



#Agricultural Technology



A report by **Pioneers** in collaboration with **Scaleup4Europe**
featuring top startups of Europe

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**Don't see your
startup in this
report?**

Check out our public
database clicking
here and add your
details!

Background:

introduction to Scaleup4Europe

The “Scaleup4Europe” project’s objective is the establishment of four cross-border operating “Scaleup Labs”. The Scaleup Labs are based on the “living lab” concept and support qualifying scaleups in achieving a “Proof of Scalability”. The “Proof of Scalability” is achieved when the scaleups comply with all requirements of general technological, market, organizational and investor readiness and their innovation is adapted to a specific customer need.

The general goal is to establish sustainable support structures that connect four partnering startup ecosystems and their deep tech member communities in an innovative way that creates a lasting and larger regional scaleup support system. To increase the efficiency of the scaling support, the project’s Scaleup Labs focus on four specific industry verticals that benefit significantly from deep tech innovations: Smart Region, Health Sciences, Agile Manufacturing and AgTech. The five connecting startup ecosystems are: **Berchtesgadener Land Wirtschaftsservice GmbH**, **UnternehmerTUM** (both Germany), **Pioneers** (Austria), **Pomurje Technology Park** (Slovenia) and **Chamber of Commerce and Industry of Serbia** (www.scaleup4.eu).



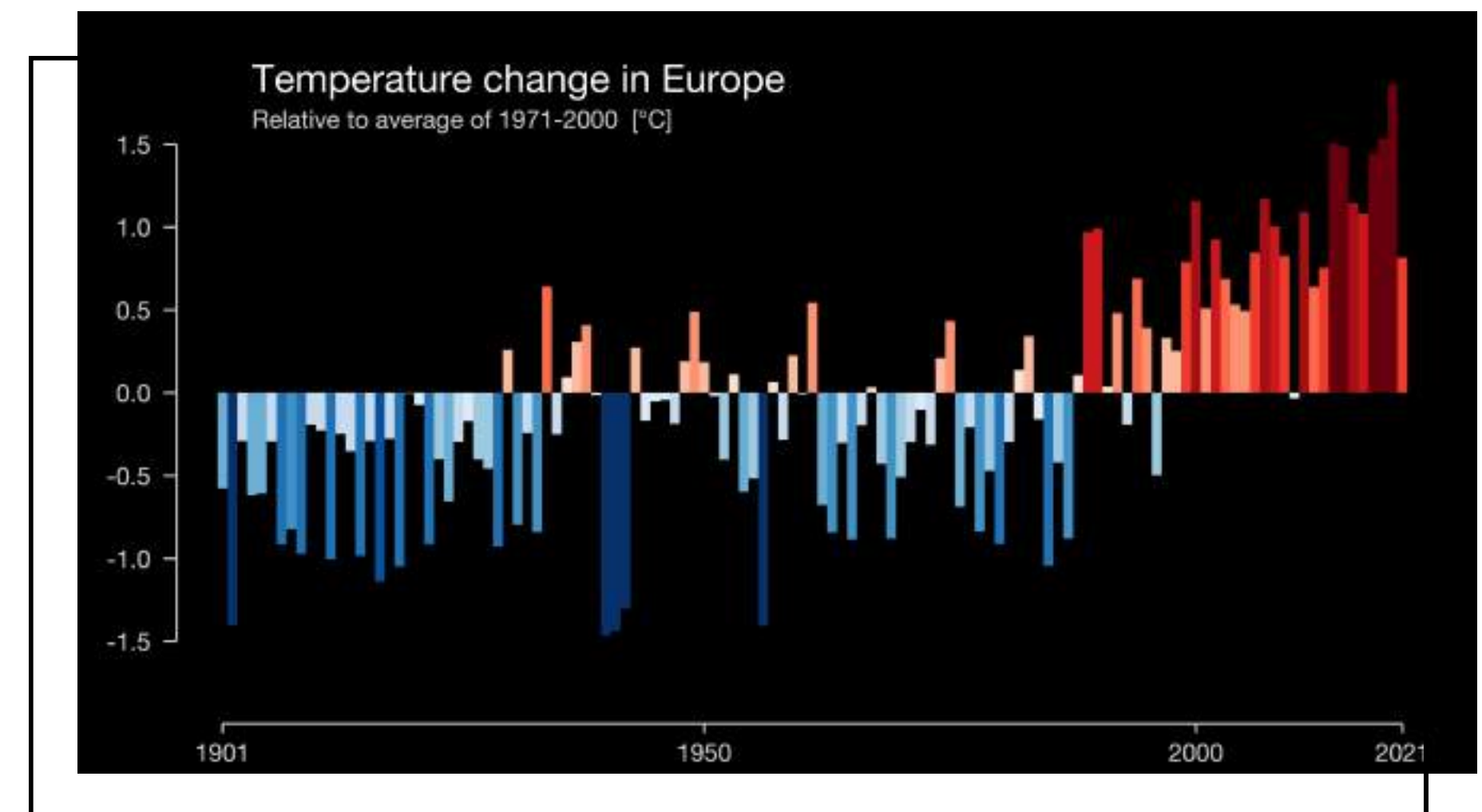
Introduction

Arguably the greatest innovation challenge humankind has ever faced is staring us in the face: the world has 8 years to halve global greenhouse gas emissions and continue doing so per decade until 2050 to reach Net Zero. The latest Intergovernmental Panel on Climate Change (IPCC) report, published in August 2021, amplified the calls for drastic action. COP26 has echoed this, and, significantly, the Glasgow Breakthroughs announcement states a plan for countries and businesses to work closely together to speed up affordable clean tech adoption worldwide.

Thousands of corporates and SMEs have made public commitments to net zero, set science-based targets, or sought to demonstrate their wider commitments to society through B Corp status. In addition, multibillion-dollar funds are increasingly being directed towards climate tech. More than half of global emissions have reduction targets placed on them. There also is a growing body of favourable legislation and willing consumers for the new generation of climate tech companies.

Increased awareness and acceptance of climate change combined with maturing technologies and blossoming market opportunities have led many entrepreneurs and investors to turn their attention to climate tech, a set of sectors focused on technologies and business models to mitigate climate change.

This is taking place against a backdrop from over a decade ago when the first cleantech bubble burst. The bubble was composed primarily of companies from hardware-intensive tech, with long development cycles and significant execution risks (thin-film solar, biofuels and energy storage). Following the 2008 financial crisis, developments in hydraulic fracking (i.e., cheaper oil/gas), expansion of solar production by China, and lower silicon costs undermined the economics of many existing cleantech companies.



Source: [Temperature change in Europe](#) (2021)

Today that story is fundamentally different. The primary technologies, such as solar, wind, and storage, are competitive with fossil fuels on a cost basis. Enabling technologies such as AI/ML and advanced manufacturing have also enabled newer climate tech companies to be built more efficiently and with greater capabilities.

The role of the global tech industry is critical to address the climate crisis. As a driving force of innovation, creativity and making the impossible possible, technology is essential to enable and accelerate transformation at the scale and pace required. Since the Paris Agreement, we have seen exceptional growth in the number of climate tech companies globally - those working to reduce or eliminate greenhouse gas emissions and address the impacts of climate change.

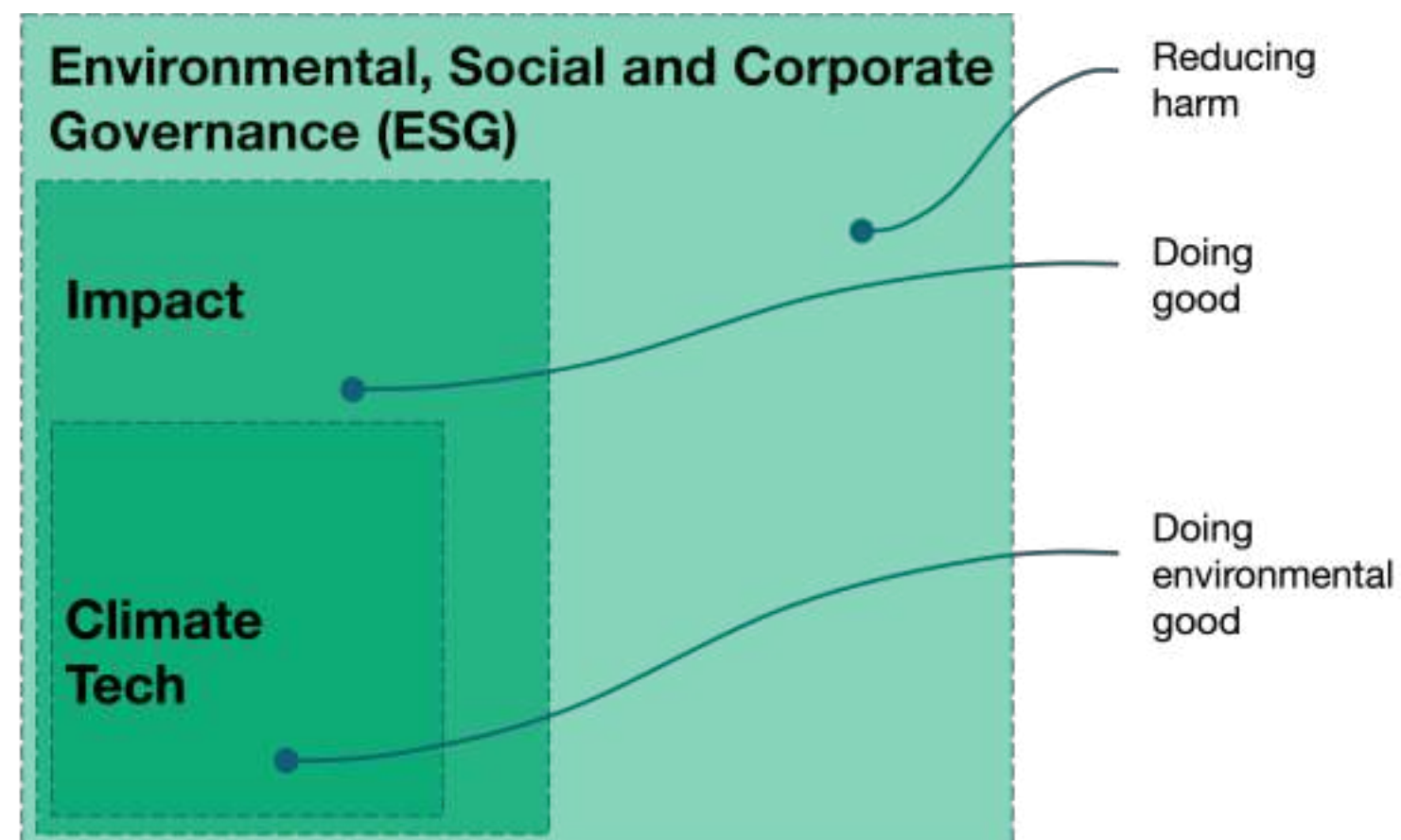
Technology is not the answer, but it is a promising avenue to beat the challenge of climate change. This report showcases a few of the promising startups and scaleups aiming to repair and upgrade our “Spaceship Earth” by tackling the climate challenge with innovations designed to reduce or remove emissions.

