Envision

Carbon Neutrality Report 2021

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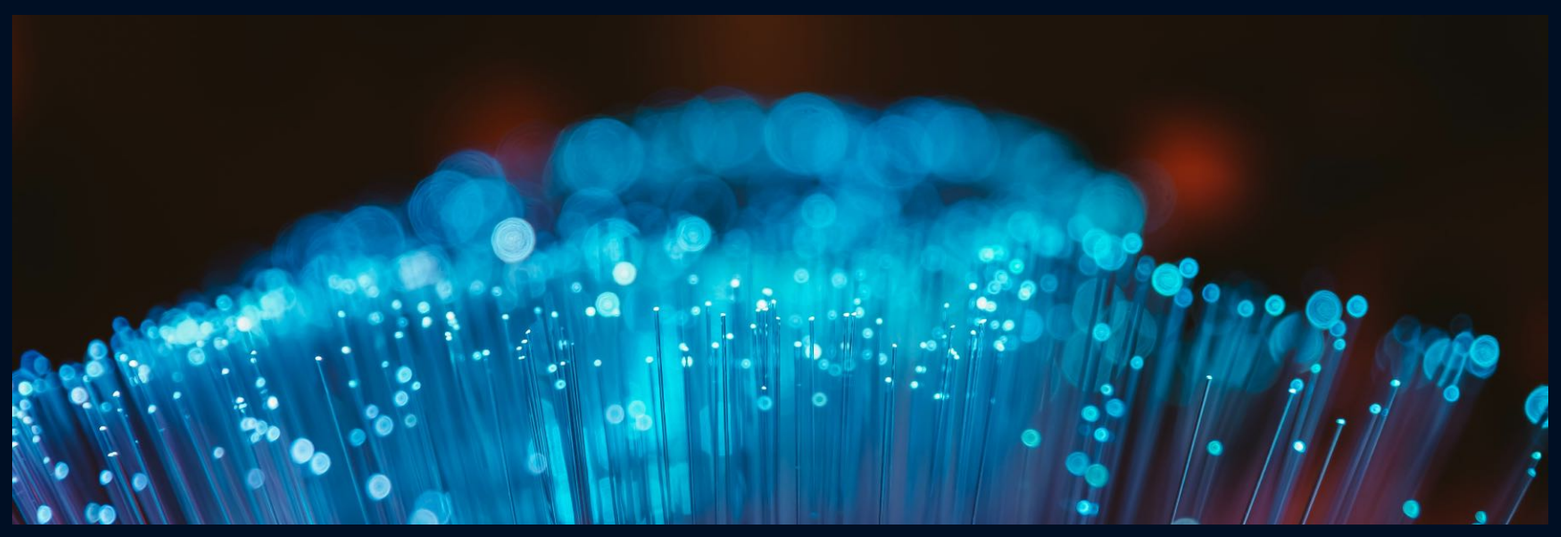
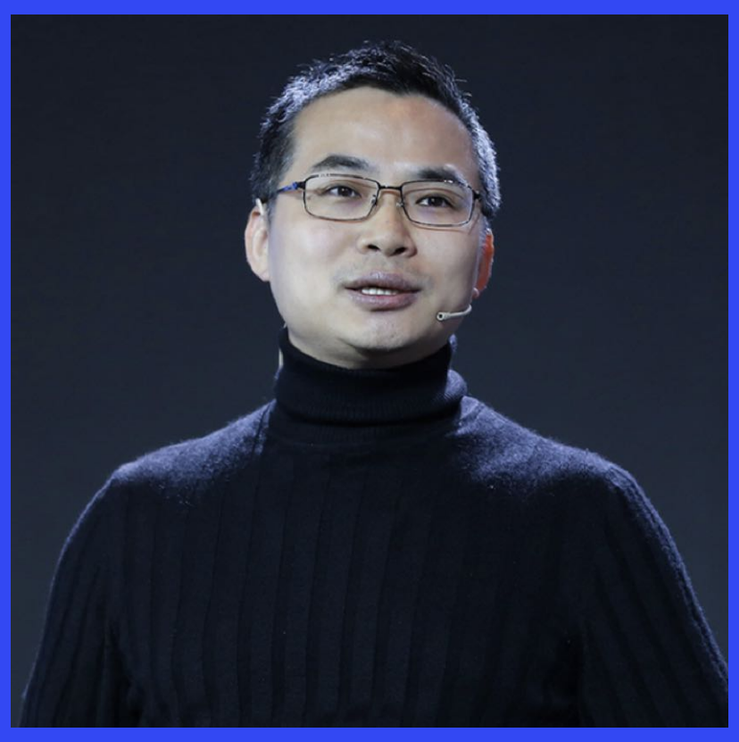


Foreward

Since our founding, Envision's mission has always been to solve the challenges for a sustainable future. The challenges posed by climate change are now more urgent than ever before. Taking bold action today is critical to the survival of humanity. At Envision, we believe that innovation is the key to combating the climate crisis. Through technology, we believe that we can solve the challenges of sustainability and build a brighter future for all.



Lei Zhang

Chief Executive Officer
Envision Group

The past year was historic for humanity. Major economies across the world have made commitments to achieve carbon neutrality by the middle of this century. Chinese President Xi Jinping announced that China would achieve carbon neutrality by 2060. Drawing on our collective experience from fighting the COVID-19 pandemic, we must understand, more deeply than ever before, that no country or individual entity can solve a global challenge on its own. There is no "vaccine" for the climate crisis. Humanity must work collectively in common purpose to prevent even worse disasters from happening.

Today, Envision Group, as a pioneer and leader in net zero technologies, will take bold action to rally our collective efforts towards solving the climate crisis. We have set a more challenging goal for carbon neutrality. Envision commits to be carbon neutral in its operations by 2022 and to become the first company in China to be carbon neutral throughout its entire value chain by 2028.

