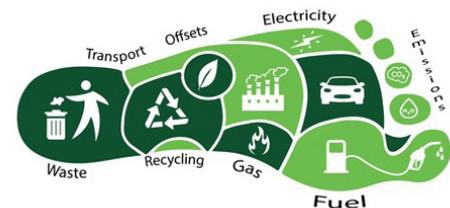
How can a green business measure its environmental impact?

A business can use several tools and methods to measure its environmental impact.

1- One standard practice is to conduct a life cycle assessment (LCA), which looks at a product's or service's environmental impact from raw material extraction through production, use, and disposal. An LCA can help a business identify areas where it can reduce its environmental impact, such as using more sustainable materials or improving production processes.



2- Another tool that a business can use to measure its environmental impact is a carbon footprint calculator. This helps a company to understand its greenhouse gas emissions and identify opportunities to reduce them. A business can also use a water footprint calculator to understand its water use and identify ways to reduce it.



Examples of green businesses in a variety of industries

1. **Renewable energy:** Companies that produce clean, renewable energy sources such as solar and wind power are considered green businesses.
2. **Sustainable agriculture:** Farms and other agricultural businesses that use sustainable practices, such as organic farming and permaculture, are considered green businesses.
3. **Eco-tourism:** Tourist companies that promote environmentally responsible tourism and support local communities are considered green businesses.
4. **Recycling:** Companies that collect and process materials for recycling are green businesses, as they help to reduce waste and conserve natural resources.
5. **Sustainable fashion:** Clothing companies that use sustainable materials and production processes, and support fair labor practices, are considered green businesses.
6. **Sustainable construction:** Companies that use sustainable building materials and practices, and design buildings for energy efficiency, are green businesses.
7. **Natural and organic products:** Companies that produce natural and organic products using sustainable materials and practices are green businesses.

What are the challenges of starting a green business?

Some of the most common challenges of starting a green business include the following:

- **Funding:** One of the biggest challenges of starting any business is securing funding. This can be incredibly challenging for green businesses, as investors may be hesitant to invest in a company focusing on sustainability.
- **Lack of knowledge:** Many entrepreneurs may not have a background in environmental sustainability and may not be familiar with the best practices for operating a green business. This can make it difficult to know where to start when it comes to implementing sustainable practices.
- **Market demand:** While there is a growing demand for environmentally friendly products and services, it can be challenging to gauge the level of request in a specific market. This can make it difficult to determine the feasibility of starting a green business.
- **Competition:** As more businesses adopt sustainability as a core part of their operations, competition in the green business space can be fierce. It can be challenging to stand out in a crowded market.
- **Regulation:** There may be several regulations and standards that a green business must comply with, such as environmental regulations and standards for sustainable products. Navigating these regulations can be challenging for entrepreneurs new to the green business space.

Examples of government incentives for green businesses

- **Tax breaks:** Many governments offer tax breaks to companies that adopt sustainable practices. This might consist of tax credits for using renewable energy or tax deductions for investing in energy-efficient equipment.
- **Grants:** Governments often offer gifts to businesses looking to implement green initiatives. These grants can be a valuable source of funding for companies and are usually competitively awarded.
- **Loans:** Some governments offer low-interest loans to businesses looking to implement sustainability projects. These loans can be a good option for companies looking to finance more significant initiatives.
- **Technical assistance:** Some governments offer specialized services to businesses looking to implement green initiatives. This might include help with identifying opportunities for sustainability or assistance with implementing specific projects.
- **Public procurement:** Governments are often significant consumers of goods and services and can use their purchasing power to support green businesses. By prioritizing the procurement of environmentally responsible products and services, governments can help to create a market for green companies.

Ways business can go green...

1- USE LESS PAPER

Minimizing paper use is one idea for how companies can be more eco-friendly. You might think of modern business as a “paperless” world, but paper and paperboard still make up about 23% of municipal solid waste. Reducing the amount of paper your business uses can have a significant environmental impact. Not to mention, you’ll save the money you would have spent on restocking paper products. Try using electronic files and cloud storage for documents. Digitizing files is a more secure, safe way to store information. When you need to use paper, commit to printing on both sides.



2- LIMIT VAMPIRE POWER

A phenomenon called “vampire power” might be bleeding your business’ money. Many modern electronics have standby settings when not in use, during which they continue consuming energy. Simple fixes can limit waste. Use power strips and flip them off when devices aren’t in use to eliminate the standby effect. Skip screensavers and unplug device chargers when not in use.



3- DECORATE WITH PLANTS INSIDE AND OUTSIDE

Consider adding plants to your office’s interior and exterior. Landscaping and decorating with plants have many benefits. Plants beautify a space, which can improve morale in and of itself. Green is a calming color and seeing it can help relieve stress. You can create a more peaceful and productive environment by adding plants. You could also impress potential clients or partners — thoughtful landscaping and decoration help create a positive first impression. What’s more, plants contribute to cleaner air quality, promoting a healthier office and reducing sick leave. Decorate your outdoor and indoor spaces with greenery. You might invest in a professional landscaping or interior decorating service for stunning results. On the other hand, you could use this as a team-building opportunity, allowing your employees to plan and create a garden as an independent project. Either way, you’ll have a positive environmental impact.



4- USE ENERGY-EFFICIENT LIGHT BULBS



One of the simplest ways for your company to go green is to replace the lightbulbs. Light-emitting diodes and compact fluorescent lamps use 25 to 80% less energy and last three to 35 times longer than incandescent bulbs. Switching your light bulbs is a quick way to benefit the planet while also reducing your energy bills. You'll spend less on energy and have to replace bulbs much less often.

5- TURN OFF THE LIGHTS



Efficient light use is another way to make your company green. Only use as much artificial light as necessary. Many offices leave lights on in unoccupied spaces, which is a drain on your finances and wasteful energy use. Instead, turn off the lights in an unoccupied space. Think about installing motion sensors that automatically shut off lights when no one is in the room. That way, no one is responsible for remembering to flip the switches off. It is also a good idea to rely more on natural light, which has numerous health benefits. It boosts the body's vitamin D production, leads to healthier eyes, helps you sleep, and improves

your mood. A little sunlight can make for a happier, healthier, and more productive working environment. If you only have thin slats for windows, think about making architectural changes to your building.

6- DONATE ITEMS



Another crucial way to reduce waste is to donate items. If you have any extra merchandise or supplies, see if any community aid programs, schools, churches, or charities can redistribute them. Before you toss away larger items, including electronics or furniture, ask if any local programs will take them. For instance, the local library may be interested in repurposing your old reception couch after you've bought a new one. You'll reduce waste and improve your company's reputation in the area. Donating items you'd otherwise throw away is an excellent way to help improve your community. Not to mention, distributing items with your trademark or logo is a free advertising opportunity. Before you throw anything away, see if you can recycle or donate instead.

7- RECYCLE MORE

If you have yet to do so, place recycling bins throughout your office space. Make recycling as accessible and easy as possible, so recyclable items always make it to the right places. Encourage employees to recycle whenever they can. Research local ordinances to determine which objects are reusable. Rather than piling more junk onto landfills, recycle as much as you can. You can contribute to the reusing cycle even more by buying recycled products. Whenever you can, seek secondhand products or ones made from recycled material.



8- CUT BACK ON SINGLE-USE ITEMS

As of 2016, annual plastic production hit 335 million metric tons, about half of which were single-use products. Almost all plastics end up in landfills. Cutting back on single-use products, especially plastic products, is one of the most significant ways companies can go green. Think of all the things in your office someone used once and threw away. How many of those have reusable alternatives? You can replace several everyday items with smarter solutions.

Instead of handing visitors plastic water bottles, use a water filtration system and reusable bottles or cups. Keep silverware in your office, offer your employees reusable travel mugs, place refillable soap dispensers in the restroom, and stock washable rags instead of paper towels. All of these steps have an initial cost but will save your company money in the long run. You'll no longer have to restock single-use items, reducing your monthly expenses.

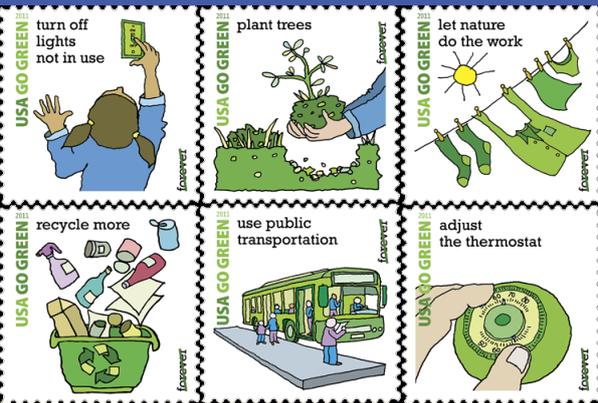


9- REPLACE EVERYDAY PRODUCTS WITH GREEN ALTERNATIVES

Gradually start replacing everyday products with greener options. For example, many cleaning products have more natural alternatives. They're safer for your health and better for the planet. There's no need to splurge on expensive organic cleaning products – instead, you can make them yourself. In many cases, all you need is white vinegar, baking soda, and acidic fruit to replace cleaning solutions. If a do-it-yourself approach is not an option, learn how to identify greener cleaning products by recognizing EPA-approved labels. Vague terms and “green-washed” packaging are not environmental guarantees, so it's essential to look for specific labels and certifications.



10- CREATE GO-GREEN ACTIVITIES FOR EMPLOYEES



Get your employees involved in your sustainability initiatives. Ask for employee input and set sustainability goals together. Celebrate your environmental impact as a team. Allow employees to form committees for brainstorming strategies and measuring successes. Incentivize employees using green practices at home—for instance, encourage your employees to track their home's sustainability efforts and offer milestone rewards. Even a simple leaderboard and quick recognition can go a long way toward increasing your company's environmental impact and boosting employee morale.

11- HOST A GREEN-CAUSE EVENT



You can get your employees and the surrounding community involved by hosting events like fundraisers. Supporting a cause is an ideal way to bolster your public image while making a significant difference in the world. It can also be an effective team-building exercise, allowing employees to work together toward a benevolent common goal. Your business may choose to host a walk-a-thon, community cleanup event, or an awareness campaign.

If organizing and hosting an activity is too much of a time and resource commitment, participate in existing community events. Have a company team at eco-friendly fundraisers, set aside part of your budget for donations, or commit to sponsoring environmental events.

12- ALLOW REMOTE WORK



Instituting a remote work policy can be a significant way in which companies can be more sustainable. Think of all the energy and resources that could be saved if there was no need for a physical office. Modern technology can make many office jobs remote these days—video conference calls, screen-sharing, and cloud storage mean most desk workers can do their jobs from home.

Permitting even partial remote work over time reduces your operating costs and decreases your drain on the environment. With no commute, no stops for coffee in foam cups, and no drain on office electricity, employees leave a much smaller carbon footprint. Not to mention, many employees prefer working from home, reporting that they feel more productive. Incorporating telecommuting into your company culture can save you money and boost employee morale.

Social Enterprise

A social enterprise exists to generate revenue (and sometimes profits) to sustain socially beneficial activities. A social enterprise can be for-profit or non-profit. At its core is a purpose to improve lives and/or the environment. It has determined that it can best do that by creating a stream of revenue from producing and selling products or services to sustain its activities and programs.

The difference between a social enterprise and a green business largely stems from the motivations behind their existence rather than what they do

As a hypothetical example, two businesses that produce construction material from crushing recycled glass have been established with different motivations. Business A has seen the amount of glass going to the landfill and has decided to explore ways to address this issue. They have looked at various uses for recycled glass – repurposing the glass into other products such as vases, lights, and jewelry, and crushing it for use as an aggregate in the construction sector. Weighing these different options, Business A decides that crushing glass for construction is the best business solution to this waste management issue.

Alternatively, Business B developed because the founders wanted to find employment for young unemployed laborers in their neighborhood, and developing a glass-crushing business was a viable option. These motivational differences mean that the two businesses may make very different strategic decisions. For instance, if the demand for construction material changes so that crushing glass for construction products is no longer viable, Business A may consider repurposing recycled glass into other products, but Business B may decide to stop recycling and crushing glass, and look for other options to employ laborers. In this example, Business A is mainly a green business, while Business B is a social enterprise.



Green Business Examples in the MENA region:

1- Egyptian Company for Solid Waste Recycling (ECARU)



ECARU is part of Egyptian investment firm Qalaa Holdings and is the sister company to Engineering Tasks Group (ENTAG). The company specializes in recycling biomass and municipal solid waste (MSW). It currently receives 500,000 tons of MSW on its projects. ECARU collects and processes around 1.5 million tons of agricultural residues per year. The company has projects in Egypt, Libya, Cyprus, and Ethiopia.