Methodology

What is a Climate Tech company?

A climate tech company is a technology-oriented firm whose mission is to provide technology or solutions capable of influencing the decarbonization of the planet. Its activities will impact the environment, ideally helping to limit global warming to 1.5 degrees Celsius compared to pre-industrial levels. More precisely, technologies may fall into one of the three categories below.

- 01** Those that **directly mitigate or remove GHG emissions** (e.g. renewables, carbon capture and removal)
- 02** Those that **help adapt to the impact of climate change** (e.g. climate insurance, crop protection)
- 03** Those that **help improve our understanding of the climate** (e.g. carbon tracking and monitoring)



How have we produced the data of this report?

Our analysis is based on 3 avenues:

- The Scaleup4Europe database
- A pan European open call for applications
- Desk research of public databases and reports featuring climate startups

This report highlights a few scaleups with fantastic business models and products or services, but the full list of all the startups sourced is [available here through our AIRTABLE](#) which will be continuously updated.

If you can't find your startup, click [here](#) and enter your data to be featured on the Airtable collecting startups in the Climate Tech solutions!

Methodology

Stage and funding

While unicorns that have raised significant funding attract the most attention, this report focuses on earlier-stage companies, but with a lower-cut-off of beyond seed-round and preferably beyond Series A.

In any case, all companies should have a product on the market and be beyond a pilot or prototype stage. We have focused our analysis on private markets and government funding into climate tech start-ups.

We do not include the substantial public markets or project financing of mature climate technologies (for example, large-scale renewable energy projects such as wind and solar farms), nor do we explicitly cover corporate research and development (R&D) funding into climate tech.

Industry focus

Agricultural Technology

All innovations that have the potential to reduce agriculture's climate footprint or make it more resilient.

Manufacturing and Industry

When we speak about manufacturing, we specifically exclude steel and cement manufacturing and instead place these two topics under construction/buildings. Manufacturing refers in this report to all topics related to circular economy, fabrics and consumer goods production.

Construction & Buildings

Here we refer to any startup that can reduce or remove emissions during the lifecycle of a building, including the materials used, its design, the energy consumed and its end of life emissions.

Smart Region

This refers to all activities that enable the digital integration of regions (incl. cities) in order to reap benefits of efficiency, circularity or energy reduction.

Climate Change and Climate Tech funding

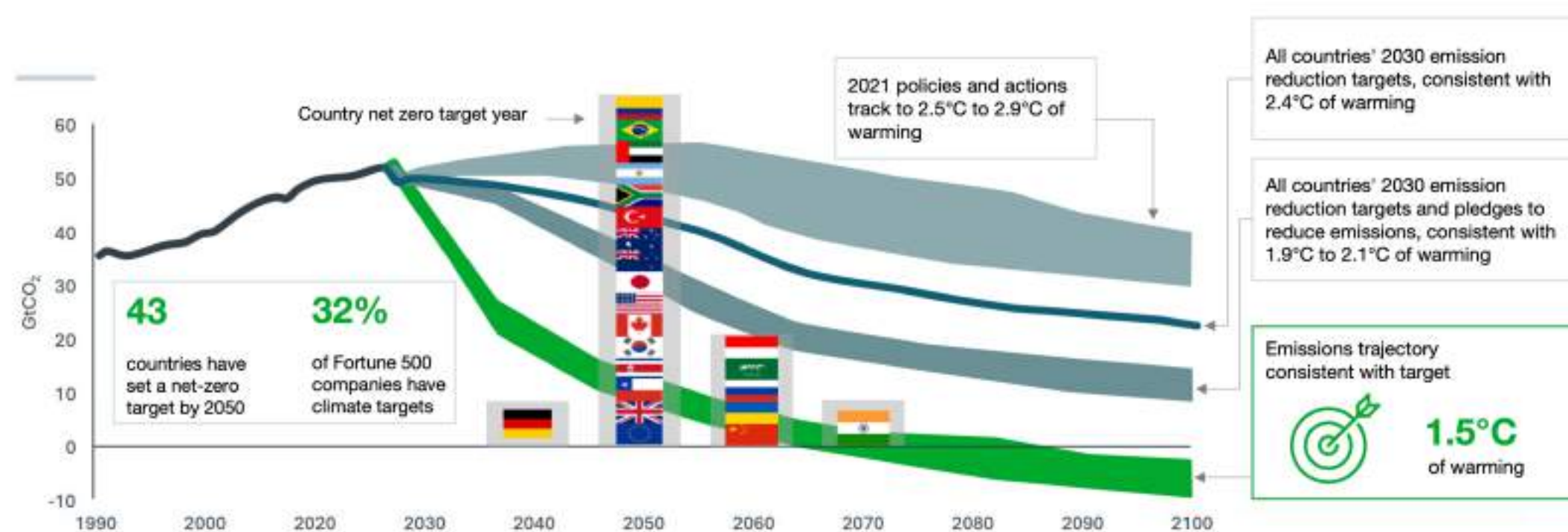


Climate change

The goal of reaching net-zero emissions by 2050 translates to an exponential pathway of cutting greenhouse gas emissions in half every decade: 50% by 2030, then 50% again by 2040, then 50% again by 2050.

This pathway is coined the “carbon law”*. The carbon law is an exponential trajectory inspired by Moore’s Law in computing, where computing power doubles and costs halve about every second year.

The United Nations Environment’s Emissions Gap report estimates that existing, market-ready solutions can cut greenhouse gas emissions by more than 50% by 2030**.



Source: [The future of Climate Tech](#) (2022)

*[Curbing emissions with a new carbon law](#) (2017)

**[Emissions Gap Report 2021](#) (2021)

55 GtCO₂

Emissions under current policies

30 GtCO₂

Emissions gap from current policies to 1.5°C

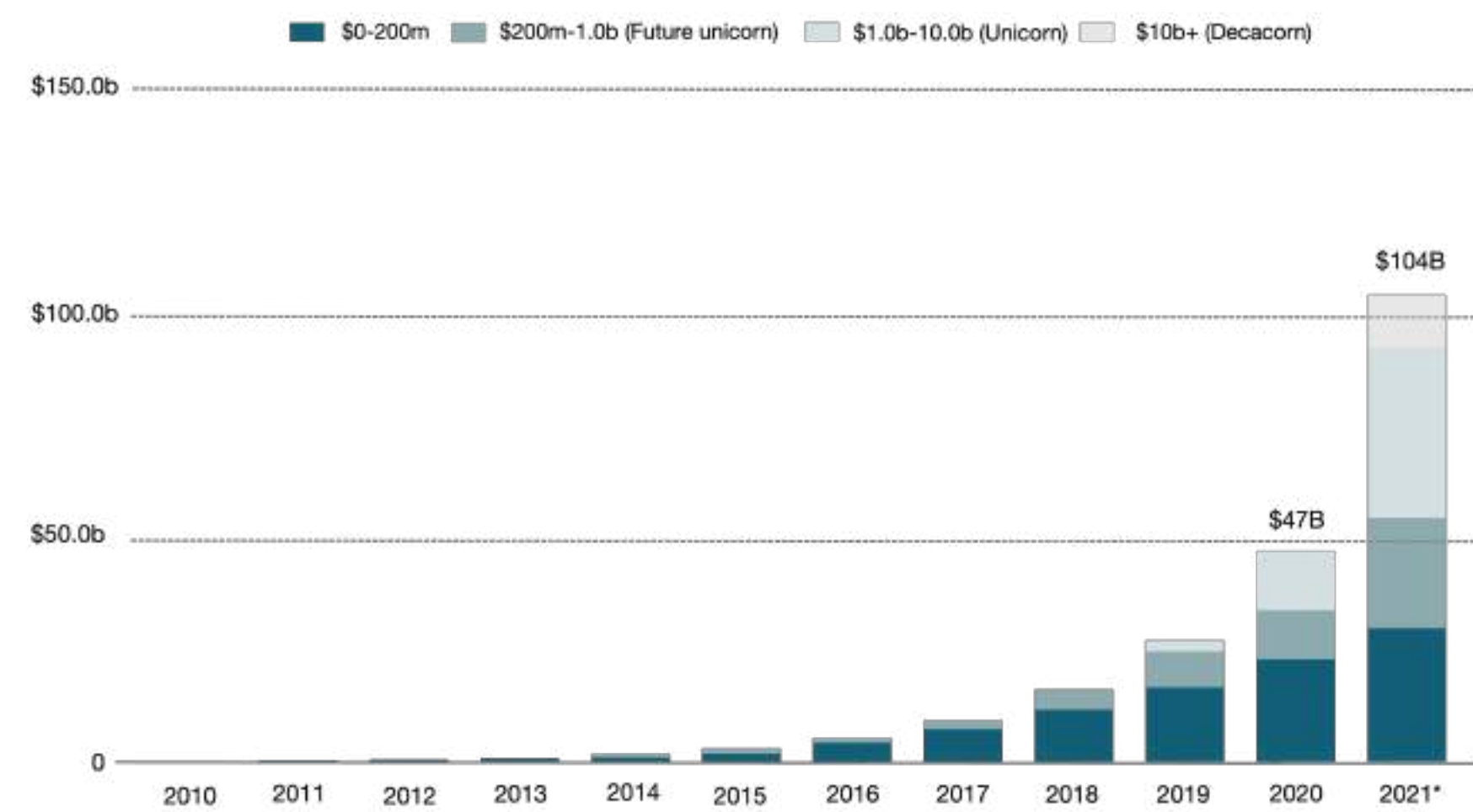
25 GtCO₂

Emissions maximum to achieve 1.5°C

Funding climate tech

Clearly there is a massive shift underway, and Europe is at the heart of this change. The EU's R&D spend has created massive commercialization potential. The famous Horizon 2020 funds with R&D focus were allocated throughout the pilot period over the last seven years, with >40% going to climate-relevant R&D, totaling €25 billion. The Ukrainian war has also accelerated efforts to decentralize energy production and has shown the dangers of a fossil fuel dependent economy. The European climate tech ecosystem is worth over €100 billion, doubling in value since 2020.