Beyond our individual net zero goals, it is even more essential that we work with others to reach these goals collectively. One person may travel fast as an individual, but a group of people, united in common purpose, will travel farther together. Henceforth, Envision is committed to becoming the world's leading net zero technology partner for enterprises, governments, and cities. We pledge to work together with our partners to build a better and more beautiful world for all.

While immensely challenging, the journey towards a net zero society will bring untold opportunities for humanity. This new industrial revolution calls for the creation of a new green industrial system that will spur groundbreaking innovation and create massive opportunities for the world. Today, let us join hands and build the new net-zero ark that will carry us to our sustainable future.

Envision Group's mission is to solve the challenges for a sustainable future.

Following this mission, Envision Group (below referred to as 'Envision' or 'the Group') has grown into a world-leading clean technology company. Through purposeful technological innovation, we have been accelerating the transition to smart clean energy systems, helping to move the global economy toward carbon neutrality.

100M tons

Ever since our first wind turbine was connected to the grid in 2008, more than 12,500 wind turbines, designed and manufactured by Envision Energy, have been installed globally. The cumulative output of clean electricity has reached over 150,000 GWh, which exceeds Beijing's electricity consumption in 2020. The clean electricity generated has helped prevent the use of 18 million metric tons of coal and reduced emissions by the equivalent of 100 million metric tonnes of carbon dioxide (tCO2e).

600k

Globally, nearly 600,000 electric vehicles have been equipped with Envision AESC lithium-ion batteries. Compared to conventional internal combustion engine (ICE) vehicles, these Envision AESC-powered vehicles can reduce annual emissions by 660,000 tCO2e.

200+GW

Envision Digital's smart, internet of things (IoT) operating system, EnOS™, is now actively managing more than 200GW of renewable energy assets, which is the equivalent of the net wind and solar capacity added globally in 2020.

1st

Envision Virgin Racing was the first vehicle fleet in the Formula E World Championship to be certified carbon neutral by the Carbon Trust.

Our Commitment

In the midst of a global "Green Recovery", Envision is leading the way in setting aggressive carbon neutrality targets and roadmaps. We look forward to collaborating with more partners around the world to drive the transition to a low-carbon economy and tackle the challenges of climate change for all humanity.

1.5°C

Envision is dedicated to aggressive climate action in our operations and across our value chain. We will develop science-based targets aligned with the Paris Agreement to limit global warming to 1.5°C.

2022

By 2022, Envision will achieve carbon neutrality across our global operations.

2028

By 2028, Envision will achieve carbon neutrality throughout our global value chain.

100%

Envision joined the RE100 initiative in 2019 as China's first company that pledged to switch to 100% renewable electricity by 2025. To achieve carbon neutrality in our operations, we will accelerate progress on this front to reach 100% renewable electricity by as early as 2022.

Our Business

As a clean technology pioneer, Envision is building the infrastructure for a net zero world by introducing the ‘new coal’, ‘new oil’, and ‘new grid’ of the future.

Envision Group owns Envision Energy, a smart wind power and energy storage systems company; Envision Digital, which has developed a world-leading Internet of Things (IoT) energy operating system; Envision AESC, a smart battery company; Envision Ventures, a leading global green tech investment firm; and the Envision Virgin Racing Formula E team. Envision continues to promote wind power and energy storage as the ‘new coal’, batteries and hydrogen fuel as the ’new oil’, and a smart IoT-enabled ‘new grid’ as the core elements of a net zero world.

Envision Energy

Wind Turbine and Energy Storage System Manufacturer

Envision Digital

World’s Leading AIoT Platform

Envision AESC

Automotive Battery Company

Envision Ventures

Leading Global Green Tech Investor

Envision Virgin Racing

First Carbon Neutral Racing Team

Our Carbon Neutrality Strategies

Reaching net zero and leading by example

To achieve carbon neutrality in our operations by 2022, we will fully leverage our renewable energy solutions in conjunction with our carbon and energy management systems to improve energy efficiency and increase the proportion of green electricity consumed while achieving carbon neutrality at low cost and with high efficiency. Through these actions, we strive to inspire sustainable approaches within other organizations.

Enabling partners

We are committed to providing low-carbon and low-cost solutions to our partners both upstream and downstream our value chain, helping them to accelerate their own sustainable transformation and help Envision to achieve its carbon neutrality targets.

Building a new, net zero industrial system

Industry is a major area of energy consumption and contributor of greenhouse gas emissions, especially in China, "the world's factory", where the industrial system relies heavily on carbon-intensive activities. Envision is working with enterprises, local governments, and investors to promote a new, net zero industrial system to accelerate the economy's low-carbon transformation and help China achieve its 2060 carbon neutrality target.

In addition, we will advocate for policies that are conducive to a net zero economy, such as increasing the use of renewable energy, establishing a carbon neutrality standard that is aligned with international standards, reforming the electricity market, and developing alternative energy sources such as hydrogen.

Case #1: Envision Virgin Racing, the first carbon neutral fleet in the Formula E Championship

Envision Virgin Racing was certified as carbon neutral in 2020 by the Carbon Trust, making it the first fleet in the Formula E championship to have achieved carbon neutrality.

Envision Virgin Racing represents a low-carbon, sustainable future built upon Envision's technological innovation. As the first electric vehicle fleet signatory to the United Nations Framework Convention on Climate Change (UNFCCC)'s Sports for Climate Action programme, Envision Virgin Racing organizes the Race Against Climate Change initiative and works with partners to research, advocate, and educate towards the transition to clean, secure, and affordable renewable energy and the mass adoption of e-mobility.