2- KarmSolar



Founded in 2011, KarmSolar was among the first private companies in Egypt to be licensed to distribute solar electricity. It also provides microgrid solutions, so remote destinations can set up off-grid solar power plants on site. The company claims to have installed 31.4 MW of renewable energy, offsetting 10,000 tons of CO₂ and saving 2.3 million liters of diesel annually. In September 2021, it launched its water solutions division KarmWater with a solar-powered water desalination project in Marsa Alam.

3- Masdar



Masdar specializes in utility-scale renewable energy projects, community grid projects, and energy services. Active in more than 30 countries, Masdar is one of the largest developers of renewable energy projects in the Middle East. Its projects have an electricity generating capacity of 11GW. It displaces over 16 million tons of carbon dioxide per year. Since its inception, Masdar has invested in solar and wind power projects with a combined value of nearly \$20 billion. Masdar's share of this investment is more than \$7 billion. The company is wholly owned by the Abu Dhabi government's Mubadala Investment Company.

4- Masen

Masen manages renewable energy in Morocco alongside the National Office of Electricity and Potable Water. The company leads development programs of integrated projects that aim to create an additional 6,000MW of clean electricity generation capacity and secure 52% of the country's energy mix from renewable sources by 2030. Between 2010 and 2016, the company completed 70 initiatives and projects at an overall budget of \$7.6 million, with 34,000 direct and indirect beneficiaries.



5- Oman Environmental Services Holding Company (be'ah)

be'ah is responsible for solid waste management in Oman, operating under the Oman Investment Authority. In 2020, be'ah achieved 100% municipal waste service coverage. The company's waste diversion strategy aims to achieve 80% diversion of generated waste from landfills by 2030 and reduce the average daily waste generation per person from 1.2kg to below 1kg by 2040. The company operates 10 engineered landfills and 16 transfer stations.



Seal awards sustainability awards winners

- About Seal award:**

The SEAL (Sustainability, Environmental Achievement, and Leadership) Awards honor the organizations and leaders dedicated to making real progress on the most pressing issue of our time. SEAL Award winners are determined by a holistic methodology that measures applicants against established benchmark metrics that demonstrate true impact and progress towards a healthy planet and a sustainable future.

The SEAL Awards blend a combination of quantitative and qualitative metrics with an expert review process to measure environmental progress across a range of categories. Environmental Award Winners must meet or exceed established baseline and comparative benchmarks.

2023 SUSTAINABILITY LEADER AWARD WINNERS:

1- **Aisha Yang** — [Herbaland](#)



Herbaland is a prominent health and wellness company known for its innovative and high-quality nutritional products. Established to promote a healthier lifestyle, Herbaland specializes in gummy vitamins, supplements, and other wellness offerings. The company is recognized for its commitment to natural ingredients and a focus on delivering convenient and enjoyable ways for individuals to support their health.

2- **Andrew Schaap** — [Aligned Data Centers](#)



Aligned is a top-tier data center solutions provider, renowned for its adaptive and sustainable approach. Specializing in flexible infrastructure that scales with clients' needs, prioritizes energy efficiency and sustainability through innovative technologies. The company offers cutting-edge, eco-friendly data center solutions tailored to meet the evolving demands of modern businesses.

3- **Cristina Crava** — [The Porto Protocol Foundation](#)

Porto Protocol is a key outcome of the Climate Change Leadership – Solutions for the Wine Industry conferences, an undertaking by all participants to adopt and promote the principles and measures established at the summits, by signing the Letter of Principles for The Porto Protocol.



the
**PORTO
PROTOCOL**

4- **Cynthia Dalagelis** — [Amalgamated Bank](#)

Amalgamated Bank is a financial institution for individuals who prioritize the impact of their money on the world.

When you choose to deposit with us, your money actively supports sustainable organizations, progressive causes, and social justice initiatives.

Committed to environmental and social responsibility, we operate as a net-zero entity powered entirely by 100% renewable energy.

With a rich history, we take pride in offering affordable access to the banking system, championing immigrants' rights, promoting affordable housing, and advocating for workers' rights.



5- **Dhruv Agarwal** — [Kontoor Brands](#)

Kontoor Brands is a global lifestyle apparel company that designs, manufactures, and markets well-known denim and apparel brands.

Headquartered in Greensboro, North Carolina,

Kontoor Brands was established as an independent company in 2019 following a spin-off from VF Corporation.

The company is home to iconic denim labels such as Wrangler and Lee, known for their heritage, innovation, and commitment to quality.

Kontoor Brands is dedicated to providing consumers with stylish and sustainable apparel options, emphasizing a balance between fashion-forward designs and timeless comfort.



**INSPIRING CONFIDENCE,
EVERY DAY**

6- **Eddy Soffer** — [Interactive Brokers](#)



Interactive Brokers Group, Inc. is a leading global brokerage firm established in 1978.

Headquartered in Greenwich, Connecticut, the company specializes in automated electronic brokerage services for a diverse range of clients, offering low-cost trading across various financial products such as equities, options, futures, forex, and fixed income. Known for its advanced technology platforms, Interactive Brokers caters to both individual and institutional investors.

7- **Francois Devy** — [SEAQUAL INITIATIVE](#)



The SEAQUAL Initiative is a sustainability effort combatting marine plastic pollution. Partnering with businesses and communities, it collects ocean litter and transforms it into recycled materials for various products. The initiative promotes awareness, responsible consumption, and supports a circular economy.

8- **Hina Gupta** — [Aditya Birla Capital Limited](#)



Aditya Birla Capital Limited is a prominent Indian financial services company within the Aditya Birla Group. Offering a diverse range of financial solutions, including life insurance, asset management, and corporate lending, the company is known for its customer-centric approach and financial inclusivity.

9- **Ibrahim J. Al-Othman** — [United Development Company](#)



United Development Company (UDC) is a prominent Qatari public shareholding company based in Doha. Established in 1999, UDC is known for its pivotal role in developing The Pearl-Qatar, a luxury island development. The company operates in real estate, hospitality, infrastructure, and urban planning, contributing significantly to Qatar's economic growth and urban landscape.

10- **John Nicholls** — [Corporate Travel Management Limited](#)

Corporate Travel Management Limited (CTM) is a global travel management company based in Australia.

Specializing in corporate travel solutions, CTM offers services in multiple countries, utilizing technology to enhance efficiency and provide cost-effective solutions. Known for its commitment to service excellence, CTM is a key player in the corporate travel industry.



11- **Jon Reed** — [Compostic](#)

Compostic is a company specializing in sustainable and compostable food packaging solutions.

They offer a range of products designed to reduce environmental impact, particularly in the context of single-use plastics.

Compostic's products are intended to be disposed of in composting systems, contributing to a more eco-friendly waste management approach.



12- **Madison Savilow** — [Carbon Upcycling Technologies](#)

Carbon Upcycling Technologies is a company focused on developing innovative solutions for carbon capture and utilization.

They specialize in transforming carbon emissions into valuable products, contributing to sustainable practices. Carbon Upcycling Technologies aims to address environmental challenges by repurposing carbon dioxide emissions and creating marketable materials.



13- **Monique Maissan** — [Waste2Wear](#)

Waste2Wear is a sustainable textile company dedicated to transforming plastic waste into eco-friendly fabrics and products.

Specializing in recycled materials for the fashion and textile industry, Waste2Wear emphasizes environmental responsibility and circular economy principles.

The company's innovative approach contributes to reducing plastic pollution and promoting sustainable practices in the fashion sector.



14- Rasika Kodithuwakku — [Brandix India Apparel City](#)



Brandix India Apparel City (BIAC) is a prominent apparel manufacturing and export hub located in Visakhapatnam, India.

Established by the Brandix Group, a leading global apparel manufacturer, BIAC serves as a comprehensive ecosystem for textile and garment production. The facility is known for its state-of-the-art infrastructure, sustainable practices, and adherence to international standards.

BIAC plays a crucial role in the textile and apparel industry, providing end-to-end solutions for global brands.

15- Sharon Vidal — [Illumina](#)



Illumina is a biotechnology company known for its advancements in genetic sequencing and genomics. Founded in 1998, the company has played a significant role in the development of next-generation sequencing (NGS) technologies, making genomic information more accessible and affordable. Illumina's innovative platforms are widely used in various scientific and medical fields, enabling researchers and clinicians to study genetic variations, understand diseases, and personalize healthcare. Headquartered in San Diego, California, Illumina is recognized for its contributions to advancing genomic research and applications.

Green Entrepreneurship



GREEN ENTREPRENEURSHIP

Definition

Green Entrepreneurship is the process of consciously addressing environmental and social requirements and problems, as well as developing brilliant, original business concepts that will provide a solution. These concepts carry a high degree of risk, which benefits the environment while assisting in the maintenance of financial sustainability. For instance, many companies now forgo paper invoices in favor of paperless invoicing in the interest of sustainable company growth and ecological entrepreneurship.

In other words, green entrepreneurship refers to businesses and companies developing products or services that are usable everywhere and have the potential to protect the ecosystem. They must simultaneously ensure that the solutions won't have a detrimental financial impact on the company.

Green entrepreneurship is a particular subset of entrepreneurship that focuses on developing and putting into practice solutions to environmental issues as well as encouraging social change to prevent ecological damage. It has been suggested that green entrepreneurship may be a new business paradigm rather than a subset of entrepreneurship because more than just offering eco-friendly goods and services to a specialized market motivates green owners of enterprises.



Characteristics of Green Entrepreneurship

1- Create Plenty of Jobs and Youth Employment Opportunities



The SME industry in Namibia is crucial to the financial growth of the nation. SMEs are thought to contribute more than 20% of the country's GDP and generate about 150,000 employees. Due to the low entry-level requirements for young people in many sectors and their usually high interest in innovative business solutions and sustainability considerations, green entrepreneurship can play a crucial role in the fight against youth unemployment, which currently stands at over 60%. Additionally, the establishment of new businesses permits gender equality and is not restricted to urban areas, where there are typically more employment possibilities. Workers who are freed up as a result of the restructuring towards a greener economic model may be able to find new employment possibilities thanks to green entrepreneurship.

2- Drives Sustainable Changes

Green entrepreneurship transcends the purely technical aspects of conducting business and stems from a degree of technical innovation such as pollution reduction, clean production methods, and resource efficiency. It can promote a way of thinking that is lifecycle-based and encourage ecological innovation at the societal level. Green business owners do this by influencing people’s mindsets to adopt a more environmentally friendly perspective and by stimulating demand for green goods and services, which boosts both job opportunities and environmental benefits.



3- Changes the Status Quo

Change is now necessary, and we must begin offering answers rather than generating more issues. And where better to begin than in the corporate world? After all, the majority of environmental improvements that occurred were to support industries. The idea of green entrepreneurship has developed over the past few years and seems to be expanding. Now, the word confuses a lot of people because, just by hearing the term, one imagines a business that only uses recycled materials and runs its systems using alternative energy sources.



4- Needs Financial Support

Companies must begin using the new model that will enable them to both support green ventures and go green themselves for the concept of “green entrepreneurship” to be effective. This may take longer to accomplish in older businesses where a specific method of operating is already in place. It will be necessary to alter the fundamentals, and in the majority of instances, businesses lack the funds to do so. But even if we are discussing a fresh business venture, capital is still crucial.



5- Maximizes the Social Benefits of the Business

Today green ventures play a key role the society. Not only the economic benefits but also reducing pollution, ensuring sustainability, and giving solutions to societal problems are part of green entrepreneurship. However, a socially responsible company goes beyond merely making charity contributions. In its daily operations, it searches for every chance to increase the social benefits of the company. The final goal of the green organization is to give value to every part of society by ensuring ecological health.



Importance of green Entrepreneurship

1- Green Marketing Awareness



Boost company recognition and competitive advantage. Because the product fosters brand confidence among environmentally aware consumers, a sustainable marketing strategy is still necessary for achieving community engagement and brand engagement. Ecological marketing has a big impact on consumer behavior. Developing your brand to align with environmental principles is a clever strategy to draw in eco-aware customers. There are countless possibilities for innovation and authenticity in this new economy of “green” consumers. According to studies, companies that consider the environment enjoy greater customer appeal and enduring loyalty.

2- Creates New Trade Opportunities



Businesses that differentiate their goods have access to new markets. Businesses can incorporate sustainability to varying extents and capabilities. Some companies change their production and consumption habits throughout the value chain, while others use greener inputs or market greener goods and services.

3- Reduce Operation Cost



After adopting more environmentally friendly business practices, many businesses have noticed increased operational efficiencies. When you consider that improved resource management and conservation lead to more efficient operations and lower costs, it makes sense.