The European climate tech ecosystem is worth over \$100B: doubling in value since 2020



Source: [The rise of Climate Tech](#) (2022)

Macroeconomic tailwinds are further accelerating the demand for climate tech investments. These include:

Macro tailwinds

Competitive Costs for Renewables*: 80% decrease in the cost of solar power in the last decade, reaching cost parity with fossil fuels.

Global Regulatory Environment*: US re-entrance into the Paris Agreement – approval of the \$1.2T infrastructure and climate bill, \$1.7B allocated to fighting climate change: EU, China among other global players committing to net zero emissions.

ESG Investment Demand**: Institutional investor demand for ESG products have doubled over the last five years – net new capital invested in 2019 and 2020 into ESG funds totaled over \$50B.

Corporate Engagement***: Microsoft and Apple have promised carbon neutrality by 2030 – Microsoft vowed to remove all GHG the company has ever emitted by 2050. Amazon launched a \$2B climate fund using funds from their own balance sheet

*Source: The Economist, The green meme, May 2021

**Source: Pitchbook, Introduction to Climate Tech: A Taxonomy Overview, Oct 2021

***Source: The Economist, Climate tech's Netscape moment, August 2021

Agricultural Technology



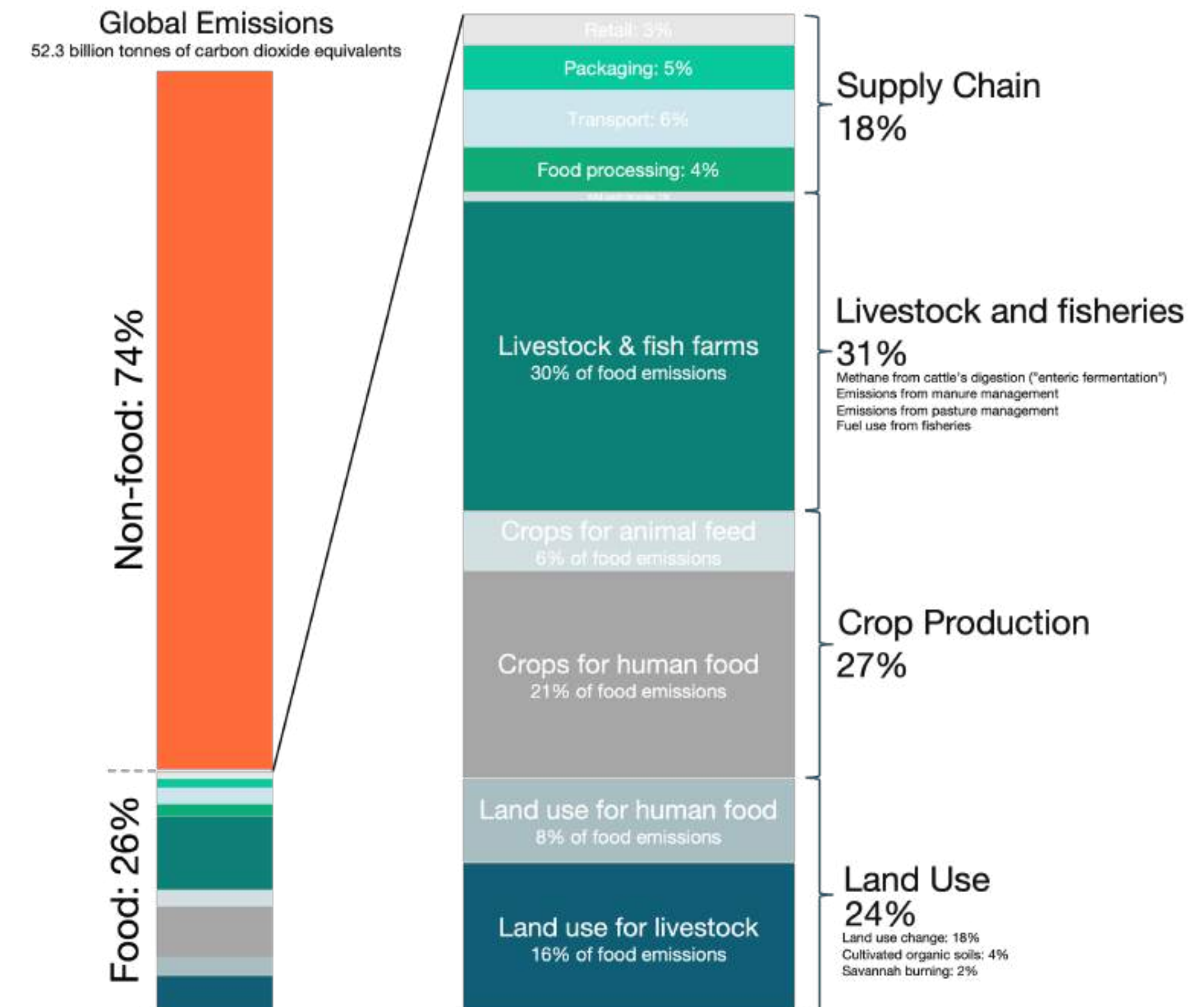
Challenges of Agricultural Technology

Global food production is the single largest human pressure on Earth, threatening local ecosystems, driving a sixth mass extinction of species, and impacting the stability of the entire Earth system. Agriculture both contributes to climate change and is affected by climate change. Food systems are responsible for 20.1% of global GHG emissions, with the largest contribution coming from agriculture and land use activities, but food waste is also a major contributing factor*.

Before reaching our plates, our food is produced, stored, processed, packaged, transported, prepared, and served. At every stage, food provisioning releases greenhouse gases into the atmosphere. Farming in particular releases significant amounts of methane and nitrous oxide, two powerful greenhouse gases. Methane is produced by livestock during digestion due to enteric fermentation and is released via belches. It can also escape from stored manure and organic waste in landfills. Nitrous oxide emissions are an indirect product of organic and mineral nitrogen fertilizers.

A 2020 report found that nearly 690 million people—or 8.9 percent of the global population—are hungry, up by nearly 60 million in five years. The food security challenge will only become more difficult, as the world will need to produce about 70 percent more food by 2050 to feed an estimated 9 billion people.

It is clear that the EU needs to reduce its greenhouse-gas emissions from agriculture and adapt its food-production system to cope with climate change.



Source: [Food GHG emissions](#) (2019)

*The WWF estimates that 6-8% of global emissions could be cut if we stopped wasting food.

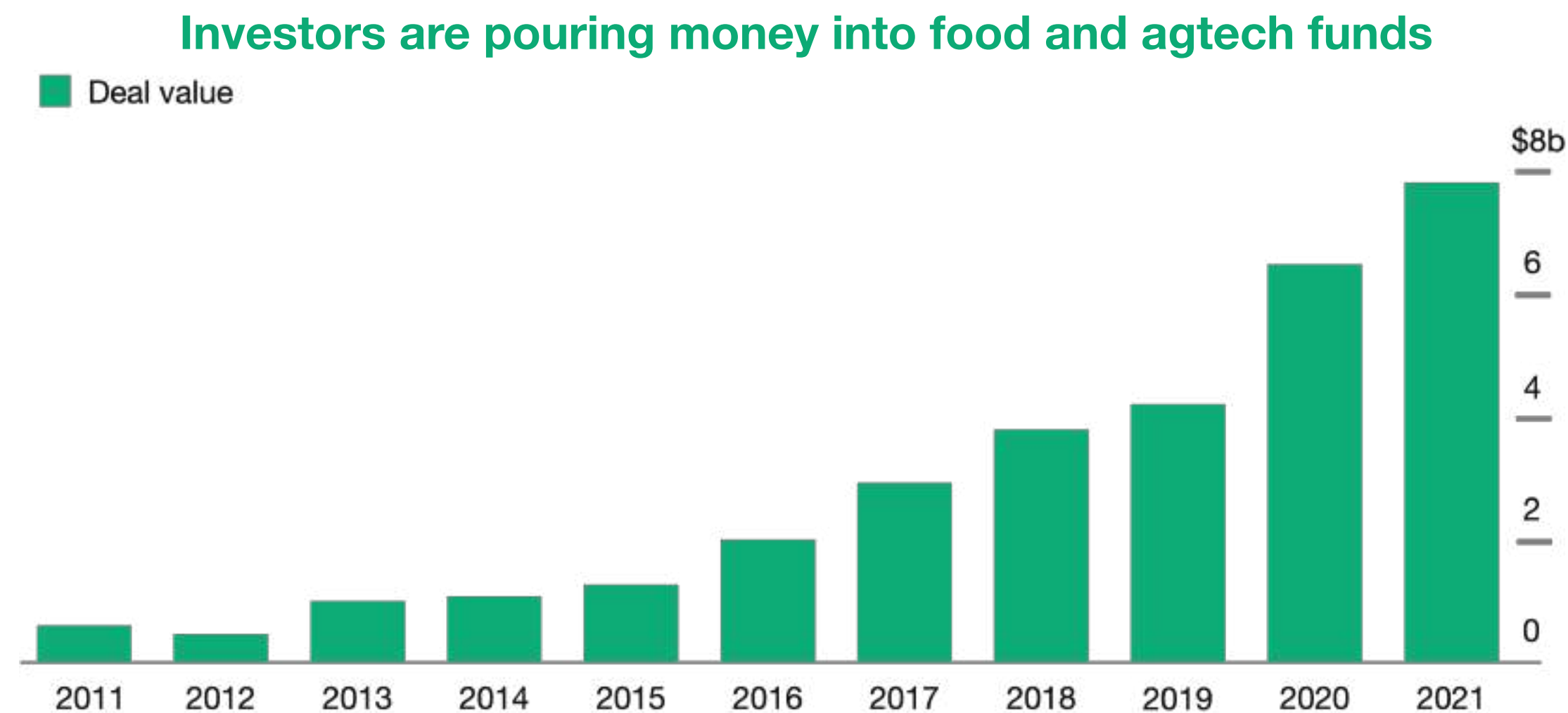
Investments into Agricultural Technology

There is growing financial investment in plant-based meat and dairy alternatives, driven by consumer demand and media coverage. The next generation of solutions is expected to focus on insect proteins for human and animal consumption, lab-grown meat and genetic editing. Further attention is required to reduce food loss and waste and to create more sustainable packaging solutions, which could also extend the shelf life of produce.