The fleet is also part of a larger coalition to transform motorsports. In 2020, Formula E became the world's first sports series to have achieved a 'net zero carbon footprint', having reduced its own carbon footprint and offset its remaining emissions. As one of the earliest fleets to join the Formula E Championship, Envision Virgin Racing contributed significantly to Formula E's overall carbon neutrality journey. We are confident that Formula E will win the race against climate change through the power of Envision's technologies.

Carbon Neutrality Across Operations by 2022

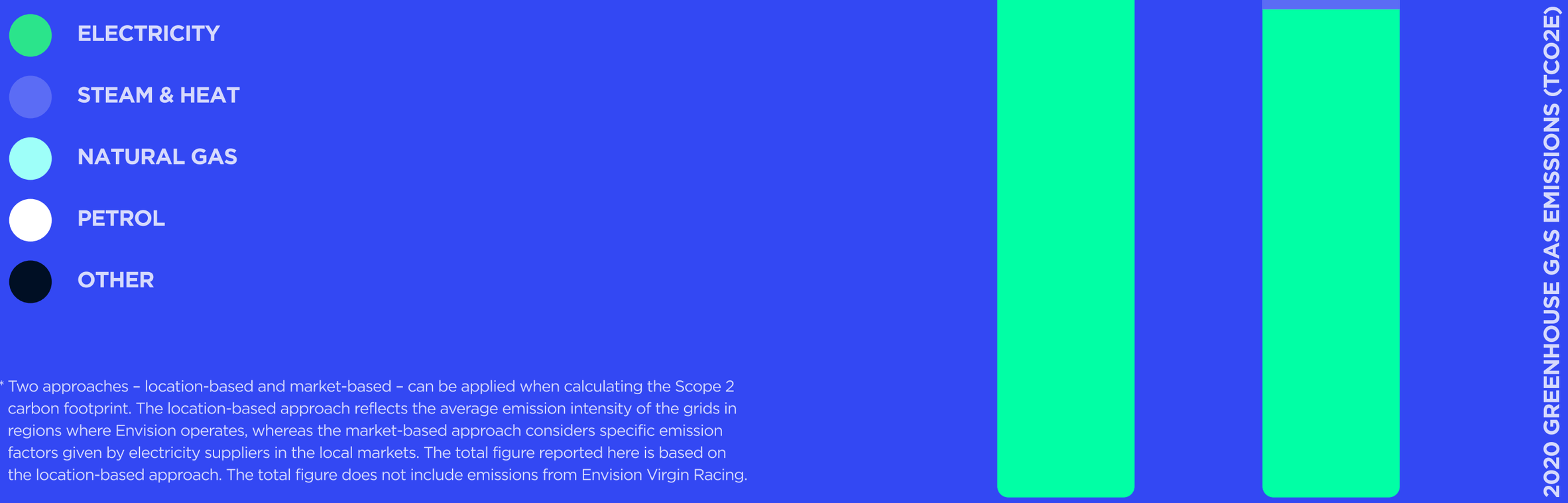
2020 Operational Emissions

Envision Group is committed to reaching carbon neutrality in our operations by 2022

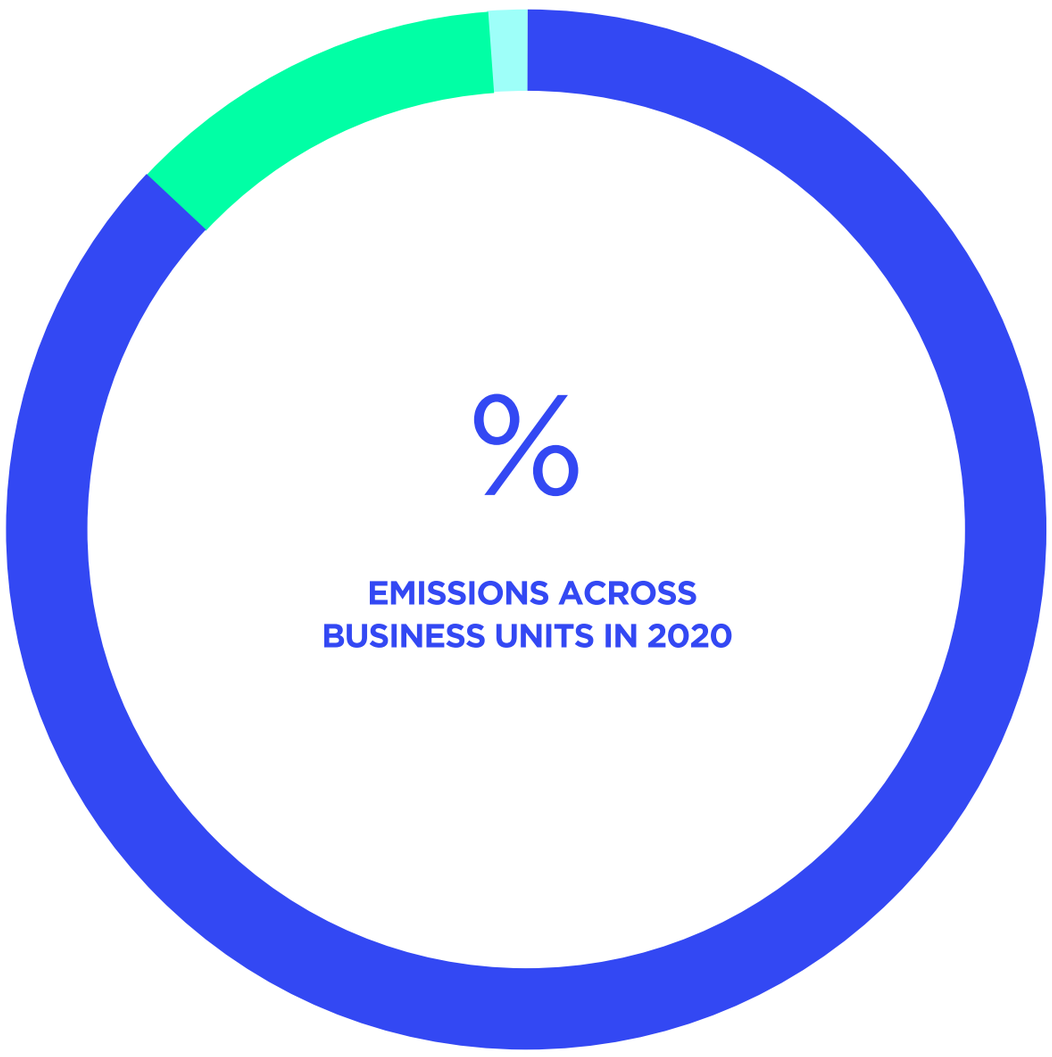
We have measured the Group's carbon footprint across the global operations under our direct control, which include Envision Energy, Envision AESC, and Envision Digital. In accordance with the Greenhouse Gas Protocol's carbon accounting standards (GHG Protocol), our modelling includes both the direct emissions from sources that are owned by the business units—such as combustion in boilers, vehicles, and other process and fugitive emissions (below referred to as 'Scope 1')—as well as indirect emissions from the generation of purchased electricity ('Scope 2').