4- **Creating Green Jobs**

Small- and medium-sized businesses (SMEs) are the backbone of most economies, creating significant amounts of jobs and boosting GDP. Entrepreneurs with a strong sense of purpose and commitment identify, create, and seize business opportunities to grow their enterprises. Therefore, entrepreneurship fosters creativity as well as long-term growth in both the economy and society. By offering green goods and services, introducing greener production methods, increasing demand for green goods and services, and generating green jobs, green entrepreneurs serve as the engine for launching and maintaining a green economy.



5- **New Green Products and Services**

A green product is environmentally friendly and made to have as few negative effects on the ecosystem as possible throughout its entire life cycle. Green services are also the same as green products. Green services give Sustainable service to customers while protecting the ecological environment and society. Electric cars, Renewable energy sources like solar and wind, and eco-friendly dishwashers are some examples of those green products. Energy Star certification, Forest Stewardship Council, and USDA Organic certification program are some of examples green services.



Green entrepreneurship business ideas

9 sustainable/ green startups in the Mena region:

1- The Concept

The Concept is a sustainable product development and design company. The company has raised over \$450,000 in total funding from companies like Mubadala and ADQ. It launched its first product, a sustainable food tray, at the end of 2020 and is currently in tender with four airlines for a joint contract value of \$10 million. It has also designed art and furniture for a large U.A.E. real estate developer.

THE
CONCEPT

2- Red Sea Farms

Agri-tech startup Red Sea Farms helps commercial farming to produce food using primarily salt water and sunlight. The company's system helps reduce freshwater consumption by up to 90%. In August 2021, the startup secured \$6 million in funding, bringing its pre-Series A round to \$16 million so far, and total funding to \$18 million. It now plans to accelerate its expansion plans in Saudi Arabia, as well as exploring growth opportunities in North America.



RED SEA FARMS

3- Bekia

Egypt-based Bekia is an online platform to exchange separated inorganic waste— such as cans, plastics, food, oil, and metal—for cash through a smart wallet or with goods and services. Since its inception in 2017, the startup has raised \$200,000 in funding. It currently employs 14 people. The company is a graduate of Cairo accelerator Flat6Labs. In 2020, the company partnered with Cairo-based e-commerce platform Homzmart to exchange waste with new furniture from the platform.



4- Edama Solutions

Edama Solutions specializes in transforming organic waste into products for desert agriculture. By eliminating organic waste from landfills, the company has helped reduce carbon dioxide emissions.

It also helps landscapers in the development of green areas by reducing water consumption by 50%. In farming, Edama's soil improver products help increase yields by 40%. Since being established in 2017, the company has raised \$1.25 million in funding.



Edama
organic solutions

إدامة
للحلول العضوية

5- Mawaad Environmental Services

Mawaad Environmental Services processes materials and recovers resources using metal recovery technology to cut costs in heavy industries. In the first half of 2021, the startup processed and sold 300,000 tons of steel slag, enabling a more circular economy in the region. It operates in both the GCC and Egypt and counts Emirates Steel and Ezz Steel as clients. The company has raised \$7 million since its inception. Founder Ismail Fahmy has 15 years of experience in renewables.



6- Baramoda

Baramoda specializes in sustainable agricultural innovations. It develops biofertilizers from plant-based agricultural waste customized for different soil and crop types. The company produces compost that can reduce the water needed for soil by 30%. In four years, Baramoda has reduced costs for small farmers by 10%, recycled 129,000 tons of waste, reduced CO2 emissions by 42,000kg, saved 1.6 million liters of water, and contributed to the organic cultivation of 3,200 hectares of land. It has raised over \$520,000 in funding. Founder and CEO, Mostafa Elnaby, is also the founder and CEO of Environeur, a waste management ecosystem.



7- Badia Farms

Badia Farms is one of the Middle East's first commercial indoor vertical farms, using hydroponic technology to grow fruits and vegetables all year round. The farm uses 90% less water compared to open-field farming. In 2020, the company announced plans to build a large-scale high-tech vertical farm that will produce 3,500kg of high-quality fruits and vegetables per year. Since its inception in 2016, the company has raised \$5 million in funding.



8- Algebra Intelligence

Algebra Intelligence creates energy monitoring solutions. Its first product, TaQTaK, enables users to monitor the energy that is generated from their solar PV systems as well as their electricity consumption. In May 2021, the startup closed a \$310,000 pre-seed funding round led by Oasis500. It plans to use the funding to develop a mobile app and a new data-based platform that uses AI and machine learning to create energy resources.



Getting into your green business

1- Access new markets

There is an increasing demand for green products and services worldwide. Global research shows a 71% rise in the popularity of searches for sustainable goods over the 2016-2021 period, a trend that is accelerating in low and middle-income countries ². Green products and services represent previously untapped business opportunities. Whether you are offering your products and services directly to consumers (B2C) or to other companies (B2B), environmental concerns are becoming more and more important.



- **Are you selling directly to consumers?**

It is no longer just a few wealthy consumers in industrialized countries who are looking for green products and services. In developing countries, there is also increased demand for environmentally responsible products and services. As a green entrepreneur, you can develop solutions that meet this growing market demand ahead of your competitors. Offering green products and services can enhance your business's reputation with customers and communities who are concerned about environmental sustainability.

- **Are you selling to large companies?**

An increasing number of large companies are incorporating sustainability requirements into their procurement processes. This means that they will select their supplies based on sustainability criteria, challenge their suppliers to become more sustainable, and/or engage with their suppliers to improve the sustainability of their products and services. Enterprises that want to become suppliers to large companies will often be required to certify that their products, services, and processes meet certain environmental criteria.

- **Are you selling to the Government?**

Public procurement – the process by which governments purchase goods, services, and works from the private sector – amounts to around 12% of global GDP. In many countries, national, provincial, and municipal offices apply sustainable procurement practices, meaning that they favor sustainable products and services over products and services that score low on sustainability aspects. In some instances, green enterprises can sell their products and services at higher prices than normal enterprises. For example, sustainable tourism lodges can charge higher prices to environmentally sensitive clients. Another example can be found in the eco agro-industry that sells products from organic agriculture with a price premium. A 2015 global survey revealed that 66% of global respondents were willing to pay more for sustainable goods. In Africa, Asia, Latin America, and the Middle East, 23-29% of respondents were willing to pay a premium for sustainable offerings.

2- Stay ahead of environmental regulation

Environmental regulation is becoming more and more stringent. Green businesses can reap the benefits of staying ahead of environmental regulation. They have already innovated and tested the right materials, technologies, and processes to meet environmental standards. In other words, they adapt their products and business processes before environmental regulation comes into place. This way they can avoid fines and the risk of business interruptions when new regulations enter into force. Staying ahead of regulation also means that businesses can improve their reputation with clients and communities.

* What kind of more stringent environmental regulation can we expect over the coming years?

<p>Greenhouse gas emissions</p>	<p>Many governments are implementing policies to bring down their greenhouse gas emissions in line with their Nationally Determined Contributions to the Paris Agreement. Some of these policies affect businesses directly, for instance when governments decide to phase out fossil fuel subsidies or when taxes on electricity, gas, or fuel prices increase.</p>
<p>Waste</p>	<p>To manage growing amounts of waste and ensure proper recycling and reuse of materials, many countries place the responsibility for managing waste on the businesses that manufacture the products in the first place. Under so-called Extended Producer Responsibility (EPR) schemes, producers become responsible for re-collecting the products or packaging materials that they have brought onto the market and/or covering the cost of disposal.</p>
<p>Chemicals</p>	<p>There is increased regulation in the area of chemical control, meaning that producers can either not make use of certain chemicals or must be able to prove a limited use of certain chemicals. These regulations mostly affect businesses in agriculture, textile, manufacturing, and electronics. Producers in developing or middle-income countries can also be affected by regulations in the countries to which they export.</p>
<p>Water conservation</p>	<p>In countries with water shortages, water use registration, licensing, and auditing may become firmer for business, while water usage restrictions when temporary shortages occur may affect business operations.</p>

3- Access to finance

Green businesses may be able to attract certain types of financing options for their green business ideas that are not available for conventional business ideas. Banks and investors are increasingly focussing on environmentally sustainable businesses. IFC estimates that the global volume of green loans in 2021 was around \$33 billion and reports a rapid rise in the volume of green loans in developing countries 4. Some banks have established specific loan products for green businesses and/or for eco-investments in businesses such as the installation of solar power panels or the purchase of eco-technology. There are also some government-sponsored initiatives providing finance to businesses developing green products or services or investing in cleaner production.



Another option to attract financing for green business ideas or eco-innovation is through crowdfunding. Crowdfunding is the use of small amounts of capital from a large number of individuals to finance a new business venture. Worldwide there are about 11 crowdfunding platforms on which green businesses can present their projects to look for investors.

4- Reduce costs

Green businesses can considerably reduce costs through greener practices. These cost reductions generally arise from efficiency gains when fewer inputs are required to produce the same output. Many green enterprises use cleaner production strategies to reduce environmental pollution and simultaneously reduce the consumption of resources. For instance, when companies find ways to save on water, gas, and electricity, they can also save on expenditures. Companies that manage to reduce the usage of raw materials or packaging materials through eco-innovation often report substantial cost savings. The majority of studies using firm-level data show a positive relationship between clean investments and firms' productivity, especially in the energy-intensive manufacturing sector.



*** Cost savings can be attained in different ways**

Process efficiency	By optimizing production processes or introducing more efficient processes, enterprises minimize the required inputs and reduce their waste production.
Product design	Enterprises can re-design their products to reduce the required inputs without sacrificing the product's utility.
Waste disposal	In addition to reducing waste by improving process efficiency, enterprises can reuse already generated waste or pass it along to other companies in a process of industrial symbiosis. This reduces the cost of waste disposal.
Source of raw material	Enterprises can reduce the cost of raw materials by switching to recycled and recyclable materials and applying circularity principles.
Energy efficiency	Enterprises can generate savings associated with energy-efficiency lighting, building insulation, cooling, and heating systems efficiency.
Packaging and transportation	Enterprises can reduce costs by reducing the volume of packaging material and by switching to local suppliers, thereby decreasing shipping distances

5- Improve quality

Implementing green measures can lead to quality improvements. Green products and services can therefore improve the value proposition of the enterprise and improve its bottom line.

In manufacturing, there can be important synergies between designing and manufacturing an environmentally sustainable product and designing and manufacturing a better quality product. When businesses design and manufacture products with a lower environmental footprint, these same products may have higher performance characteristics, i.e. a longer life, or a longer mean time between failures. The same synergies can be pursued by enterprises in the services industry. Hairdressers that use less chemicals and more natural products are offering a better service to their clients' hair. Restaurants that use organic vegetables may also be offering more tasty dishes. Construction companies that use green building design and smart thermal technologies, may at the same time offer housing solutions that bring greater comfort.



* What holds entrepreneurs back from going green?

There can be several reasons why businesses are hesitant to improve their environmental sustainability. Greening your business may entail investments in technology, innovation, market research, staff training, and certification, amongst others. Many entrepreneurs do not see a direct demand from their clients to make their products more environmentally sustainable. Therefore, they have doubts as to whether these investments will pay off.

Green entrepreneurs often face various types of uncertainty:

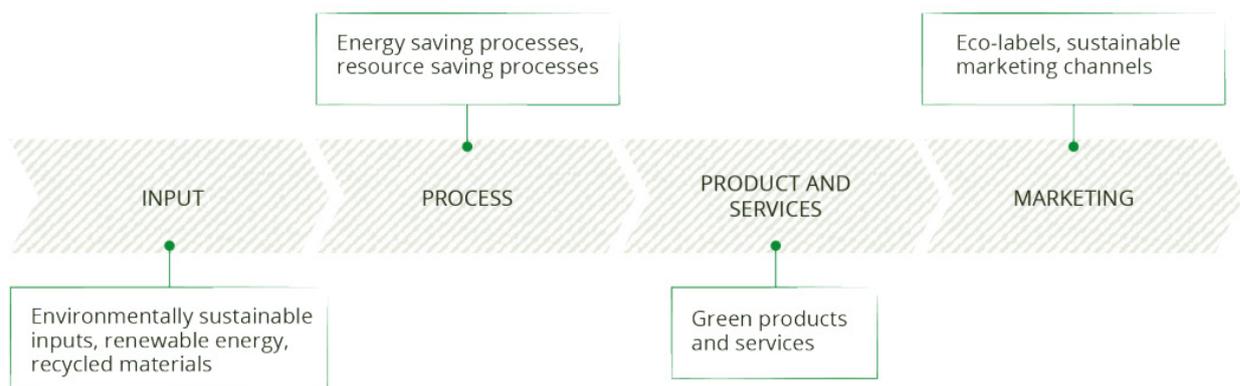
Technical uncertainty	Entrepreneurs may not be certain about the technical feasibility, usefulness, or functionality of the innovation that they would have to accomplish.
Market uncertainty	Many green entrepreneurs are building market demand for a product or service that doesn't exist yet and they are not sure whether the market uptake will be as good as expected.
Policy uncertainty	Green entrepreneurs find it hard to foresee the types of environmental regulations that will come in place and the kind of policy support that will exist for green businesses in the medium term.
Staff capacity and competencies	Small companies do not have dedicated staff to work on the environmental aspects of the company. Whereas large companies can have full-time sustainability experts, in small companies the responsibility falls on people who can only spend a small amount of their time on it.
Eco-certification	Many small businesses around the world struggle with eco-certification. Once they have developed their environmentally safe products or services and put in place environmentally safe business practices, they want to obtain certification. Certification is important to communicate to the outside world that the product or service – or the company itself – is environmentally, socially, and economically responsible. In many countries, however, certification processes are time-consuming and expensive.