Furthermore, with increasing penetration of the internet, agriculture can become more exact, satellite data can be connected with sprinklers, weather forecasting and more generally IOT sensors. Vertical farming provides another avenue for agriculture to become more efficient, producing more on less land, closer to consumers.

Covid-19 has exposed deep flaws in today's globalized food system and sparked renewed interest in local, sustainable production. On top of this, increasingly cheap distributed renewable energy could unlock new agricultural lands. This combination will give smaller companies the economic cover and the infrastructure necessary to gain a foothold in a fiercely competitive industry.

There will be multiple unicorn-level outcomes as companies begin reshaping the \$7 trillion food industry while removing or reducing gigatons of carbon from the atmosphere.



Source: [AgTech booms as investors target climate-friendly technology](#) (2021)

Startups to watch

Agricultural Technology



AGREMO

Serbia

Agremo is a highly precise field data analytics engine. Aerial data are taken using drones and all the images get stitched into a map and uploaded to the Agremo web app. The next step is to request a specific type of analysis. Then, sophisticated AI software is leveraged to create easy to use and easy to understand data in shapefile or PDF format, which can be shared with your clients or colleagues. Finally, Agremo provides you with actionable insights which they can upload to 3rd party software and use throughout the growing season.



BLUE PLANET ECOSYSTEMS

Austria

Blue Planet Ecosystems builds, develops and operates modular LARA (Land-based Automated Recirculating Aquaculture) systems for sustainable seafood production in extreme environments. They help farmers, agriculture businesses and future entrepreneurs to diversify their farming methods in the face of climate change.



CARBOMINER

Ukraine

Carbominer is a Ukrainian hardware startup that develops innovative technology to capture CO₂ from the ambient air. Their technology relies on a mix of dry and wet CO₂ capture approaches, using ion-exchange sorbent on the capture stage and electrochemistry-based regeneration on the CO₂ release stage. One of the key advantages of Carbominer's capture process is its ability to use an intermittent energy from renewable sources.



CLIMATEFARMERS

Germany

ClimateFarmers Carbon+ Credits is a financial instrument to de-risk farm transitions to regenerative systems. Through them we guarantee the highest quality carbon offsets in the market and create tangible impact while offering the most farmer-friendly financing tools. Climatefarmer collects all available data, create processes and methodologies to measure regeneration and make it available for farmers, businesses and policymaker.

Startups to watch

Agricultural Technology



HEMPCONNECT

Germany

HempConnect provides smart agricultural carbon management from seed to sink. They focus on a natural carbon cycle with Industrial Hemp and Pyrogenic Carbon Capture and Storage (PyCCS), which enables the simultaneous climate-positive provision of plant-based proteins, natural fibres, and renewable energy. The HempConnect platform allows them to coordinate farming, collect data, calculate emissions, control carbon removal and consecutively certify their projects. They ensure compliance with international standards and facilitate the communication of sustainability assessments and social responsibility.



KERN TEC

Austria

Kern Tec is a B2B manufacturer and processor of cherry, apricot, plum, damson and many other fruit stones. These raw materials are carefully refined into high-quality products such as new baking ingredients, sustainable oils and a plant-based milk alternative.



MONITORFISH

Germany

Intelligent monitoring and control systems for fish farming. Their AI-based fish farm monitoring software works via an underwater camera. By keeping track of the whole tanks' data, they guide you to achieve your optimal growth strategy while ensuring a healthier fish population.



REFARMO

Austria

Refarmo are bringing satellite enabled solutions to the farming industry and accelerating transition to climate positive food systems. Refarmo offers certification for regenerative agriculture. REFARMO field scout automatically processes satellite images in the cloud and provides reports that include hi-resolution soil moisture and vegetation maps from satellites as well as crop damage detection.

Startups to watch

Agricultural Technology



TRAPVIEW

Slovenia

Trapview is a pest insect monitoring and forecasting platform developed by a Slovenian company Efos. Automated electronic traps enable efficient, nearly maintenance free monitoring of pest insects. Advanced artificial intelligence based processing of trap data assists customers to get accurate and real-time understanding of pest population dynamics as well as forecast of pest development stages in a specific area. This positions Trapview as key decision support tool for planning field activities and for optimal usage of crop protection. With Trapview nearly 40 different insect species are being monitored all over the world.



VOLTA GREENTECH

Sweden

Volta produces a seaweed supplement for cows to burp less methane and launched the world's first methane-reduced beef. At the Swedish grocery chain, Coop, there is now a new product that isn't available anywhere else in the world: "low methane" beef.



Manufacturing



Challenges of Industry and Manufacturing

Both the global economy and our daily lives depend on manufacturing. As a sector, it generates essential goods, offers a variety of jobs all over the world, and fosters innovative growth. While the manufacturing and production sectors are key drivers for economic growth, comprising 16% of global GDP, activity from these sectors also poses serious environmental risks that must be collaboratively addressed.

Global industry and manufacturing are responsible for 29.4% of GHG emissions* and are one of the most difficult challenge areas to abate due to the need to retrofit, upgrade and replace existing equipment and transform the associated supply chains.

The price and availability of resources for manufacturers have been significantly impacted by economic, geopolitical, and social factors. The worldwide COVID-19 pandemic, which began in 2020, has seriously disrupted supply chains on a global scale. Manufacturers are aware of how quickly they must adapt to these shifts. Future-proofing manufacturing requires operations to change and products to be redesigned to use less energy and more recycled materials.

There are a few key ways the manufacturing sector can decarbonize:

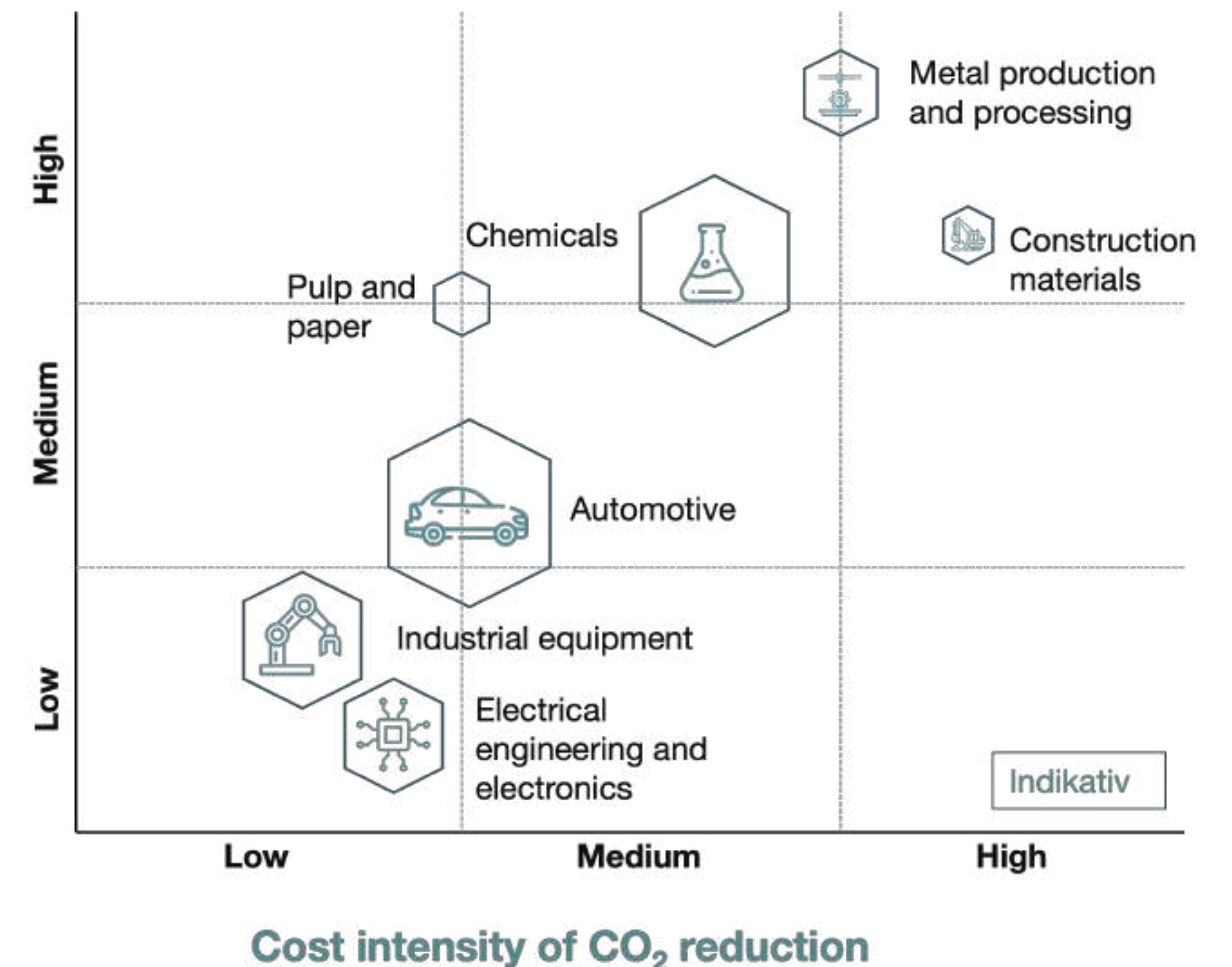
Materials

Energy usage

Design

*Source: [Emissions by sector \(2020\)](#)

Different industry sectors' share in GHG emissions and the cost of reducing them



Source: [Climate protection in the manufacturing sector \(2019\)](#)

Decarbonization possibilities

Materials

Materials and resources required for industrial processes form the basis of everyday life. Chemicals form plastics, fertilizers and synthetic fibers, and metals are the basis of many infrastructure materials.