Electricity generation contributed to over 80% of overall emissions, followed by steam and heat at 13%. As Envision had already built on-site renewable electricity generation facilities and purchased low-carbon electricity products for selected sites, its market-based footprinting result for 2020 is lower at 82,268 tCO2e. Figure 1 illustrates the comparison of the results from location-based and market-based approaches.

Envision emitted 97,255 tCO2e in 2020.*



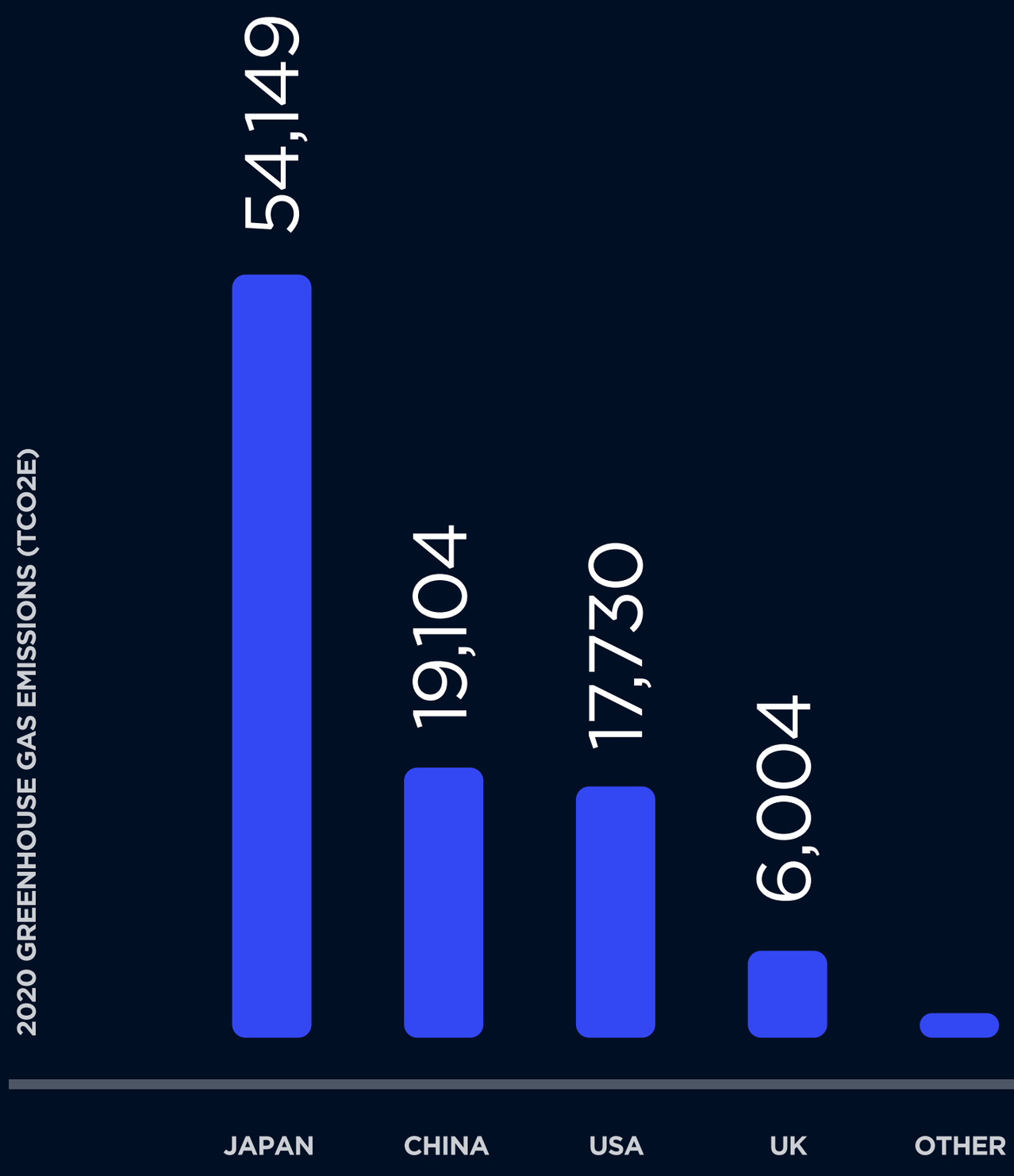
* Two approaches – location-based and market-based – can be applied when calculating the Scope 2 carbon footprint. The location-based approach reflects the average emission intensity of the grids in regions where Envision operates, whereas the market-based approach considers specific emission factors given by electricity suppliers in the local markets. The total figure reported here is based on the location-based approach. The total figure does not include emissions from Envision Virgin Racing.