Green business: how to go about it

You have just learned why green business is important and why green business can be good business. But how does one undertake to establish such a business? What does it mean for a business to go green or be sustainable? Green businesses can create value and market opportunities by reducing the use of energy, water, and materials, minimizing pollution and waste, limiting gas greenhouse emissions, and providing goods and services that enable more responsible production and consumption patterns. But how do green businesses practically do that? Do they need to do all that at the same time? The answer is that there is no single way for enterprises to go green. Entrepreneurs, depending on their starting point, objectives, and possibilities, choose different pathways. Some entrepreneurs create their enterprises having clearly in mind from the start-up phase that they want to become green entrepreneurs. Others may be in business for many years before commencing the process of greening their business. There are different approaches to greening a business, and some entrepreneurs may go step by step.

1- Four main elements of green business

Green businesses use – as much as possible – environmentally sustainable inputs. They use for instance renewable energy sources such as solar, wind, and biogas, rather than energy coming from the burning of fossil fuels. They use organically produced inputs or materials, rather than inputs produced through the use of chemicals. They use recycled materials, rather than materials taken directly from nature. Green businesses carefully look at their supply chain and try to source sustainable inputs, preferring environmentally certified supplies over others.



Green businesses make their production processes as environmentally sustainable as possible. They save energy, water, and other resources as much as they can. They apply the waste management hierarchy practices in their processes starting with waste prevention, reduction, reuse, or recycling of materials as much as possible and resort to waste disposal as the last option. They may apply these practices within the company or in collaboration with other businesses or the municipality. They reduce the use of chemicals and, when required, only use sustainable chemicals. Through resource efficiency approaches and Eco-innovation they reach the same outputs with lower inputs, reducing their environmental impact, saving costs, and improving quality.

Green businesses produce products and services that enable sustainable consumption. For instance, they improve the environmental impact of packaging materials or eliminate packaging. They produce products that can be recycled, repaired, reused, or that simply have a longer lifespan. They allow consumers to reduce their energy consumption, often also contributing to a healthier lifestyle.

Green businesses undertake marketing efforts that inform their clients about the environmental sustainability of their products or services. They use eco-labels and eco-certifications to communicate to their clients – either other companies in the value chain or final consumers – that their products are more environmentally sustainable than other products or services in the market.

Approaches to green business

Enterprises use different approaches to produce green products and services and to green their business processes. The most important approaches are:

- Eco-innovation
- Resource efficiency and cleaner production
- Life cycle management
- Circularity

• Eco-innovation

Innovation is about introducing something new to your business, whether it is a new product, a new market strategy, a new process, or simply a new way of doing things. Eco-innovation is any form of innovation that aims to reduce the environmental impact of your products or services. Mostly, Eco-innovation is about the efficient and responsible use of natural resources, including energy and water. An example of eco-innovation is when you develop a new product or service that provides value to customers with a reduced environmental impact compared to traditional products. For instance, a carpet-producing company has started to use recycled plastic to produce carpet pads.

Eco-innovation can help businesses access new or growing markets. It can increase productivity, competitiveness, and profitability. Eco-innovation can also help businesses stay ahead of environmental regulations and standards. Eco-innovation does not necessarily have to be expensive and in many countries subsidies and technical support exist for businesses that want to eco-innovate.

• Life cycle management

Life cycle management is about managing the environmental impacts linked to the whole life cycle of a product or service, from inputs, manufacturing, packaging, transport, and distribution to consumption and final disposal. Life cycle management is sometimes called the “cradle to grave” approach, as it looks at the environmental impact of products from the cradle (where the raw materials come from) to the grave (how is the product disposed of).

• Resource efficiency and cleaner production

Green enterprises apply resource efficiency and cleaner production approaches to reduce the use of resources in their production processes. As such, they reduce environmental pollution and save costs. This helps enterprises to increase productivity by applying preventive environmental practices continuously.

• Circularity

Circularity is about ways to put products, components, and materials back into use and to avoid them being discarded or ending up in landfills. Green businesses, depending on the sector they are in, apply different approaches to contribute to the circular economy. Usually, these approaches are based on the circular economy principles of “eliminate waste and pollution”, “keep products and materials in use” and “regenerate natural systems”.

Small businesses can apply circularity principles within the business, for instance by designing their products to use less resource inputs or to be more easily repairable. They can also apply circularity principles by working with others, for instance by making sure that the waste of one company is used as input in another company or by ensuring that their waste is being recycled by other companies

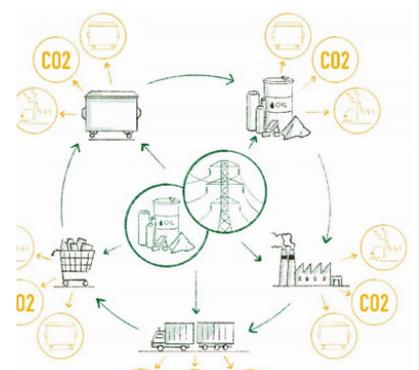
• Eco-innovation

Introducing an innovation in your business that aims to reduce the environmental impact of your products or services. Most eco-innovations are about the efficient and responsible use of natural resources, including energy and water.



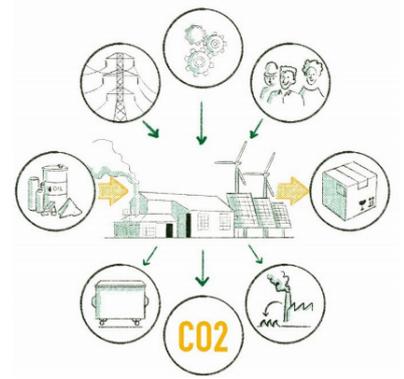
• Life cycle management

Managing the environmental impacts linked to the whole life cycle of your product or service, from “cradle to grave”. At the basis of life cycle management is the “life cycle assessment”.



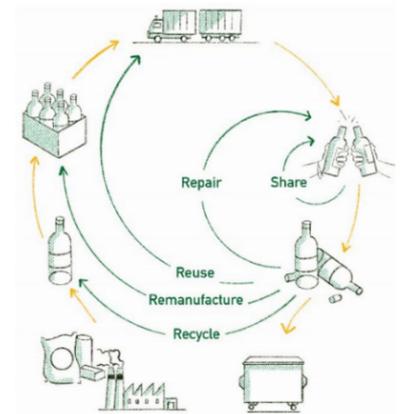
• Resource efficiency and cleaner production

A strategy for businesses to reduce environmental pollution and simultaneously reduce the consumption of resources through eight different RECP practices.



• Circularity

Strategies that businesses use to put products, components, and materials back into use and to avoid them being thrown away or ending up in landfills, are mostly based on the principles of “eliminate waste and pollution”, “keep products and materials in use” and “regenerate natural systems”.



Steps in creating a green business

What are the steps in developing a green business? There are different pathways to green business and every enterprise is unique. Some entrepreneurs may start a business that is green from the beginning, offering environmentally sustainable products or services straight from the start. Others may have started a conventional business and then endeavor to green their processes, products, or services as they go along. Let us first of all look at the steps to develop a green business start-up. After that, we will describe the steps for an existing business to green its products, services, or processes.

“keep in mind that the distinction between “developing a green business start-up” and “greening business processes” is of course a bit artificial. Green business start-ups, once they are operational, may have to make additional efforts over time to make their processes more environmentally friendly, for instance when new materials or production technologies become available. Businesses that have engaged in greening their processes, on the other hand, could decide to develop new green products and services, as part of or in connection to their greening processes.”

* Steps for a green business start-up?



1- Scan your environment

The first step is to explore your business environment. Which green products and services are already being produced by enterprises in your area? For which green products and services could there be a market? What kind of green products and services are consumers looking for? What kind of green products and services are companies looking for?

2- Develop and screen your business idea

Once you have scanned your environment, the next step is to develop your business idea. The International Labor Organization “Generate Your Business” manual 6 guides different ways of coming up with business ideas. To put forward an idea for a green product(s) or service(s), you may think about the environmental problems that need to be solved in your community and the resources in your community you could tap into.

Once you have produced a list of possible green products or services, you may do an initial screening of these ideas, by trying to answer questions such as:

- 1) Which need will the product(s) or service(s) fulfil?
- 2) Who will the business sell the product(s) or service(s) to & how?
- 3) What are the market requirements of the clients that would buy your product(s) or service(s)?
- 4) Who could provide you with technical support in developing your product(s) or service(s)?
- 5) Who could provide you with the necessary financing?
- 6) What are the environmental certifications or eco-labels for the product(s) or service(s) you would like to develop?

3- Develop your business plan

Once you have selected the most promising green product or service, you will need to develop a business plan. The business plan would include the following:

component	Purpose & green dimension
Executive summary	The executive summary of your business plan gives the reader a preview of your company profile, vision, mission, strategic objectives, main products, marketing channels, and how the business is organized. In addition to the generic issues covered in a business plan, the summary should highlight its green dimensions.
Legal format and ownership	Like any entrepreneur, you will need to decide on the legal format of the business. A green business needs to choose the best legal format for its situation and purpose, for instance, a sole proprietorship, a partnership, a cooperative, or a limited liability company. You should weigh the pros and cons of each format before choosing the best option.
Green business value proposition	Here you describe the green business value proposition that you have and that makes your business different from what is offered by competitors.
Market analysis	Your marketing plan needs to be based on a solid understanding of the market. In your business plan, highlight the outcomes of the market research you have undertaken for each product or service you are planning to bring on the market.
Marketing strategy and plan	Once you know your market, you then need to develop a marketing plan based on the 4 «P»s: Product, Price, Place, Promotion, People, Process, and Physical Evidence. Consider the environmental dimension of these 4 «P»s when developing the plan (for example, for «Price», whether you can charge a premium price for your green product)
Production and sales plan	In this section, you explain your production process and you estimate your production and sales volumes, based on your market research. Explain how green your production processes are, for example in terms of the environmental sustainability of your raw materials or your resource efficiency and cleaner production strategies.
Organization and staff	You will need to decide what your business's staffing needs are based on what tasks need to be performed. When assessing what staff you need, consider whether any additional technical skills are needed for your green product(s) or service(s). Add an organogram showing how management and employees are structured.

Regulatory compliance	In this section, you describe the required taxes and permits and selected insurance policies. Make sure to include environmental taxes and environmental permits when doing so.
Life cycle assessment	Your business may need to carry out a life cycle assessment to analyze the environmental impact of your products and services from cradle to grave. Life cycle assessments can be relatively simple or very complex, depending on their exact purpose. A life cycle assessment helps to communicate to clients and partners to what extent your product(s) or service(s) are environmentally responsible.
Environmental certification or eco-labelling	You will need to inform your clients about the environmental characteristics of your product(s) or service(s). Can you get your product(s), service(s), or your business certified? What certification or eco-labelling schemes would be adequate? Indicate the costs and the process of obtaining certification.
Costing and pricing	In this section, you outline the cost of your goods and services. Use information from the other sections of the business plan to identify costs that you will incur in producing and marketing your products and services. Keep in mind that you may incur some additional costs at the outset for green investments relating to equipment, premises, or skills, but also that you will most likely make savings thanks to green practices such as reduced consumption of electricity or water, resulting in reduced utility bills.
Financial planning	You need to be able to plan and monitor the financial situation of your business using tools such as a profit plan and a cash flow plan. Like any other business, your green business needs to perform well financially, otherwise, you will not be able to keep it going!
Required start-up capital	When estimating the required start-up capital, you will need to assess your needs in terms of capital investment and working capital. Consider the elements required for your business to be green while estimating this cost, and be realistic when doing so.
Sources of start-up capital	The most important types of start-up capital are owner's equity and loans. Keep in mind that there are also several institutions with special funding opportunities for green businesses.