At the same time, new materials are coming onto the market that either fully replace or complement existing high carbon materials. Designing products in such a way that they can be disassembled is also opening up new business models within the circular economy space. Furthermore, supply-chain decarbonization will be a “game changer” for the impact of corporate climate action. Addressing Scope 3 emissions is fundamental for companies to realize credible climate change commitments, and particularly relevant for the manufacturing industry.

Energy usage

Emissions arise from the production of materials, manufacturing and the energy used in industrial processes, and emissions are generated by the industrial processes themselves (eg CO₂ released during chemical reactions). Absolute reductions in emissions from industry and manufacturing therefore require the use of a wide range of mitigation options, including more efficient use of resources, more efficient processes and improved energy efficiency.

Design

Manufacturers can lower their CO₂ emissions by considering and actively minimizing the environmental impact of a product across its entire lifecycle, from material extraction and supply to end of life. This is commonly known as ‘eco-design’, but many manufacturers and engineers may know it as the ISO/TR 14062 standard for environmental management in product design.

Design engineers can follow the principle of eco-design by considering factors such as the amount of energy and materials consumed in production, or how the product and its manufacturing by-products may impact biodiversity. Then, engineers and manufacturers can investigate alternative processes, systems or materials to minimize the impact.

Startups to watch

Industry and manufacturing



AVILOO

Austria

The health condition of an electric battery is significantly decisive for the vehicle value of a used electric car. Aviloo tests and monitors batteries in electric vehicles, electric buses, electric ships, etc, as well as in all electric industrial and residential applications, so that the battery remains as efficient as possible for as long as possible.



CYRKL

Czech Republic

Thanks to advanced technological solutions, Cyrkl helps companies turn waste into resources and thus into revenue with Europe's largest digital marketplace for waste and residuals. Maximize the value of your waste when finding the best potential partners for every type of waste, material, by-product or recyclate. Minimize CO₂ and boost your green sourcing through secondary materials procurement. Optimize your overall material flow with a Circular Waste Scan.



INFINITY FIBER

Sweden

The patented technology takes piles of trashed textiles that would otherwise be landfilled or burned and transforms them into brand-new premium-quality fibers for the textile industry. While Infinity Fiber currently focuses on using cotton-rich textiles, the beauty of the technology is that it can also turn other cellulose-rich materials – old newspapers, used cardboard, crop residues like rice or wheat straw – into the same fantastic fiber. Infinity Fiber breaks waste down and captures its value at the polymer level, giving it new life as Infinna™ – the unique textile fiber that looks and feels like cotton and is known scientifically as cellulose carbamate fiber.



LAM ON

Bulgaria

A 100% biodegradable and fully compostable laminating film and a packaging foil, made of corn. LAM'ON is the only solution for print finish lamination that is suitable for compost, applicable on the standard machines currently used by printers and publishers, and available at a competitive price.

Startups to watch

Industry and manufacturing



LANDPACK

Germany

Landpack GmbH develops, builds and operates plants for the production of ecological packaging based on renewable raw materials. Landpack offers a sustainable alternative to Styrofoam packaging for companies in the food industry as well as in the life sciences and biotechnology sectors.



LIGNOVATIONS

Austria

To create the most sustainable ingredients, Lignovations makes use of nature's ingenuity. In nature, lignin protects plants from negative influences such as UV radiation, oxidation and microbial attacks. Through the patented technology Lignovations creates Lignin Particles in colloidal form which unlocks their functionalities for high-value applications like cosmetics, coatings and packaging.



MADE OF AIR

Germany

Made of Air's materials are biochar enriched and replace fossil materials and other composites in manufactured products. Composed of carbon sequestered from the atmosphere, the materials permanently remove CO₂ and are thermoformed by standard industrial processes to meet millions of building and consumer product applications. Storing carbon in products enables manufactured goods to become an engineered carbon sink.



MATЯ

Austria

The first all-in-one mattress solution that embeds circular economy design right from the start, featuring a premium mattress made from just 2 high quality materials, hassle-free digital mattress management and accessible flexible financing. MATЯ mattresses never end up as waste and always go back into the material cycle, resulting in a carbon footprint 50% less than conventional mattresses - ideal for hotels wanting to reduce their footprint and provide premium sleeping experiences.

Startups to watch

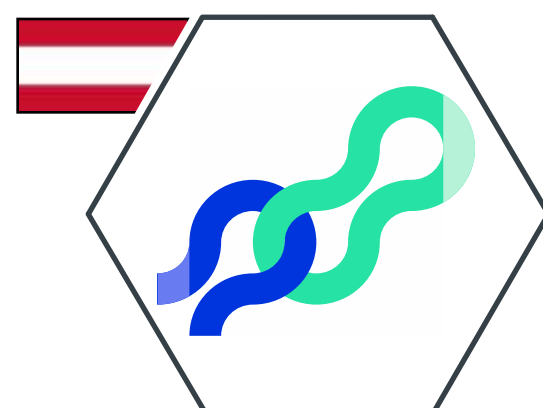
Industry and manufacturing



REVERSE RESOURCES

Estonia

A SaaS platform to digitize, connect and scale global textile-to-textile recycling. Reverse Resource digitizes data on textile waste flows which enables the entire supply chain to track, trace and valorize textile waste - connecting fashion brands, manufacturers, waste handlers and recyclers. They are building the infrastructure to scale circular supply chains.



S1SEVEN

Austria

S1SEVEN introduces digital material certificates to industrial supply chains. As a drop-in replacement for today's paper-based documents, for manufacturers, their software unlocks the value of traceable quality and sustainability data to create safer products and reach climate targets. The award-winning applications from S1SEVEN upscale existing enterprise software and enable the industry to share, process and verify material quality and sustainability certificates for steel, aluminum and engineering plastics across global supply chains. This is how automotive, engineering, construction and packaging companies are enabled to introduce data-driven processes and automate quality assurance and sustainability reporting.



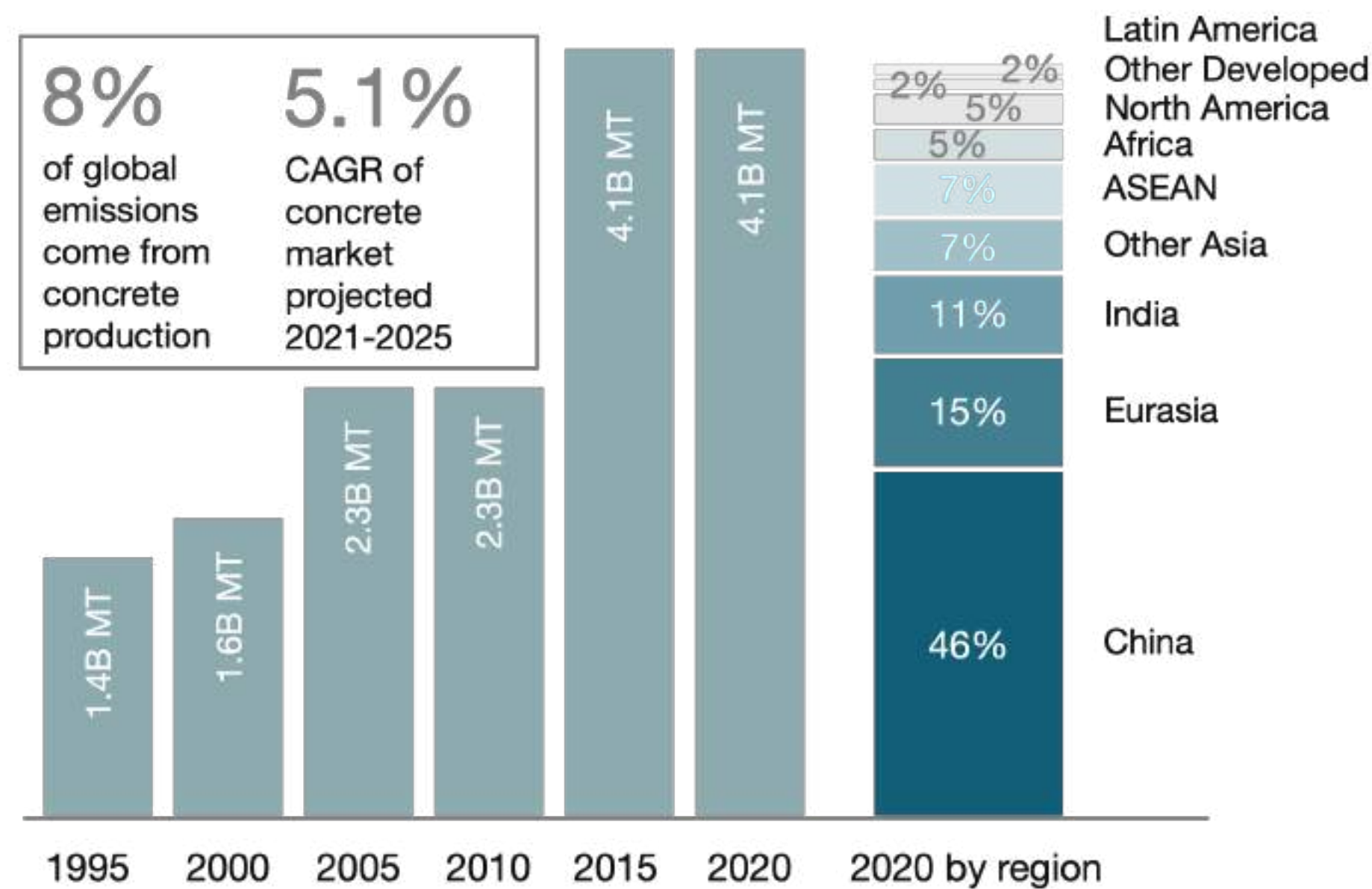
Buildings and Construction



Challenges of Building and Construction

Buildings and structures account for 20.7% of global greenhouse gas emissions. Nearly two-thirds of this is operational emissions, with the remainder coming from embodied CO₂ emissions, or 'assumed' carbon associated with materials and construction processes. The World Green Building Council has found that buildings and construction account for a massive 39% of all carbon emissions in the world, with 28% being related to energy expended lighting, heating, and cooling buildings (operational carbon) and the remaining 11% from energy use, related to producing construction materials (embodied carbon)*.