Envision AESC accounted for 87% of the Group's emissions in 2020, followed by Envision Energy at 12%.

Envision Digital released minimal emissions in comparison.

- ENVISION AESC
- ENVISION ENERGY
- ENVISION DIGITAL



Across all regions, Japan, which holds the majority of Envision AESC operations, accounted for over half of the Group's total emissions.

This is followed by China, the United States, and the United Kingdom in terms of emissions per country. Prioritizing carbon reduction in these countries, with consideration of local market conditions, will be crucial to achieving our carbon neutrality targets.

2022 Carbon Neutrality Roadmap

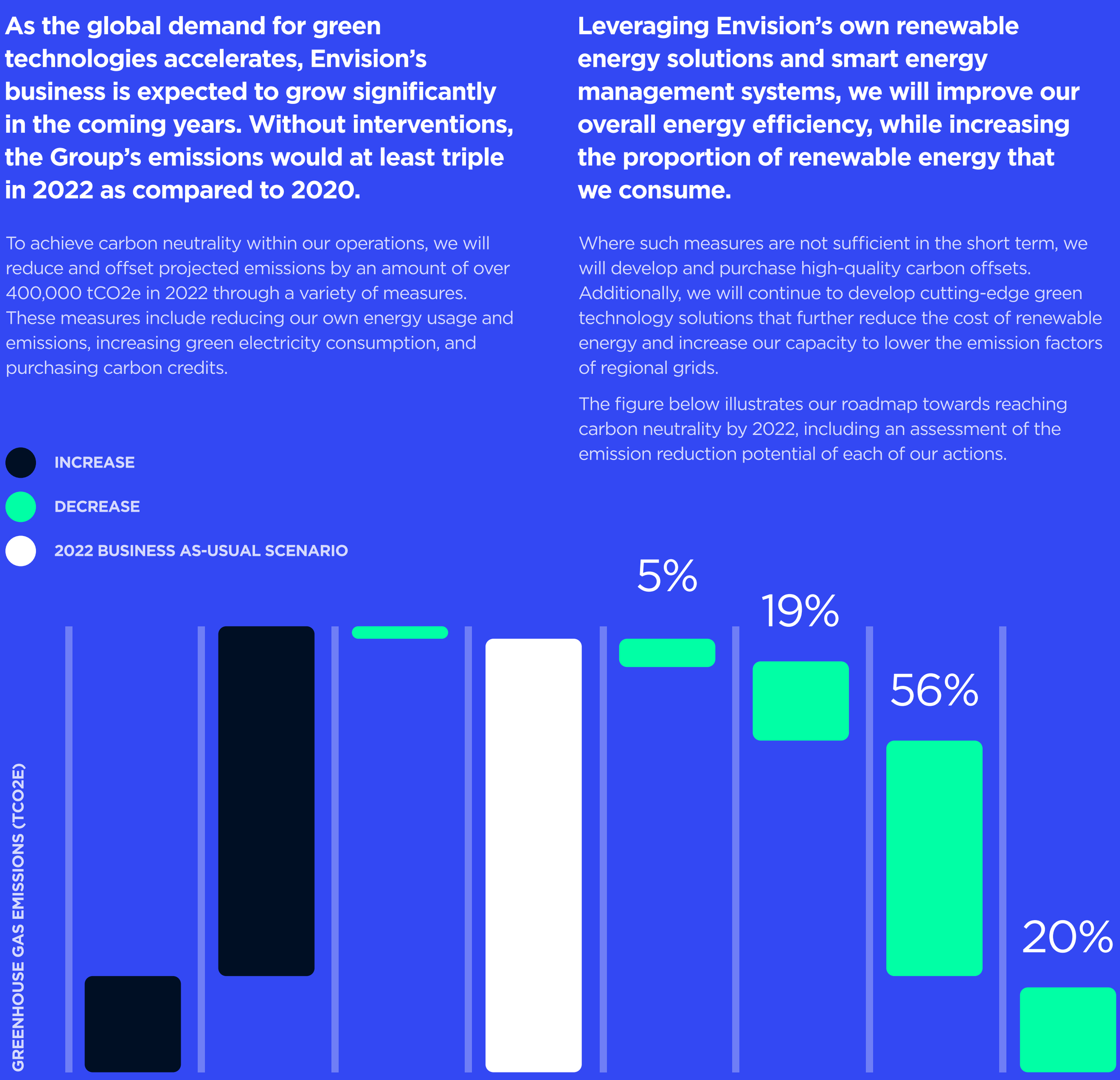
As the global demand for green technologies accelerates, Envision's business is expected to grow significantly in the coming years. Without interventions, the Group's emissions would at least triple in 2022 as compared to 2020.

To achieve carbon neutrality within our operations, we will reduce and offset projected emissions by an amount of over 400,000 tCO2e in 2022 through a variety of measures. These measures include reducing our own energy usage and emissions, increasing green electricity consumption, and purchasing carbon credits.

Leveraging Envision's own renewable energy solutions and smart energy management systems, we will improve our overall energy efficiency, while increasing the proportion of renewable energy that we consume.

Where such measures are not sufficient in the short term, we will develop and purchase high-quality carbon offsets. Additionally, we will continue to develop cutting-edge green technology solutions that further reduce the cost of renewable energy and increase our capacity to lower the emission factors of regional grids.