Once you have developed your business plan, share it with trusted and experienced entrepreneurs or investors and ask them to provide you with critical feedback. You may, at this stage, also ask for the support of a business development service provider or a professional business consultant. The analysis that you have to do to write your business plan, should provide you with the necessary information to decide whether to go ahead or not with your business idea. Keep in mind that a business plan is not a one-off document. Entrepreneurs need to continually update and improve their business plans.

4- Approach partners

Once you have developed your business plan and you are convinced about the feasibility and the profitability of your green product(s) or service(s), you will need to establish the necessary partnerships in order to start the business. This means you may need to present your business plan to a bank or investor. You may need to get in touch with potential clients or retailers, as well as with input suppliers. At this stage, you may also need to collect information on how to register the business with the municipality, tax office and social security institute and to check how to obtain any licenses you need in order to start operations.

5- Start the business

Once all previous steps have been completed with success and the necessary start-up finance is in place, it is time to launch the business in accordance with the business plan.

* Steps for an existing business to green its processes



1- Create an environmental improvement committee

Set up an environmental improvement committee or team within your business and inform staff of the enterprise's intention to improve its environmental sustainability. The environmental improvement committee can be big or small, more or less formal, but it needs to have the right level of authority as well as the necessary financial and human resources to carry out the tasks and propose the necessary changes to management.

2- Conduct a life-cycle assessment for your product(s) or service(s)

A life cycle assessment will provide you with a good overview of the environmental impacts of your business from cradle (inputs) to grave (final disposal of your products and services) and hence with a good overview of the changes you need to create to make your business processes more environmentally sustainable. Life cycle assessment can be relatively simple or very complex, depending on your ultimate objective. Most businesses would hire an expert to carry out the life cycle assessment for their company.

3- Complete a resource efficiency and cleaner production assessment

A resource efficiency and cleaner production (RECP) assessment will provide you with the necessary information as to how the business can improve its resource efficiency and move towards cleaner production. Chapter 4 of this guide explains the approaches that businesses can use in this regard, and it explains the steps to be undertaken. In practice, the business would have to carry out steps 1 (initial assessment) to 7 (feasibility analysis) of the RECP methodology.

4- Develop an Action Plan

Once the business has undertaken the life cycle assessment and/or the resource efficiency and cleaner production assessment, it should have the necessary information to develop an Action Plan. The Action Plan should look at 1) actions for the business to buy more environmentally sustainable inputs, 2) actions to make the business' production process as environmentally sustainable as possible, and 3) actions to ensure that the business sells products and services that enable sustainable consumption. The action plan should have clear objectives, indicators, measurement tools and it should define the responsibilities and resources available for the different actions.

5- Assess the possibility of environmental certification

Before implementing the action plan, the business should assess the possibility, advantages and costs of environmental certification.

6- Implement the action plan

The next step is to implement the environmental action plan. During implementation, close monitoring is needed to ensure the business will meet the stated objectives. Over time, adaptation of the action plan will be needed to ensure the business goes through a process of continuous improvement.

7- Install an environmental management system

Once the business has obtained good experience with life cycle management, resource efficiency and cleaner production, it may consider setting up an environmental management system. This will ensure that the business incorporates environmental sustainability in a consistent, rigorous and long-term manner.

Focus on greenhouse gas emission reduction

One of the key objectives of most green businesses is to reduce their greenhouse gas emissions (GHG) as compared to the emissions produced by conventional businesses. No matter what approach you choose for your green business (life cycle management, resource efficiency and cleaner production, Eco-innovation, circular economy), the reduction of GHG emissions is almost always an important element of all of those approaches!



- What are greenhouse gas emissions?

Greenhouse gases, such as carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals, trap some of the earth's outgoing energy, thus retaining heat in the atmosphere. Greenhouse gas emissions from human activities strengthen this greenhouse effect, causing climate change. If we want to avoid extreme climate change, we need to urgently decrease our greenhouse gas emissions and carbon footprint.



- What is carbon footprint?

The carbon footprint of your business is a measurement of the greenhouse gases you generate through your business activities. Carbon dioxide (CO₂) is the most common greenhouse gas generated by burning fossil fuels such as coal, gas, petrol and diesel. Businesses produce greenhouse gases when they use electricity or burn natural gas, when they buy inputs, transport products, and when they generate waste, amongst others.



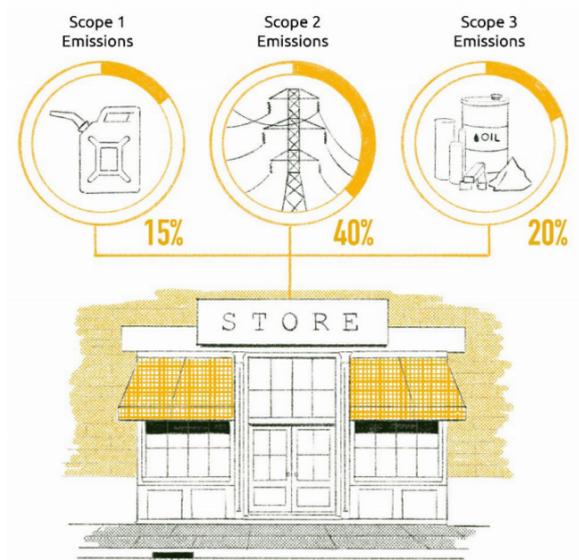
- How to measure your business' carbon footprint?

Reducing the carbon footprint of your business is an essential element of greening your business. By measuring your carbon footprint, you can understand the different ways your business is contributing to climate change and identify ways to reduce it. A good way to start is by understanding where your greenhouse gas emissions come from. You can calculate your enterprise's carbon footprint using, for instance, the Carbon Trust SME carbon footprint calculator or the carbon calculator of the SME Climate Hub.



When you calculate your enterprise's carbon footprint, you may immediately realize the difference between Scope 1, Scope 2 and Scope 3 emissions as follows:

- Your scope 1 emissions: Your direct emissions cause by the use of your vehicles, burning oil or gas and/or chemical leakage.
- Your scope 2 emissions: Your indirect emissions, caused by buying electricity, cooling, heat and or steam.
- Your scope 3 emissions: Indirect emissions that incur in the value chain of your business, such as emissions resulting from the raw materials you are buying or the transport you are using to bring these raw materials to your workplace.



- How to reduce your business' carbon footprint?

All of the green business approaches mentioned in this guide (life cycle management, resource efficiency and cleaner production, eco-innovation, circular economy) help you to reduce your carbon footprint, but they also help you to reduce other environmental impacts such as air pollution, eco-toxicity, acidification or depletion of freshwater resources.

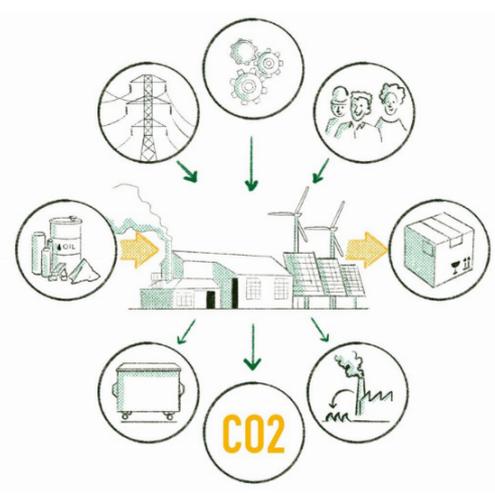


Depending on the objectives of your green business, you may focus on the reduction of your carbon footprint as your prime objective or you may take a broader approach looking at all your environmental impact categories. When you make this choice, you may study the options for product certification available to your business. Some product certification standards focus just on the low-carbon intensity of your products and processes, while others also include your impacts on other environmental impact categories.

While carbon dioxide (CO₂) is the most important greenhouse gas, there are other greenhouse gases such as carbon dioxide, methane, nitrous oxide, and certain synthetic chemicals that cause climate change. If your business is in the agricultural sector, just looking at carbon dioxide emissions may not be enough! You may need to look at methane emissions from livestock and nitrous oxide from mineral fertilizers. In the same way, businesses in the waste sector need to take into account that emissions in this sector include carbon dioxide, methane and nitrous oxide.

Resource Efficiency and Cleaner Production

Resource Efficiency and Cleaner Production (RECP) is a strategy for businesses to reduce environmental pollution and simultaneously reduce resource consumption. It helps the business to increase productivity by applying preventive environmental practices on a continuous basis. Businesses that apply the RECP strategies can reap the following benefits:



- Increased productivity and optimized investments.
- Minimized environmental impacts, reduced business risks and compliance costs.
- Compliance with international environmental standards for accessing new markets.
- Secured long-term supply of production inputs.
- Improved relationship with stakeholders (such as banks, consumers and local communities).

Resource Efficiency and Cleaner Production aims to contribute to:

- Resource efficiency through the optimization of the productive use of materials, water and energy
- Waste minimization by reducing both waste and emissions
- People's well-being by reducing the environmental risks for workers, communities and consumers

1- Eight RECP practices

A business that applies Resource Efficiency and Cleaner Production, may apply one or more of the following practices:

1 GOOD HOUSEKEEPING	2 INPUT MATERIALS CHANGE	3 BETTER PROCESS CONTROL	4 EQUIPMENT MODIFICATION
5 TECHNOLOGY CHANGE	6 ON-SITE REUSE	7 PRODUCTION OF USEFUL BY-PRODUCTS	8 PRODUCTION MODIFICATION

Type of practice		Typical solutions
1	Good housekeeping: changes in operational procedures and workplace management to reduce unnecessary «wastage».	<ul style="list-style-type: none"> - Switch off what is not in use - Conduct maintenance and repairs - Keep workplace organized and clean - Minimize and manage inventory - Keep staff motivated
2	Input materials change: use of alternative input materials results in lower or less problematic waste and the usage of less harmful materials.	<ul style="list-style-type: none"> - Use renewable energy - Use sustainably-sourced renewable materials - Use of secondary materials, water and energy - Reduce use of harmful chemical and biological substances - Source supplies from local sources
3	Better process control: Improve control over processes and equipment so as to operate these continuously at highest efficiency and lowest wastage.	<ul style="list-style-type: none"> - Monitoring of standard operating practices and processes. - Undertake sub-metering for water, energy and materials. - Implement automated or otherwise improved controls, including shut off etc. - Undertake preventive maintenance.
4	Equipment modification: Equipment modification or new technology to avoid wastage and improve efficiency.	<ul style="list-style-type: none"> - Insulation (pipes, equipment, walls, windows) - Proper alignment of production line - Improve process temperature, pressure, speed, mixing - Rationalize utilities and distribution systems - Combine process steps where applicable
5	Technology change: Replacement of (process) technology with more efficient and/or less wasteful technology.	<ul style="list-style-type: none"> - Efficient boilers, motors, fans, compressors etc. - Change of process, e.g. chemical to mechanical, multi- stage change of process chemistry, e.g. to catalytic or solvent free. - Equipment with integrated recovery loops. - Advanced separation processes. - Solar process cooling/heating.
6	On-site reuse: Application of useful waste (material, energy, water) within the same company for similar or alternative purpose.	<ul style="list-style-type: none"> - Countercurrent energy or cascaded use of water and energy.
7	Production of useful by-products: Convert waste products into input materials for another company.	<ul style="list-style-type: none"> - Provision of used cooling water for external heating or cooling purposes (buildings, fish farms etc.) - Segregate recyclables for external recycling and resource recovery. - Industrial symbiosis, e.g. use of inorganics in cement making, slags in construction, etc.
8	Production modification: Redesign products in order to reduce their environmental impact during production, use and/or disposal	<ul style="list-style-type: none"> - Design for optimal product lifetime - Design for minimum use of water, energy, cleaning etc. - Design for low-waste manufacturing - Design for refurbishment, recycling etc.

2- RECP: A step-by-step approach

These are the twelve steps in applying a resource efficiency and cleaner production approach.



Step 1 - Initial assessment

The business familiarizes itself with the RECP approach and assesses whether the approach is of interest.



Step 2 – Secure management commitment

Senior management commits to the RECP approach and to making the necessary human and financial resources available. Senior management communicates to its workers its intention to apply an RECP process.



Step 3 - Create an RECP team

The business appoints workers from different functional units of the company (production, finance, purchasing, sale, etc.) to join the RECP team. The team should be led by a motivated leader who can mobilize the necessary support and make decisions during the process. The team needs to be trained and it needs to have a work plan.