Global cement demand by region

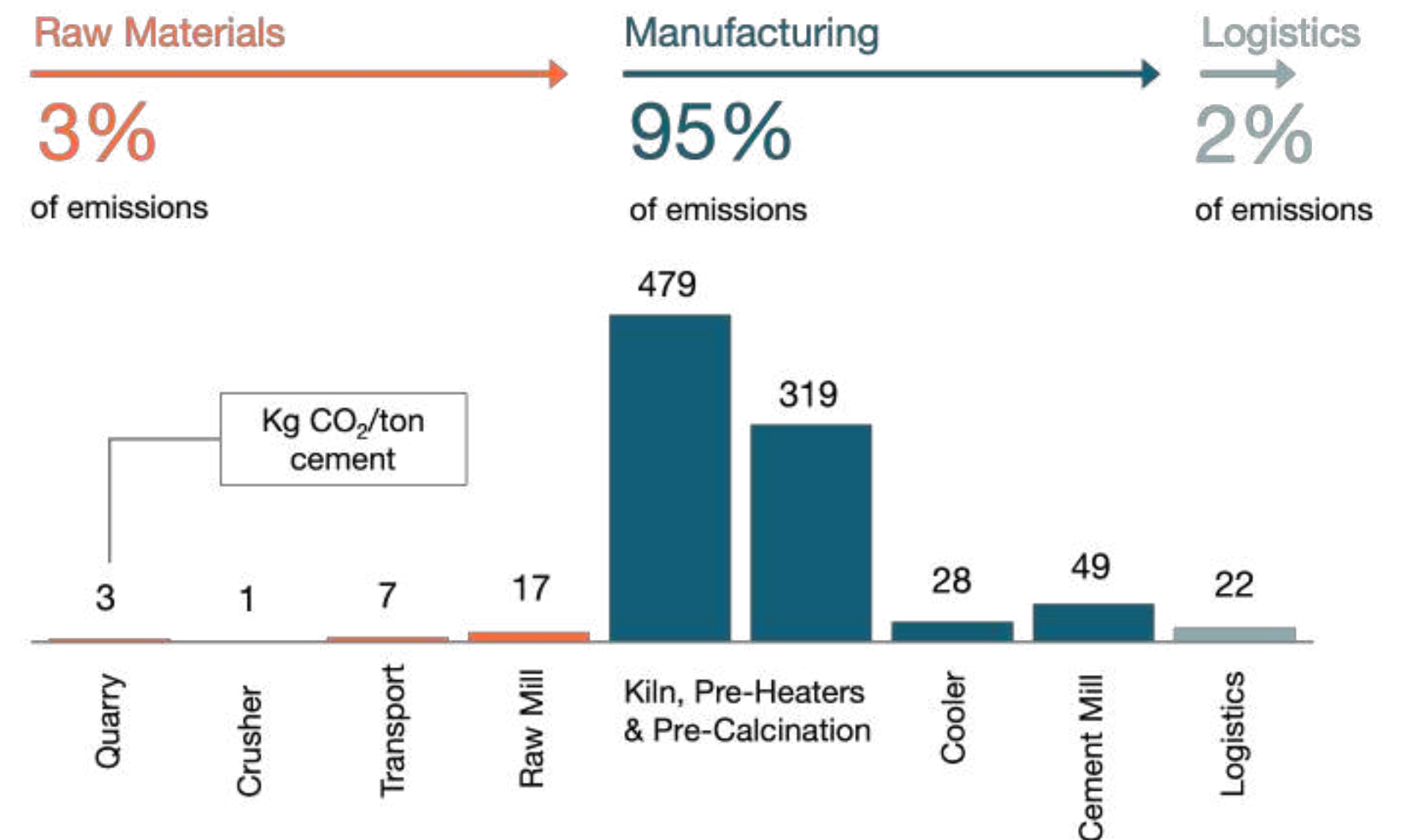


Source: The future of Climate Tech (2022)

*Global status report: Buildings and construction sector (2019)

To eliminate the carbon footprint of the built environment, both buildings and materials need to become more efficient, smarter and cheaper. Small improvements in efficiency, such as better heating, lighting, or appliances, also play a role. Given the breadth of impacts of the built environment, we also need more centralized solutions such as building-level power and heat storage, innovative building design, innovative circularity, and sensor-driven intelligent building management.

Breakdown of cement production emissions



Challenges of Building and Construction

The WBCSD estimates that the goal is for all new buildings to operate at net-zero emissions by 2030 at the latest, and for all buildings to operate at net-zero by 2050. Embodied carbon in building materials and equipment needs to be reduced by at least 40% from today's levels by 2030 and to net-zero by 2050*.

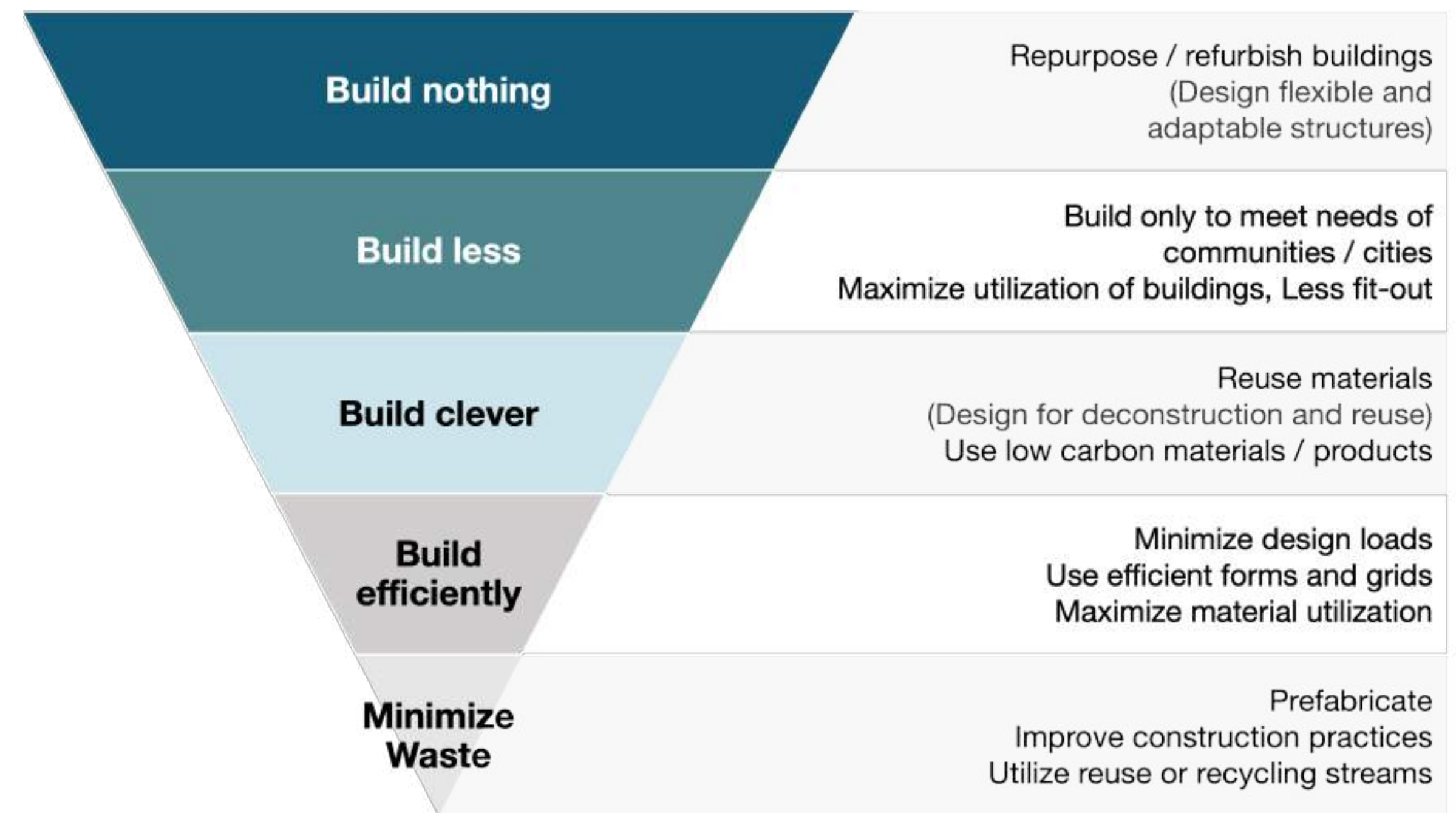
In line with this, in Q4 2020, the European Union passed its “Renovation Wave” regulations—requiring a 60% reduction of carbon emissions in buildings over the next decade, along with an 18% reduction in heating and cooling demand. Building owners that do not comply will pay substantial fines.