The figure below illustrates our roadmap towards reaching carbon neutrality by 2022, including an assessment of the emission reduction potential of each of our actions.



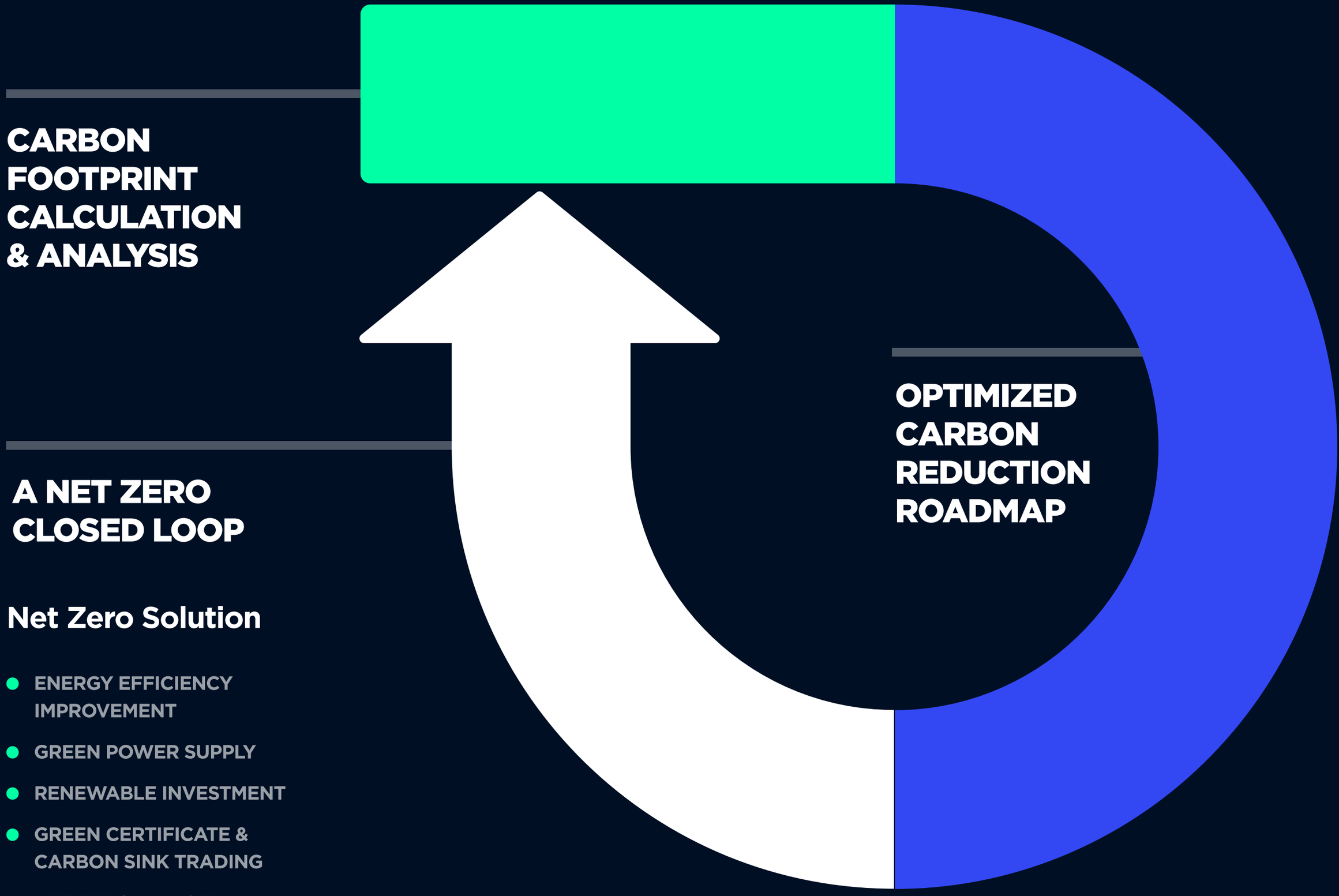
Our Solutions

Achieving net zero requires a fundamental change to our socioeconomic system, which will result in tectonic shifts in the global economy as green technology innovations transform all facets of life.

In taking on the challenge of net zero, Envision will lead the industry by setting new technical standards and connecting the business ecosystem to encourage collective innovation at the product, business model, and solutions levels.

To accelerate the progress towards carbon neutrality within our own operations and value chain, Envision has dedicated its R&D efforts towards the areas of renewable energy, carbon management, energy efficiency, renewable energy certificates (REC), and carbon trading.

ENVISION ARK CARBON MANAGEMENT SYSTEM



Net Zero Solution

- ENERGY EFFICIENCY IMPROVEMENT
- GREEN POWER SUPPLY
- RENEWABLE INVESTMENT
- GREEN CERTIFICATE & CARBON SINK TRADING
- NET-ZERO INDUSTRY

ENVISION ARK, AN END-TO-END SMART CARBON MANAGEMENT SOLUTION

The Envision Ark Carbon Management System monitors the real-time carbon footprints of companies and organizations, and automatically generates a carbon emission report to visualize that data. The system also provides an optimized carbon reduction roadmap for future reduction and offset planning, while allowing companies and organizations to directly purchase green electricity, obtain, trade and retire environmental attributes. The Envision Ark Carbon Management System delivers a truly end-to-end solution for the journey towards net zero.

A net zero closed loop

The EnOS™ platform has already connected over 50% of China's wind power assets and will be connecting over 30 GW of additional power plants that provide REC's on a yearly basis. Meanwhile, Envision is also working with APX and I-REC, two internationally recognised REC certifiers, to provide an EnOS™-powered, blockchain-based, one-stop solution integrating asset registration, certificate application, issuance, trading, and retirement. Through Envision Ark, enterprises will be able to view each certificate's history, ensuring that they are traceable, reliable, and tamperproof.