Step 4 – Begin the assessment

During this phase, the business looks at its production process and collects data on inputs and outputs. It usually collects data on annual volumes and costs at an annual basis, using the information available from the last 12 months or the last fiscal year. Based on this information, the business identifies the priority areas with the highest potential for improvement. These can either be inputs (energy, water, materials) with significant costs or outputs (emissions, waste, water effluents) with significant environmental impacts. The business will – at least in first instance – focus its efforts on these low hanging fruits.



Step 5 – Finish the diagnosis

The business quantifies input flows (materials, energy and water) as well as outputs (emissions, waste, water effluents). The data collected will serve as baseline data for the process. During this phase it will also identify inefficiencies and causes of pollution.



Step 6 – Identify potential solutions

The RECP team will prepare a list of viable solutions. These solutions can be based on the abovementioned eight RECP practices (good housekeeping, input material change, better process control, etc). The business will prioritize preventive solutions (good housekeeping, process control etc) over pollution treatment options (end-of-the-pipe solutions).



Step 7 – Perform feasibility analysis

The RECP team assesses the technical and economic feasibility of the different solutions. The team will make a cost-benefit analysis, estimating the investments to be made and the savings that can be expected. They may compare different technical solutions to certain problems. At this phase, the RECP team may need expert advice to prepare the right recommendations to management.



Step 8 – Develop an action plan

Based on the work done by the RECP Team, management decides on an action plan. The action plan identifies the technical solutions, the investment costs, responsibilities for implementation as well as the timeframe for implementation. The action plan also defines indicators that the business will use to measure success. Management may decide for one action at the time or for a full set of actions. It makes the necessary recourses available to implement the action plan.



Step 9 – Establish a reliable information system

The business needs to make sure that a monitoring system is in place to measure the results of the RECP practices implemented. The business will measure impacts based on a set of indicators that look both at environmental and financial performance.



Step 10 - Implement the action plan

For the implementation of the action plan, it is necessary to include and train all workers that will be involved in the implementation of the solution.



Step 11 – Conduct on-going monitoring and evaluation

Once the implementation is on-going, the business will make sure that it measures performance by looking at the different input (materials, energy, water) and output (emissions, waste, water effluents) flows, in line with the indicators identified in the action plan.

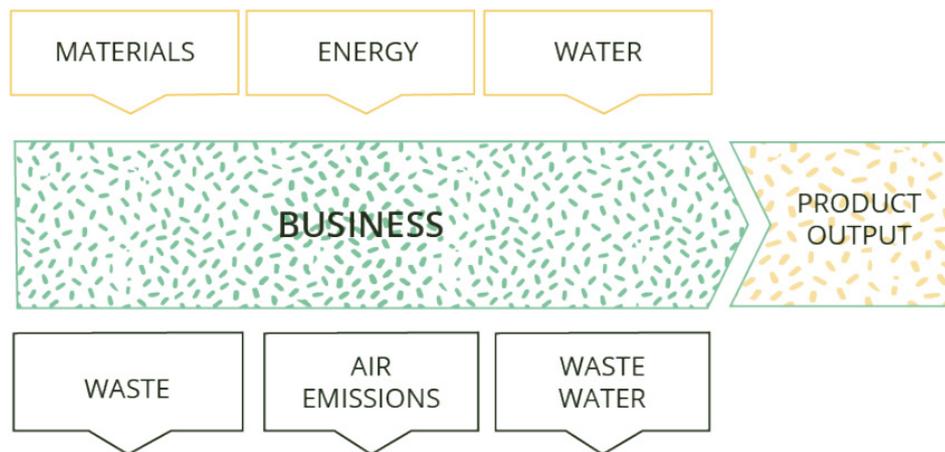


Step 12 – Commit to continuous improvement

The business will reflect on the experience, making sure that the good results are sustained over time. As RECP is, in essence, a process of continuous improvement, Management may decide to start looking at the longer list of proposed improvements, going beyond the low-hanging fruit and continuing with more complex solutions.

3- RECP monitoring

Businesses that apply Resource Efficiency and Cleaner Production strategies need to monitor to what extent the desired changes are achieved. The United Nations Industrial Development Organization (UNIDO) and the United Nations Environment program (UNEP) propose a relatively simple set of six indicators, that can be used to measure and monitor the business' performance towards reducing resource use and pollution.



- **The indicators referring to resource use are:**
 - **Energy use:** Energy use of your business, measured in kilowatt hours, including energy content of fuels used (gas, oil, petrol, biomass, etc.) and electricity consumption.
 - **Materials use:** total mass of materials used by your business, measured in tons, including raw materials; packaging and distribution materials, auxiliary materials, etc., but excluding the weight of fuels.
 - **Water use:** total water consumption of your business, measured in kiloliters or cubic meters, including all sources (ground water, tap/drinking water, surface water) and all applications (process water, cooling water, sanitary water, etc.).

- **The indicators covering pollution are:**
 - **Air emissions:** Greenhouse gas (GHG) emissions, measured in tons of equivalent emissions of carbon dioxide (CO₂). This includes on-site energy-related GHG emissions (use of fuels, gas etc.), off-site energy-related GHG emissions (in particular for electricity generation and distribution) and process-related GHG emissions (both CO₂ and non-CO₂, particularly CH₄ and N₂O).
 - **Waste water:** The total volume of contaminated water leaving the enterprise, measured in kilolitres or cubic meters, regardless of the final disposal method (sewer, surface water), excluding water streams discharged without chemical or biological load (thereby excluding cooling water).
 - **Waste:** The total value of waste (solid or liquid) trucked or otherwise transported from the site or disposed and stored on the site, measured in tons, regardless of the respective disposal methods (e.g. incineration, landfill, recycling, etc.).

Ideas for sectors where to create your green business

Agriculture – livestock	<ul style="list-style-type: none"> - Manufacture of compost from food waste, etc - Organic market gardening - Organic aquaculture
Handicraft	<ul style="list-style-type: none"> - Repair, restoration and resale of recycled products: household appliances, telephones, furniture - Manufacture and marketing of natural, non-toxic beauty products - «Waterless» vehicle washing - Organic catering: from local products and from organic farming
Commerce	<ul style="list-style-type: none"> - Bulk grocery store, organic and local products - Clothing: sale of second-hand clothes - Bookstore: sale of used books, games, toys, etc - Sale and repair of bicycles
Construction	<ul style="list-style-type: none"> - Construction of housing with sustainable materials: wood, mud bricks or adobe, straw... - Installation of insulating materials for walls and roofs - Equipment and construction of positive energy buildings
Waste management	<ul style="list-style-type: none"> - Collection, sorting and resale of recyclable materials: metals, plastics, precious metals (from mobile phones ...) - Reuse of products from recycling: ink cartridge refill, etc
Water	<ul style="list-style-type: none"> - Creation and marketing of purification filters from natural fibers: coconut, hair, etc - Creation and marketing of drinking water purifiers
Energy	<ul style="list-style-type: none"> - Manufacture of vegetable charcoal - Recovery of domestic oils for refining and use as fuel
Industry	<ul style="list-style-type: none"> - Manufacture of biodegradable or edible containers or utensils to replace single-use plastic products - Manufacture of furniture from sorted and recycled materials
Services	<ul style="list-style-type: none"> - Facilitation of sustainable development awareness training - Eco-organization advice to companies - Educational animation of environmental awareness - Animation of workshops to learn how to repair household appliances by oneself - Eco-tourism
Transport	<ul style="list-style-type: none"> - Car-sharing and carpooling service - Green taxi / bike taxi - Delivery by non-polluting vehicle: cargo bikes

Green Jobs



GREEN JOBS

Definition

Green jobs are positions that focus on preserving or restoring the quality of the natural environment. The U.S. Bureau of Labor Statistics further distinguishes green jobs as being positions that create goods or offer services that benefit the environment or reduce the use of natural resources. It also classifies a job as a green job if it involves duties that focus on helping to make a company's production processes more eco-friendly, often by using less natural resources.



According to the Emissions Gap Report 2021, published by the United Nations (UN), **the current insufficient climate commitments put the world on track for a global temperature increase of at least 2.7°C by the end of the century.** This is well above the 1.5°C estimated in the Paris Agreement. As the report explains, **the world needs to halve annual greenhouse gas emissions over the next eight years to succeed in limiting the effects of global warming.** Net zero emissions pledges, if fully met, could make progress in reducing the projected global temperature increase to 2.2°C, closer to the Agreement, but below the 2°C expected. Otherwise, there is a risk that the frequency and intensity of the disastrous climate impacts that have shaken the planet in recent years will increase.

In light of the situation, humankind needs to speed up the transition toward a decarbonized economy which respects the environment. **Such a transition not only has the potential to halt climate change, but also to become a real driver of growth** by creating numerous green jobs in a great number of sectors, something that has been happening in the last few years in rich and emerging economies alike.

The circular economy, which **involves reusing, repairing or recycling, increasing sustainable manufacturing and consumption**, will also create green jobs. As well as reducing waste, the circular economy will save energy and contribute to preventing irreversible damage in terms of the climate, biodiversity and air, ground and water pollution caused by our exploitation of resources at a rate faster than the planet can replace them.

Why are Green Jobs Important?

It's evident that green jobs are essential for future-proofing the planet. There's a long way to go if we're to reverse the environmental damage that's been done and tackle the impending climate crisis, but there's also enormous potential in the jobs market to help make those necessary changes to the way we live and grow as a society.



Green jobs are also important because they provide an optimistic and stable future for the young people of today.

It's no surprise that Gen-Z (those born between the late 90s and early 2010s) and Gen-Alpha (born since 2010) are the driving force behind many of the environmental protests we hear about in the news. These generations are the future workforce – but are they being trained appropriately for the future of work? Do they receive career guidance based on today's world or tomorrows?

Green jobs impact on the economy

In the United Nations Environment Programme (UNEP) green jobs are defined as **“positions in agriculture, manufacturing, R&D, administrative, and service activities aimed at substantially preserving or restoring environmental quality”**. In other words, environmental jobs are those aimed at protecting and promoting the environment, or those which consider their impact on the health of the planet at all times and endeavour to minimise it.



Another benefit of these green jobs is their effect on the global economy. The ILO has warned that, if nothing changes, growth in future employment will be insufficient to satisfy the growth in the workforce in emerging and developing countries. However, **“changes in production and use of energy to achieve the 2 °C target may lead to the creation of around 18 million jobs in the world economy”**, explains this organisation in its report World Employment and Social Outlook 2018. These changes, aimed at complying with the Paris Agreement and generating green jobs, will include more extensive use of energy from renewable sources, the growth of electric vehicles and carrying out construction works to achieve energy efficiency in buildings.

Discovering the green jobs

Over the years and international climate conferences, in order to speak a common language and measure the evolution of the sector, the concepts have been defined and stabilized. It is generally accepted that the green economy includes two components: eco-activities and peripheral activities.

- **Eco-activities:** activities that produce goods or services with the aim of protecting the environment or the sustainable management of natural resources. 3 sectors are identified as the heart of the green economy:
 - Production and distribution of energy and water
 - Sanitation and waste treatment
 - Protection of nature, the environment and biodiversity

- **Peripheral activities:** activities promoting better environmental quality, without this being their primary purpose. 6 traditional sectors are particularly affected by changes in their production methods:
 - Transport
 - Building
 - Agriculture and livestock
 - Forest industry
 - Fishing
 - Manufacturing

In order to be effective, the response of our societies and economies to climate change cannot rely solely on Eco-activities. While it is essential to turn to clean and renewable energies, to better manage water resources, to sort waste and to protect the environment, these actions will be insufficient, if we do not reduce the polluting action of the traditional sectors of activity. These sectors must profoundly transform their modes of production, to be more efficient in the use of energy and natural resources. When they do, they contribute to the green economy.



Focus on eco-activities

Production and distribution of energy and water



The use of fossil fuels (coal, oil, gas) is the main source of greenhouse gas emissions, the cause of global warming. Other alternative energies, non-polluting or less polluting, must be developed to replace, at least in part, old energies, in order to produce electricity. The origins of the main alternative energies are:

- Solar – captured by voltaic photo panels
- Wind turbine - use of wind force,
- Hydraulic - use of the force of rivers or sea currents,
- Vegetable – production of biofuels from biomass or dedicated crops.

Water management and production is also a very strong issue. Fresh water is a scarcer resource on the planet, while it is essential for life, agriculture and many production activities. Freshwater resources are decreasing due to evaporation linked to global warming, due to groundwater pollution, due to the increase in the world population and due to poor management of the resource.

Sanitation and waste treatment



Air, water and land pollution is linked to the overproduction of waste and the dumping of harmful products into the environment. Waste remediation and treatment activities aim at a renewed and sustainable use of resources and materials. Thus, the collection and treatment of waste water aims to avoid its discharge into the environment, but also the reinjection of treated water into consumption circuits. In the same way, the cleaning of public spaces, the collection of waste, its treatment, aim to eliminate the disposal of toxic products into the environment. Thus, the waste is sorted to separate all materials (metals, plastics, paper, organic matter ...) that can be recovered to be reintroduced into a production cycle. This is the logic of recycling.