Bloomberg New Energy Finance estimates that in Europe alone, this will cost more than \$3 trillion**.

WIKIPEDIA Definition of Green Building

Green building (also known as green construction or sustainable building) refers to both a structure and the application of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from planning to design, construction, operation, maintenance, renovation, and demolition. This requires close cooperation of the contractor, the architects, the engineers, and the client at all project stages.

Embodied Carbon Reduction Strategy



Source: [Net-zero buildings](#) (2021)

* [Building System Carbon Framework](#) (2020)

**[EU to slash building emissions with renovation wave](#) (2020); [Bloomberg New Finance](#) (2022)

Startups to watch

Building and Construction



2050 MATERIALS

Cyprus

2050 Materials centralizes all sustainability information about building materials into a single platform, enabling designers to save time and money at any project stage. 2050 Materials collects all sustainability information and provides simplified ratings. These ratings enable everyone to understand the performance of each product as well as to find and compare alternatives. They cover all carbon life-cycle stages, water, circularity, end-of-life, financial considerations and available certifications.



BUILTRIX

Portugal

Builtrix is a fast-growing provider of data-driven energy intelligence solution for energy experts, consultants and facility managers. Builtrix has a cloud-based solution that combines big data analytics and artificial intelligence with energy efficiency. Its SaaS solution enables facility and property managers, energy services providers and consultants to understand the energy consumption, analyze usage patterns as well as inefficiencies, and detect anomalies in real time. It supports companies to optimize the energy efficiency of their buildings and to reduce carbon emissions.



ECOWORKS

Germany

Ecoworks industrializes and digitizes energetic refurbishments for the housing and construction industry. A fully digitized end-to-end process, industrial prefabrication and modular construction enable the decarbonization of apartment buildings with up to four floors in very short construction times. This includes prefabricated elements of a building shell with already integrated windows, doors and intelligent building technology as well as a digital 3D planning and work process.



H2 GREENSTEEL

Sweden

Steel producer based on a fossil-free manufacturing process, in a fully integrated production process, using end-to-end digitalization, electricity from fossil-free sources and green hydrogen instead of coal. The resulting steel will have 90% less emissions.

Startups to watch

Building and Construction



HYPERION ROBOTICS

Finland

Hyperion Robotics converts construction waste into concrete and 3D prints buildings. Hyperion have developed a unique robotic system that can automatically produce reinforced concrete structures faster, cheaper and safer than compared to traditional construction methods as well as more sustainably by up-cycling waste materials from different industrial processes.



MCLIMATE

Bulgaria

IoT company that designs and develops affordable and universally compatible smart home and smart building automation solutions (both hardware and software) with a focus on delivering enhanced comfort, security and energy savings to its end users while optimising stakeholders' carbon footprint. Its hardware sensors and actuators are designed to retrofit any old building making it smart by allowing end users and facility managers to monitor and control temperature, humidity, air quality, CO₂ and water leakages remotely using an end user app or a simple IoT platform. The solution does not require any alterations to the existing heating system and there are no building works making it easily scalable.



LEKO LABS

Netherlands

Leko Labs bills itself as a “carbon negative” construction company — on account of having developed a novel wall and floor system based solely on wood and wood fibre, which is capable of replacing up to 75% of concrete and steel currently used in constructing a single building. Its wood composite product is built to withstand high compression loads and its engineered wood yields superior insulation properties for buildings that also have thinner walls — meaning both better heating/cooling performance.



MIXTERESTING

Austria

Mixteresting offers an industry-tailored management system that serves as a central platform for maintaining, testing and documenting mix designs for concrete. They combine mathematical optimization, physical models and AI in a software tool that is able to propose new and promising concrete mix designs with a single click. This makes innovation cycles shorter, cheaper and reduces the number of laboratory experiments significantly. Mixteresting's new optimization approach results in better reproducible concrete mixtures of higher quality, whose properties have a high stability. Given the specific use case, the tool automatically suggests new and better mix designs through self-adaptive algorithms.

Startups to watch

Building and Construction



NEUSTARK

Germany

Neustark specializes in fossilizing atmospheric CO₂ in recycled concrete and reducing its CO₂ impact (storing, removing and reducing). About 10kg of the captured CO₂ are permanently stored in each cubic meter of concrete. It's a natural process sped up from centuries to hours by Neustark's technology (who also quadruple the CO₂ uptake). The enriched material allows for the reduction of cement in fresh concrete. Up to 20kg of new CO₂ emissions per m³ of fresh concrete are avoided.



OXARA

Switzerland

Oxara's solution consists of using the landfill waste (excavation materials) that is locally available to produce a poured earth concrete. Because Oxara would like the process to be simple and competitive to concrete, they developed a cement-free concrete technology that allows builders to cast the excavation materials in fresh state using concrete infrastructure and accelerate the hardening over time in order to remove the formwork after 24 hours. Oxara poured earth concrete has all the advantages of concrete but it is cheaper and 90% more ecofriendly.



A vibrant, futuristic city street scene. Tall, modern buildings with extensive greenery and vertical gardens line the street. A blue tram is visible on a track, and a car is driving on the road in the foreground. The scene is set during the day with a clear sky.

Smart Region challenges

More than half of the world's population lives in cities, and most future population growth is predicted to happen in urban areas. But the concentration of large numbers of people and the ecosystems built around their lives has also been a driver of climate change. Cities cover 3% of the earth's land surface yet are responsible for more than 70% of all carbon emissions*. To keep global temperature increases to 1.5°C or below, cities have to achieve net-zero. As more than 70% of the world's population is set to live in urban areas by 2050, it is clear that cities need to become more sustainable.

According to *Yndestad (2014)* a smart region can be characterized as follows:

Sustainable

Regions take responsibility for their own sustainability compared with other regions.

System integration

Regions are responsible for integrating their Smart Cities, Smart Grids, Smart Transport, natural resources, etc.

Flexibility

Local flexible solutions as an alternative to large-scale solutions.

Decentralization

Public services managed by decentralized internal controls.

Consumer and producer

Each region balances its role as a resource producer and consumer with other regions.

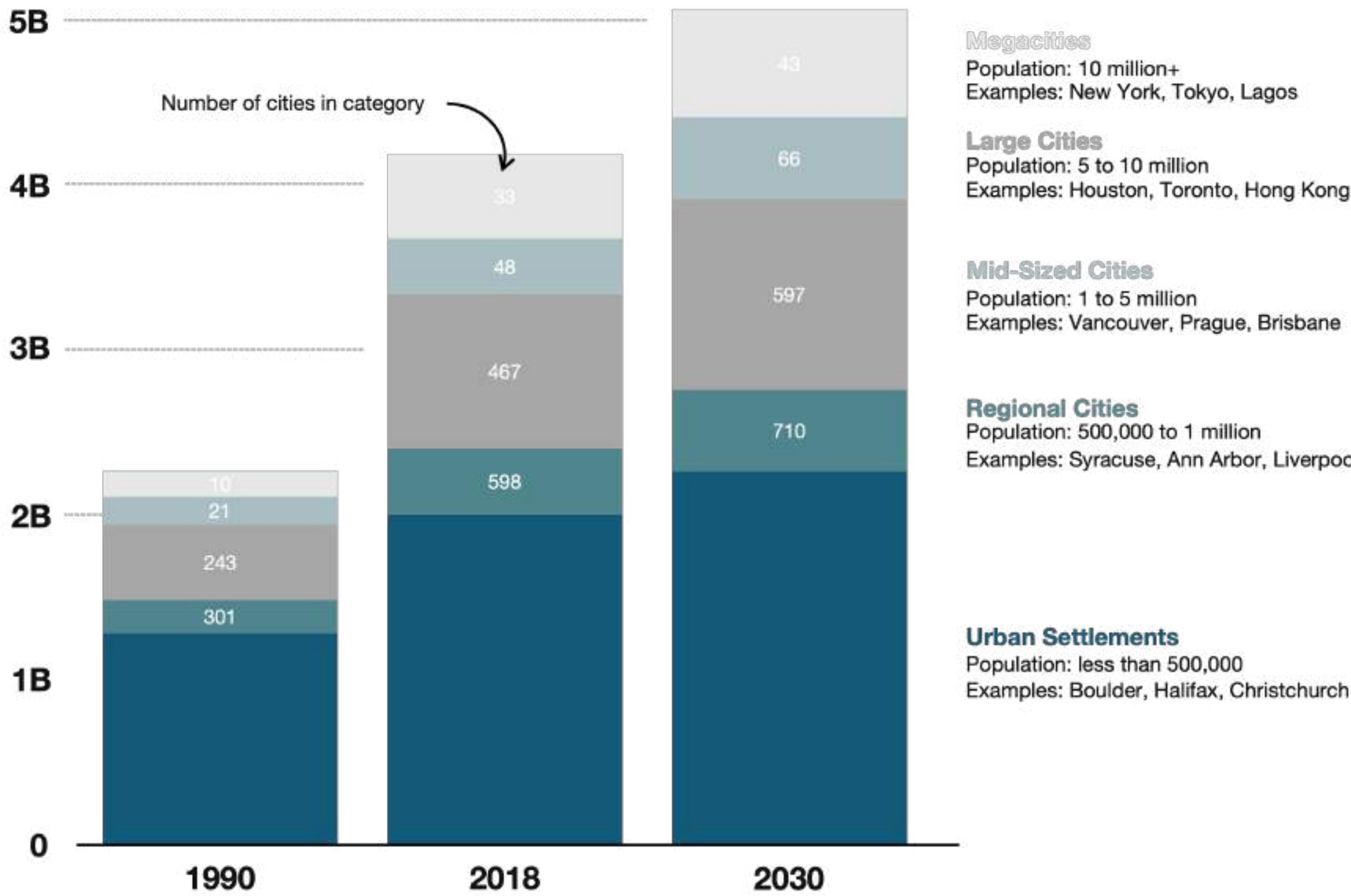
Cost

Priorities and policies are chosen based on cost indicators.

Open innovation

Public services are research based, with open innovation services.