Carbon management at your fingertips

Based on EnOS™, Envision Ark uploads carbon emission-related data to the cloud in real time, covering a wide range of energy use such as electricity, heating, steam and gas.

Working smartly

Utilizing supercomputing and digital twin technologies, Envision Ark can perform carbon footprinting, carbon neutrality pathway planning, and progress measurement. Furthermore, it can monitor the energy consumption of key equipment, adjust power usage, and run preventive maintenance in real-time. For example, heating, ventilation, and air conditioning (HVAC) equipment usually consumes the most energy in a building. Based on EnWeather, an AI-based weather forecast system developed by Envision, Envision Ark can predict the building's heat load and optimise power usage to reduce building energy consumption without compromising comfort.

RENEWABLE ELECTRICITY

To improve the accessibility of renewable electricity, Envision continues to explore ways to source renewable energy, including distributed generation, renewable electricity purchases, and REC trading.

In 2019, Envision Group joined the RE100 global initiative and pledged to use 100% renewable energy by 2025. In order to achieve carbon neutralization in 2022, we will accelerate this process.

In the short term, we will implement measures that are most accessible and economical to improve the level of green energy used. In the mid- to long-term, Envision Group will transition to more direct and self-generated sources of renewable energy. In suitable regions, we will utilize Envision Group's distributed wind farms, PV power stations, and energy storage solutions to provide green electricity to industrial parks, factories and office spaces. By 2028, Envision Group will transition to investments in renewable energy projects or green electricity direct purchase agreements, to reduce the purchase of green certificates as much as possible.
To achieve our objective of using 100% renewable energy across the regions we operate in, roadmaps will be customized to suit the unique electrical and regulatory requirements of each country.

In addition to our continuous advocacy that is driving the renewable energy sector to engage more broadly in market transactions, Envision Group will work with our partners to develop new green financing products. We are building a more convenient path for our partners to realize decent yields, invest in renewable energy assets, and gain environmental attributes.

OFFSETTING RESIDUAL EMISSIONS

As there will be some residual emission in 2022 after the aforementioned reduction measures, we will continuously seek technological development to broaden the scope for emissions reduction.
We will continuously identify and assess the best available technologies, such as through the electrification of related industrial processes. We will also work with process and production design engineers and equipment suppliers to identify areas for improvement in terms of energy management and efficiency.

Finally, we will purchase carbon offsets that are aligned with international best practices (e.g., Gold Standard or Verified Carbon Standard) for any remaining emissions.

Case #2: Envision Industrial Park in Wuxi, Jiangsu

The Envision Industrial Park in Jiangyin, Wuxi houses Envision's smart wind turbine manufacturing centres for phase 1 and phase 2, the wind turbine testing and verification centre, the smart wind turbine blade and chain drive R&D centre, and the AESC battery product engineering centre.

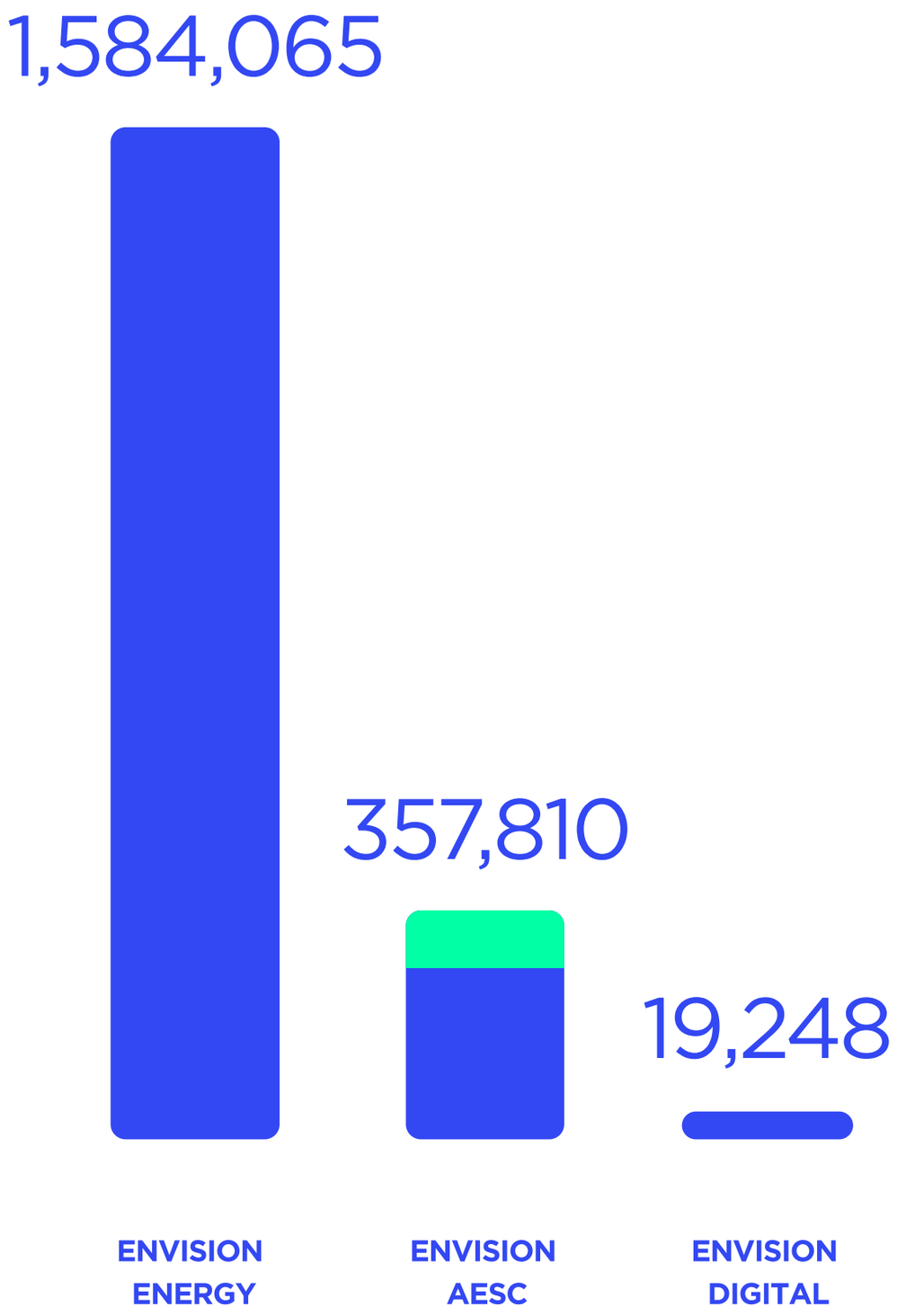
To accelerate the carbon neutrality of the industrial park, we have deployed Envision's smart energy efficiency management software and the carbon management product, Envision Ark, to digitalize and visualize the energy consumption and carbon emissions of electricity, gas, water, heat and steam. The digital solution can visualize the energy consumption of each factory, section, and piece of equipment in real-time, as well as make targeted recommendations for energy use improvement through a system diagnosis. In addition, all factories in the park are currently undergoing ISO50001:2018 energy management system certification, management review, and the 'national green factory' certification.