Protection of nature and the environment



The planet is our common good and yet we have mistreated it for centuries, and especially in the last 100 years. Environmental protection consists in taking measures, individual and collective, to limit or eliminate the negative impact of human activities on their environment.

This can involve different types of action:

- Nature conservation and conservation actions, for example through the creation, management and monitoring of protected areas (national parks...)
- Scientific actions to study the operation of ecosystems to develop the knowledge necessary to protect nature and biodiversity. This helps to improve the understanding of the phenomena, identify the risks, the opportunities and sometimes manage to repair the damage already caused.
- Education and awareness-raising activities for the populations but also for decision-makers.

Where are the green jobs?

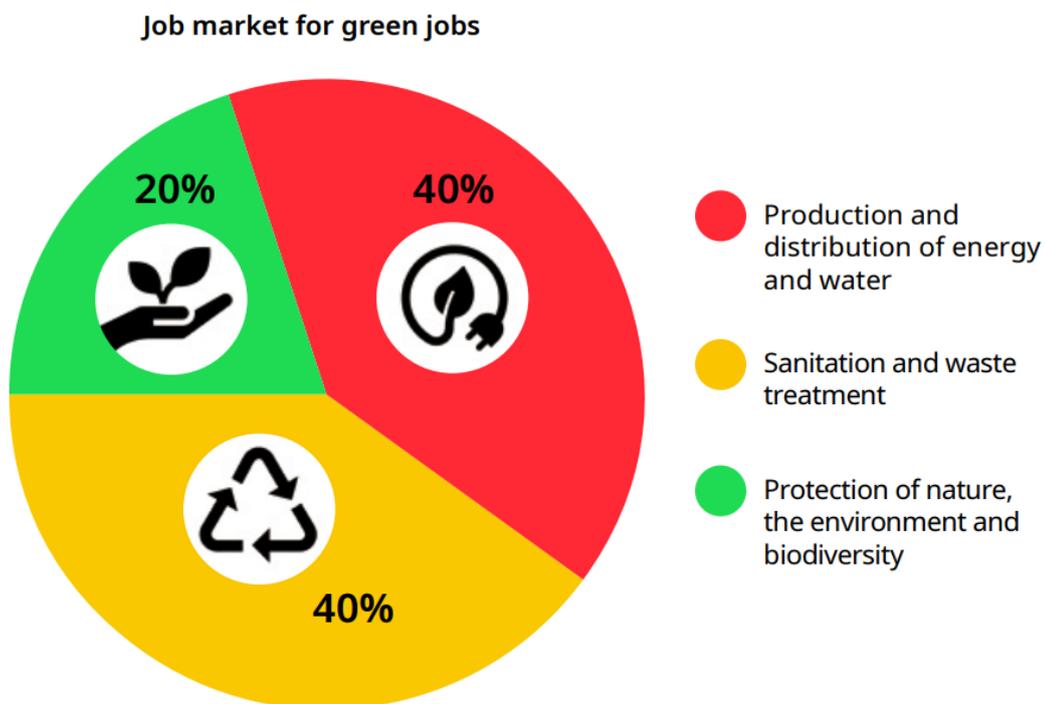
Green economy jobs contribute to reducing energy, raw materials and water consumption, reducing greenhouse gas emissions, minimising or completely avoiding all forms of waste and pollution, and protecting and restoring ecosystems and biodiversity. They can be practiced either in the 3 sectors called “eco-activities”, or in peripheral activities, or even in other sectors.

They fall into two categories:

- **Green jobs:** These are professions whose purpose and skills implemented contribute to measuring, preventing, controlling, correcting negative impacts and damage to the environment. They are therefore directly linked to the environment and the sustainable economy. Some examples: national park officer, water quality measurement technician, waste sorting technician.
- **Greening jobs:** These are professions whose purpose is not environmental, but which integrate new “skills blocks” to take into account in a significant and quantifiable way the environmental dimension in the business gesture. Some examples: farmer in organic production, lumberjack in eco-managed forests, plumber installing heat pumps, mason in bioclimatic construction.

• Which job market for green jobs?

Mainly located in the 3 sectors identified as the heart of the green economy, green jobs are distributed differently according to the countries and their challenges. At the global level, it can be seen that the number of jobs in nature conservation occupations is generally half as high as for each of the other two sectors.



Discovering the greening jobs

Peripheral activities act in favor of better environmental quality, without this being their primary purpose. These primarily concern 6 traditional sectors, which emit a lot of greenhouse gases (see graph) that are changing in order to reduce their polluting action by profoundly transforming their production methods or their orientations. In recent years, environmental regulations in many countries have tightened to force these sectors to undergo environmentally essential transformations.

- Transport
- Building
- Agriculture and livestock
- Forest industry
- Fishing
- Manufacturing

Greening jobs: Professions whose purpose is not environmental, but which integrate new “skill blocks” to take into account in a significant and quantifiable way the environmental dimension in the practice of the profession. In terms of volume on the job market, the greening jobs most often represent a much larger volume of jobs than the green jobs.



Focus on peripheral activities

Building



If we add up residential and office buildings, their energy consumption represents the main source of greenhouse gas (GHG), with more than 16%. The energy renovation of buildings is therefore a major challenge to reduce emissions. The priority is to eliminate “thermal strainers”, that is to say to better insulate houses and buildings. Legislations are tightening and aid schemes are being deployed to encourage such renovations. But the transformations also affect new constructions, with, here again, regulations that encourage more efficient materials and techniques: solar water heaters, heat pumps, rainwater recovery, etc to achieve eco-designed, or even positive energy buildings. The construction sector is probably one of the most impacted by the greening of the economy, with strong consequences on job creation and expected skills.

Transport



Road transport is estimated to contribute more than 10% to GHG emissions. To this, sea and air transport must be added, which has developed strongly in recent decades with a very strong polluting effect, due to the type of fuels used.

The trends aim to limit transport by private vehicle and promote public transport, including rail, as well as soft mobility. In the medium and long term, the purpose is to switch to much cleaner means of transport. Particular focus is placed on:

- Free public transport in certain cities
- Encouraging carpooling and reducing the speed limit in built-up areas
- Incentives to buy electric or even hybrid vehicles
- Promoting cycling, therefore cycle lanes and all types of “soft mobility “
- Developing much less polluting aircraft engines,
- Relaunching sailing propulsion for the merchant navy ...

These orientations imply a significant industrial transformation, generating many jobs in engineering, R&D, but also in production.

Manufacturing



Over the past century, industry has worked to maximize production to meet the demands of a growing world population, rising living standards and increasing urbanization. However, industrial production, which consumes a lot of energy (electricity and gas) and water, is now the 4th largest GHG emitting sector. Its activity harms our health, pollutes the air we breathe, contaminates soil and water and depletes the world's resources.

The industrial sector needs to transform rapidly to significantly improve its energy efficiency and resource use. Enterprises will have to modify their factories to save energy, use more recycled materials and deploy new production processes. If we consider steel as an example, increased use of scrap metal would lead to lower energy, water and land consumption and reduce GHG emissions. To achieve these opportunities, public authorities will need to take regulatory and incentive measures to push industry away from the linear economy – which extracts, transforms, consumes and then disposes of raw materials – and generalize decarbonization, circular economy and resource efficiency.

Agriculture and livestock



Through adding animal husbandry and land use, agriculture contributes more than 10% to GHG emissions. Its negative effects on the environment are serious. These include pollution and degradation of soil, water and air. But agriculture can also have positive effects because crops and soils absorb greenhouse gases and some agricultural practices mitigate flood risks.

One of the main challenges facing the agricultural sector is to feed a growing global population while reducing its ecological footprint and preserving natural resources for future generations. Farmers have made progress in the use and management of nutrients, pesticides, energy and water, the quantities of which per unit area have decreased. Despite these improvements, however, much remains to be done and public authorities have an important role to play in promoting sustainable or organic agriculture, strengthening food education, and better organizing the management of water resources.

Fishing



Populations of fish, crustaceans and molluscs are renewable, but not inexhaustible. When the industry removes more fish from the ocean than can be reproduced, stocks can shrink or even collapse. One of the reasons for overfishing is the rapid technical progress of the last 70 years. Increasingly efficient nets, sonars, radars and other fish finders have helped locate and easily track fish shoals. Freezer factory trawlers have also appeared, which can remain at sea for months. Heavy nets rake the seabed causing the destruction of habitats, corals and sponges and capturing secondary species or marine mammals, which will then be discarded.

A supervision of practices is essential for a fishery that does not threaten the ecosystem, protects the environment and provides humans with jobs and food indefinitely.

Green jobs projection in the UAE

Skills needs identification / anticipation

The recent Shams Dubai initiative launched in 2015 for installation by the Dubai Electricity and Water Authority (DEWA) of solar PV on rooftops has driven demand for Solar PV «Junior» and «Senior» experts. From the beginning DEWA realized the potential skills shortage and developed ad hoc training as part of the initiative. As a result a total of 352 engineers have been provided with the adequate skills to successfully install solar panels on UAE's rooftops (see case study) and connect them to DEWA's grid.

As such, ESCO/Energy management companies have flourished, creating green jobs in the positions of **Energy Manager, Energy Auditor, Retrofitting Project Manager, Controls Engineer, LED Lighting expert, Solar Engineer, and Retrofitting & Solar Sale Professionals, among others.** Dubai Municipality has recently launched its building rating scheme which may trigger further sudden demand for Energy Auditors if all UAE's existing buildings are to be audited and rated. Other existing occupations required for greening of skills sets include Facility Manager (see case study). However, a shortage of water professionals in the UAE was identified during the interviews. Data from water savings achieved in retrofitted buildings has decreased from 2016 levels which is probably due more generally to a lack of availability of adequate skills .

The green new building sector also requires specific certifications, such as **LEED** and **Estidama** is a mandatory building design methodology for constructing and operating buildings and communities more sustainably in Abu Dhabi. Individuals interested in working on Pearl Rated projects should become Pearl Qualified Professionals (PQPs); at least one PQP is mandatory per project planned for development within the Emirate of Abu Dhabi. In renewables, according to the Thilanka M. et al. report by Masdar professors, R&D and manufacturing jobs are more likely to be foreign and stable jobs, while installation jobs are more likely to be local and temporary; O&M workers are also local and permanent. These are probably the key dynamics in the UAE. Currently the 100MW solar power plant Shams 1 in Masdar employs a total of **90 permanent workers in O&M.** Professionals range from the more technical occupations of **Plant Manager, Commissioner Engineer, Design Review Team and Site Manager** to the more generic occupations of Finance Manager, HSE Manager and Project Control Manager. Masdar has created detailed job profiles for all current Shams 1 positions which may help educational providers draw up adequate curricula and researchers to collect occupational data and statistics.

The job profiles include:

- 1) Job details
- 2) Basic function
- 3) Health and safety
- 4) Main activities
- 5) Job context
- 6) Attitude and problem solving
- 7) Number of staff supervised and budget responsibilities
- 8) Qualifications, experience and skills
- 9) Key accountabilities

Other skills typically required in the UAE, albeit to a lesser extent than in the previous examples, have to do with **air quality, EIA, ecology, EHS, ISO 14064, ISO 50001, CDM, and sustainability reporting, among others**. However, these professionals are often required to have skills in multiple areas at the same time to be able them to be allocated to different projects according to demand, otherwise employers argue that there is no economic justification for hiring many specialists who can only undertake a very narrow range of work. Skills related to waste management and recycling skills are reportedly not to be in demand which is reflected in the high rates of waste dumped in fields in the UAE. Increasing the availability of skilled professionals may drive the development of **waste management and recycling projects**.

In addition to those skills typically attributed to the green sector, transversal skills are also sought after. Currently the most wanted workers in the UAE are **engineers to oversee design, construction and implementation of projects**, whether they be for construction of new projects, retrofitting of buildings for ESCO contracts or standalone renewable energy (primarily PV) projects. **Therefore mechanical and electrical engineering skills** are the most soughtafter, both quantitatively and qualitatively. For instance, Dubai's metro extension to the EXPO 2020 site has created a large number of jobs in the construction of the new line. The works started in 2017 and will continue up to 2020. Mechanical and Electrical Engineers and Inspectors are the most common roles. However Civil Engineers, Designers, Project Managers are occupations that have also been filled. In addition, **Project Management Professionals (PMP) & Primavera qualifications** are very much in demand in the UAE whenever timelines, resources, risk management activities, cost control and so forth are involved. Project management skills or certifications are requirements often demanded by the government in large tendered projects to avoid delays in execution.