Global urban population by size of city



Source: [UN World Urbanization Prospects 2018](#) (2019)

Source: [SMART REGIONS](#) (2014)

*Cities are responsible for 70% of global greenhouse gas emissions

Smart Region challenges

Cities are highly exposed to many of the impacts of the climate change they contribute to, in particular heat stress, flooding and health emergencies. Making cities more resilient, sustainable, inclusive and safe is one of the United Nations' Sustainable Development Goals (SDG 11), requiring sustained investment.

Smart regions refers to the ability of a city or village and its surrounding to use digital technologies to enhance efficiency of processes, energy consumption, etc.. Digitization offers European cities and regions many new opportunities. The upgrade and the inter-linking of infrastructures, new technologies and services in transport, buildings, energy as well as information and communications technology (ICT) improve the regions' competitiveness, the quality of co-existence life of their natural and corporate citizens and the cities' environmental sustainability.

One of the areas receiving the most attention with regard to smart regions is mobility: Mobility startups currently receive the largest amount of funding, as electric vehicles, micromobility and other innovative transit models continue to attract significant investor attention. Of the ten start-ups that attracted the most investment in H1 2021, eight were in Mobility and Transport*.

Source: [PWC State of Climate Tech 2021](#) (2021)



Startups to watch

Smart region



2HIRE

Italy

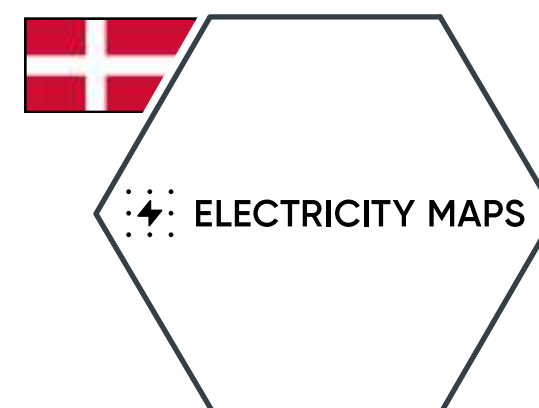
Connect any kind of vehicle through 2Hire's platform and leverage the integrated suite of mobility solutions. 2Hire's focus has always been on vehicles, and on making it possible to communicate with them. To meet modern mobility needs, they built Adapter, a universal software layer to communicate with all vehicles. Adapter standardizes the different protocols that different vehicle types, makes and models use to communicate with the outside world, providing a single access point to retrieve vehicle data and trigger remote interactions. Adapter enables anyone to build apps and services that are instantly compatible with thousands of vehicles, enabling anyone to launch mobility services.



AIRLY

Poland

Using sensors, Airly provides accurate, ultra-local, predictive data for governments, media and businesses to tackle the issue of air pollution head-on. Local councils and municipalities can start by monitoring air quality in real-time on an ongoing basis, locating sources of pollution. Airly provides actionable insights about air quality with its AI-driven algorithms that predict air pollution for the next 24 hours with a verifiability of up to 95%. Airly gives customers across the globe an environmental intelligence platform by installing networks of sensors that track all the key pollution markers - particulate matter (PM1, PM2.5, PM10) and gases (NO₂, O₃, SO₂ and CO).



ELECTRICITYMAPS

Denmark

Electricitymap provides actionable data quantifying how carbon intensive electricity is on an hourly basis across 50+ countries. The data can be accessed historically, in real time, or as a forecast for the next 24 hours. For example, for data center operators, they can recast data to shift the timing of compute tasks running on their hyperscale data centers to times when low-carbon power sources, like wind and solar, are most plentiful. In the future they may load shift not only based on time, but also based on location in order to maximize the reduction in carbon emissions.



LATITUDO 40

Italy

Latitudo's data analytics platform is based on satellite images and artificial intelligence, providing understandable data that lead to decisions that are economically sound and sustainable. Thanks to a flexible, zero-code approach, Latitudo 40 offers a new way to create, deploy and scale geospatial applications, improving life on our planet and helping to achieve Sustainable Development Goals. Latitudo helps cities plan their way to carbon neutrality (zero carbon 2030) through a proprietary algorithm that estimates the amount of CO₂ that urban green infrastructure is able to capture. Their model enables urban planners to learn from the past, monitor the present and shape the future.

Startups to watch

Smart region



RESOURCIFY

Germany

Resourcify, founded in 2015, is a software and recycling platform that helps companies in over six European countries optimize their waste management. With automated, digital workflows that makes recycling more efficient and transparent, companies recycle more, reduce costs, and turn waste into valuable materials. This ultimately helps companies achieve their zero-waste goals. Waste management companies can also use Resourcify to improve their customer service and strengthen their sales teams to attract and retain more high-revenue customers.



SAVEECOBOT

Ukraine

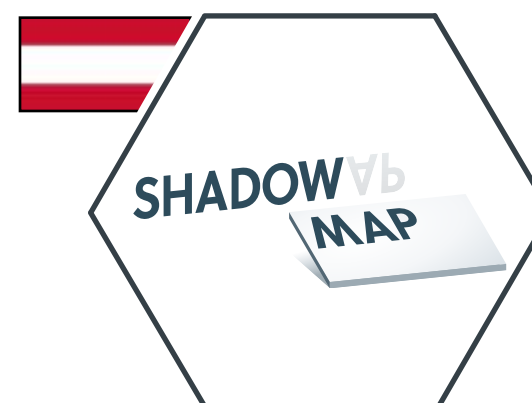
The first environmental chatbot in Ukraine: anyone can get information on air quality, background radiation, environmental data etc.. Save Ecobot aggregates data from the largest number of public sources, including public and commercial projects, local governments, universities, and even individual residents' stations.



SENSONEO

Slovakia

Sensoneo helps customers to cope with the biggest challenges in today's world of waste management – lack of efficiency and transparency. The solutions include smart sensors that monitor waste in real-time, advanced tracking and monitoring equipment, and sophisticated software providing digital transformation and data-driven decision making which results in transparent waste streams, optimization of waste collection routes, frequencies, and vehicle loads, and the introduction of easy-to-run incentive programs dedicated to decreasing waste production. The company also provides comprehensive solutions that digitalize, optimize, and automate the complex reverse logistics of post-consumer take-back, recycling, and processing such as deposit return systems.



SHADOWMAP

Austria

Shadowmap visualizes sunlight and shadow on an interactive 3D map, taking into consideration buildings and terrain. This makes it valuable for prospective home-owners, solar PV firms, agriculture, photographers, etc., anyone who works with the sun. By allowing a simulation of the shadows' path, optimal placements can be identified, allowing for the most efficient use of space.

Startups to watch

Smart region



SOLBYTECH

Austria

Decentralized photovoltaic ground-mounted systems are often affected by disturbances that cause time-consuming and cost-intensive technician assignments. In addition to inverter failures, false reports and power deviations, the most common incidents include communication failures. Solbyvise automates the operational management process and minimizes service costs: If communication and connection problems occur, these are counteracted immediately by sending warning messages in good time by e-mail or integrating alerts into the customer system via API. A remote maintenance option also enables the user for a restart of the industrial router and data logger via the dashboard.



TRIPLY

Austria

Triply develops software solutions that help to analyze current mobility situations and, based on this, to develop sensible, safe and sustainable mobility solutions. The triply technology is intended to give decision-makers the opportunity to "implement better mobility solutions across the board". triply receives data, among other things, from movement analysis by the telecom operator Drei Österreich, which creates these from anonymous and highly aggregated movement data from its mobile phone customers.



Annex

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Picture credits

As we were choosing pictures for this report, we realised that all stock photos in existence are of a world that “was”, i.e. are from the past. As the world ventures into an as yet unknown, sustainable future, we decided to employ technology in the form of an AI (Dall-E, Stability Diffusion) to help us visualise what a sustainable world may look like, but painted in a way recognisable to us from our great artists (Hundertwasser, Dali, Breuegel).

Resources for startups

Finally, if you want support to get your startup up funded check out this list of climate tech accelerators

Accelerators

- [*Third derivative*](#)
- [*Greentown Labs*](#)
- [*Climate Founders*](#)
- [*Katapult Climate*](#)
- [*Norrsken Impact Accelerator*](#)
- [*Airtable of climate startup programs*](#)

Sources

- [*Fight climate change by preventing food waste*](#) (2022)
- [*AgTech booms as investors target climate-friendly technology*](#) (2021)
- [*Emissions by sector*](#) (2020)
- [*Climate protection in the manufacturing sector*](#) (2019)
- [*The future of Climate Tech*](#) (2022)
- [*Global status report: Buildings and construction sector*](#) (2019)
- [*Building System Carbon Framework*](#) (2020)
- [*EU to slash building emissions with renovation wave*](#) (2020)
- [*Net-zero beuildings*](#) (2021)
- [*Bloomberg New Finance*](#) (2022)
- [*Catalyzing Private Sector Investment in Climate Smart Cities*](#) (2020)
- [*SMART REGIONS*](#) (2014)
- [*UN World Urbanization Prospects 2018*](#) (2019)
- [*Green building*](#) (2022)
- [*Food GHG emissions*](#) (2019)
- [*Scaleup4Europe*](#)
- [*ClimateKIC*](#)
- [*PWC State of Climate Tech 2021*](#) (2021)
- [*ClimateEU*](#)
- [*Seedtable Slovenia*](#)
- [*Norrsken 100*](#)
- [*Speedinvest and Creandum*](#)
- [*Temperature change in Europe*](#) (2021)
- [*The future of Climate Tech*](#) (2022)
- [*Curbing emissions with a new carbon law*](#) (2017)
- [*Emissions Gap Report 2021*](#) (2021)
- [*The rise of Climate Tech*](#) (2022)
- The Economist, The green meme, May 2021
- Pitchbook, Introduction to Climate Tech: A Taxonomy Overview, Oct 2021
- The Economist, Climate tech’s Netscape moment, August 2021

CLIMATE TECH LANDSCAPE

A report by Pioneers in collaboration with
Scaleup4Europe featuring top startups of Europe