Another frequently required skill is previous GCC experience. This is true for all trades and occupations but more so in the case of Business Development Managers or other technical roles with a sales component in their job description. Typically, hiring someone based in the UAE is a preference, but most organisations are happy to hire from overseas for senior or highly specialist roles. Notably when hiring for commercial activities (sales, business development, client management), it is deemed essential that candidates are based in the UAE and able to demonstrate their in-country experience. Multilanguage skills are often an advantage, with preference for English, French and Arabic. In 2016 one of the largest online career portals in the region conducted an employer survey in the UAE²³, which could be potentially extrapolated to the green scene. The following nine soft skills are those that companies listed as most desired:

- 1) Team player
- 2) Bi-lingual communication skills
- 3) Efficiency
- 4) Leadership skills
- 5) English fluency
- 6) Ability to work under pressure
- 7) Good negotiation skills
- 8) Passion or ability to make a difference
- 9) Ability to take on challenges

According to interviews, in the green sector individuals with up to five years of relevant experience are relatively easy to find at local level given the availability of high-quality university courses delivered locally. This has enabled projects to be developed and delivered, which in itself may be considered as a driver of green transformation. A smaller pool of available professionals exists when the required length of experience is 5-10 years. However, for individuals with 10 or more years of experience, given that greening is still a relatively new area of expertise, there tends to be a lack of senior professionals with local experience available in the market.

Education and training

The UAE hosts a large number of international universities and institutes of technology such as NYU, American University, British University, Sorbonne, RIT and others, and collaborates with top-ranked entities such as MIT. In addition, top business schools such as INSEAD and LBS have a presence in the country; these private institutions provide training for the majority of the students in the UAE. As shown in Table 4, the most popular specialities in higher education during the 2015/2016 term were business and economics followed by engineering for non-nationals and sharia and law for nationals. Environmental and health sciences attract fewer students, yet ranks fourth among non-nationals with a much lower rate of success among nationals. In government universities the percentages are similar to those of private universities.

TVET Training

Currently, UAE's TVET provision does not contain any green component whatsoever. However a large number of green jobs are positions that have existed for many years but are simply being applied in the green economy; for instance, Facility Managers have existed for decades but their focus on energy conservation is comparatively recent. Therefore within this context new TVET courses or the upgrade of existing courses can offer a practical way for people to modify their skills (up-skilling), improve their employability and contribute to the greening of the UAE's economy.

Higher education. Number of students at private higher education institutions by specialist nationality and sex

SPECIALISTS	NON-NATIONAL			NATIONAL		
	TOTAL	FEMALE	MALE	TOTAL	FEMALE	MALE
Arts & Design	1,746	1,390	356	245	225	20
Engineering	12,193	4,160	8,033	5,703	3,000	2,703
Information Technology	2,441	864	1,577	1,272	550	722
Business & Economics	15,465	7,120	8,345	12,457	4,759	7,698
Education	2,559	2,100	459	784	695	89
Sciences	339	256	83	136	109	27
Foreign languages	377	332	45	219	132	87
Environment & Health Sci.	3,900	3,264	636	849	799	50
Medical Sciences	4,104	2,759	1,345	684	612	72
Communication & Media Science	2,799	1,775	1,024	5,596	1,975	3,621
Sharia & Law	2,963	1,245	1,718	6,873	2,379	4,494
Hum & Social Sciences	3,495	2,824	671	2,125	1,620	505
Agriculture	0	0	0	0	0	0
Foundations	620	290	330	2,234	1,307	927
Undeclared major	668	329	339	299	95	204
Total	53,669	28,708	24,961	39,476	18,257	21,219

Number of students at government higher education institutions by specialist nationality and sex

SPECIALISTS	NON-NATIONAL			NATIONAL		
	TOTAL	FEMALE	MALE	TOTAL	FEMALE	MALE
Arts & Design	24	23	1	599	599	0
Engineering	751	331	420	6,238	2,305	3,933
Information Technology	189	127	62	4,516	3,214	1,302
Business & Economics	711	421	290	8,586	6,605	1,981
Education	150	139	11	1,574	1,571	3
Foreign Languages	106	106	0	264	264	0
Environment & Health Sciences	223	203	20	1,526	1,468	58
Medical Sciences	22	13	9	258	190	68
Communication & Media Sciences	172	133	39	2,487	2,181	306
Sciences	407	263	144	453	440	13
Sharia & Law	97	46	51	515	306	209
Human & Social Sciences	264	217	47	2,511	2,296	215
Foundations	1,158	782	376	12,320	9,791	2,529
Agriculture & Food	42	14	28	169	126	43
Undeclared major	46	32	14	36	29	7
Total	4,362	2,850	1,512	42,052	31,385	10,667

Selected Higher Education programmes for greening in the UAE

UNIVERSITY	BACHELOR	MASTERS	PHD
Hamdan Bin Mohammed Smart University		Excellence in Environmental Management	
Heriot Watt	Chemical Engineering	Renewable Energy Engineering	Engineering and Physical Sciences Energy, Geoscience, Infrastructure and Society
Amity University	Solar and Alternative Energy		
American University of Sharjah	Environmental Sciences Minor in Environmental Policy Minor in Environmental and Water Engineering Minor in Environmental Sciences Minor in Renewable Energy		
British University		Sustainable design of Built Environment Programme Intelligent Buildings Design	Architecture and Sustainable Built Environment
Canadian University	Environmental Health Management		
NYU	The Environment Minor		
Masdar		Health, Safety and Environmental Engineering Sustainable Critical Infrastructure Water and Environmental Engineering Water and Environmental Technologies Water and Environmental Resources	
Paris-Sorbonne		Environment: Dynamics Of Territories and Societies	

Booming green jobs sectors

Energy	<p>The COVID-19 pandemic had a major impact on the global economy for most of 2020 and 2021, affecting both the volume and structure of energy demand. Employment, including in this sector, has been profoundly affected by the different types of restrictions applied, which put pressure on supply chains and resulted in considerable limitation of economic activity. Despite this, the renewable energy sector will reach 12 million jobs in 2021, compared to 11.5 million in 2019, according to the eighth edition of the «Renewable Energy and Employment Report: Annual Review 2021».</p>
Agriculture	<p>According to the report published in 2022 by the Organic Farming Research Institute (FiBL), sales of organic food and beverages increased by 15% globally. Revenues surpassed the \$100 billion annual mark in 2018 and in just two years, the market expanded to \$129 billion. The historic growth seen in 2020 was a result of both the impact of the pandemic and increased consumer interest in organic food. North America and Europe comprise the majority of sales, with a combined share of 90%. However, most of the growth is coming from other regions, especially Asia as organic food markets have gained importance in countries such as China, India and South Korea.</p>
Design	<p>European policies require increasingly high recycling rates and establish ever-stricter ecodesign criteria. This fact, added to many consumer environmental awareness, have made ecodesign – from packaging to building roofs and myriad products – a booming source of jobs</p>
Tourism	<p>In a society increasingly concerned with the health of the planet, ecological tourism – or ecotourism – is a rising trend. This sector creates jobs related to activities such as design of adventure experiences, the creation of high mountain trails and the discovery of protected areas, as well as the renewal of rural areas, such as ecovillages, at risk of disappearance.</p>
Transport	<p>This sector is responsible for more than 30% of CO₂ emissions in the European Union (EU), 72% of which come from road transport. Many countries have already adopted measures to drastically reduce transport emissions. The EU will cut these by 60% compared to 1990 levels for 2050, creating job opportunities in the electric vehicles sector, public transport and electrified railway good haulage.</p>

Examples of Green Jobs

Job	Primary duties
Environmental technician	monitor the environment and identify ways to reduce contamination or pollution. Their responsibilities may include collecting and analyzing soil samples, performing environmental impact studies to determine how various human activities affect the environment and cleaning up contaminated sites. They might also engage in scientific tests and field investigations to determine the extent of environmental damage from natural disasters like forest fires.
Insulation installer	Insulation installers add and replace insulation material in homes, buildings and mechanical systems, which helps to save energy and reduce noise. Their duties may include removing old insulation, analyzing structure blueprints and determining the type and amount of insulation needed for a job. They also follow safety guidelines and protocols when performing their work, particularly when measuring and cutting the insulation to fit into walls and ceilings.
Agricultural specialist	An agricultural specialist researches different crops and farming practices to help farmers implement sustainable practices. They create and implement eco-friendly breeding programs, set up and adapt research centers and procedures, participate in experimental projects and ensure the appropriate sanitary and health standards are met on the farm. They might also educate others in the agricultural industry and support land conservation efforts while working at universities or on research projects.
Solar technician	Solar technicians assemble, install and maintain solar panel systems on structures like homes and buildings to reduce dependence on fossil fuels. Their common duties include configuring solar panels, determining where to place panels, ensuring the structural integrity of panels and making sure installations meet local, state and federal building codes. They also repair solar panels on homes and commercial buildings.
Wind turbine technician	Wind turbine technicians install, repair, operate and maintain the wind turbines that produce renewable energy. They diagnose issues relating to wind turbines, help ensure the physical integrity of wind turbines and complete inspections. They might also troubleshoot the electrical, mechanical and hydraulic components that make up a wind turbine.
Boilermaker	A boilermaker installs, creates and maintains tanks, boilers and closed vats. Common duties of a boilermaker include analyzing building blueprints to better understand where to place and install the boiler, completing boiler maintenance and repairing or replacing boiler parts when necessary. Boilermakers might also repair and maintain closed vats and other large containers holding gases or liquids.

<p>Solar installer</p>	<p>Solar installers work with solar panels. They assemble solar modules, apply sealant, determine how to lay out panels and identify any hazards that would interfere with photovoltaic installations. They might also educate customers on the most efficient type of solar panels to install and measure, cut and assemble support structures for larger panels.</p>
<p>Energy adviser</p>	<p>Energy advisers offer energy services and assist clients with a variety of energy needs. They might help clients choose the right energy-efficient product for their needs and preferences, schedule energy equipment installations and educate clients on available energy products and their benefits. They also perform energy audits of homes or businesses, analyze their current energy usage, and figure out ways to make buildings more energy-efficient</p>
<p>Water resources engineer</p>	<p>A water resources engineer oversees the water supply and use of a specific community. Their duties include testing water samples to ensure it's safe for human consumption and implementing ways to clean water that may be contaminated. This can also involve implementing strategies to preserve water and promote sustainable use.</p>
<p>Environmental specialist</p>	<p>Environmental specialists monitor how humans affect the environment. They identify environmental hazards, recommend ways to reduce impact, oversee field examinations and create reports on hazardous materials or locations. They may also implement employee training programs that focus on integrating more sustainable practices in the workplace and conduct inspections to ensure that their clients are complying with local, state and federal environmental regulations.</p>
<p>Energy engineer</p>	<p>Energy engineers create, develop and design energy-related programs or projects to reduce energy costs and usage and improve overall energy efficiency. Their duties may include conducting energy audits, identifying areas for energy conservation and cost reduction and assessing energy consumption. They might also inspect energy systems to ensure they're working properly and that they meet the energy standards and help clients learn more about available sustainable energy systems.</p>

The top categories where you can find an earth-friendly career

Category	Job	Description
Environmental Protection	1. Environmental scientists	examine and find solutions to environmental issues. For example, some environmental scientists and professionals work to restore polluted lands and streams. They spend most of their time in offices or laboratories, but part of the job can be fieldwork as well.
	2. Environmental Law	a demanding and complex field of study. This is a sector of law that requires a highly specialized appreciation of environmental issues. You will get the chance to bring a change in attitudes and policies that affect sustainability issues.
	3. Zoology	Zoologists are biologists who research animal species. Their typical duties include analyzing the human impact on wildlife and carrying out conservation plans to protect them. <ul style="list-style-type: none"> • Maintenance and care for animals- good for wildlife lovers. • Zoologists work in different zoological parks, aquariums, state agencies, and laboratories.
Renewable Energy	1. Solar Energy	Solar energy careers work in a variety of areas that use engineering to absorb the energy from the sun. This energy is used to generate electricity for homes and buildings, or to heat up water. Solar engineers work on: <ul style="list-style-type: none"> • Automobiles • Heating and air conditioning systems • Solar panels • Solar-powered devices • Telecommunications and guidance systems
	2. Wind Energy	Wind energy is the development and creation of wind farms. Wind energy engineers build, manufacture, and install wind turbines and collector structures for wind farms. The job is mainly done in offices, a laboratory or manufacturing plants, depending on the type of work. Different careers include: <ul style="list-style-type: none"> • Aviation • Ecologists • Mechanical • Software

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