Within the industrial park, Envision has used its products to build distributed wind power, solar PV, energy storage and electric vehicle charging stations, and integrated them via the EnOSTM IoT operating system. Green electricity generated now meets 70% of the factories' needs while the cost has been reduced by 15%; in 2019, the park was running on 100% renewable electricity for more than half of the year. From 2021 to 2022, 6 MW of solar PV and 18 MW of wind capacity will be added for self-consumption, further increasing the share of renewable electricity consumption across the park.

Going forward, new actions will be undertaken across the industrial park to further improve the manufacturing process and energy management to minimize emissions. Actions include further optimizing the energy mix and electrifying industrial processes to replace purchased heat. We will then purchase green certificates to meet the remaining green electricity demand and offset the residual emissions by purchasing carbon credits. By the end of 2021, we expect that the park will achieve 100% renewable electricity use, followed by carbon neutrality in 2022, making it a model for carbon-neutral industrial parks in China.

Carbon Neutrality Across Value Chain by 2028

Value Chain Emission Hotspots



Over 95% of the greenhouse gas emissions related to Envision Group in 2020 came from indirect sources across our value chain*.

In alignment with the GHG Protocol, these indirect emissions from the value chain, including emissions from Envision's upstream and downstream activities, are referred to as 'Scope 3' emissions. The largest business unit contributor is Envision Energy, which accounts for 84% of the Group's Scope 3 emissions, followed by Envision AESC accounting for the rest.

ENVISION ENERGY

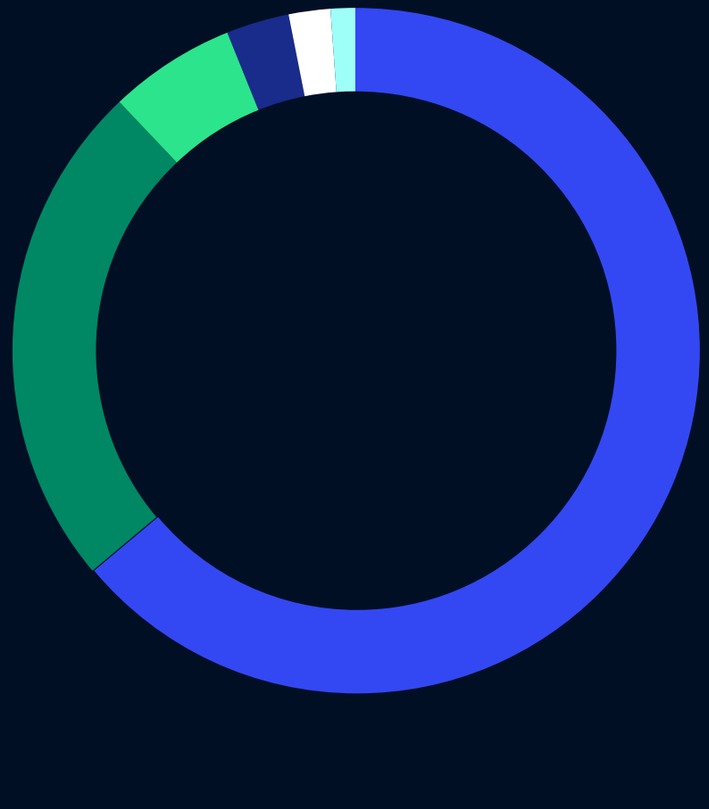
At Envision Energy, the purchase of goods and services – most of which are for manufacturing wind turbines – accounts for 64% of its Scope 3 emissions. This is followed by the transportation and distribution of Envision's products to its clients, which is estimated at 28%. Envision Energy's value chain-level carbon footprint is reflective of the nature of the business, namely, the manufacturing of heavy and material-intensive goods.

ENVISION AESC

At Envision AESC, the purchase of goods and services similarly accounts for 65% of its Scope 3 emissions. This is followed by emissions (14%) from the capital goods it owns, which are primarily buildings and machinery. Emissions at the use phase of the AESC batteries contribute 11% of the business unit's Scope 3 emissions.

ENVISION DIGITAL

At Envision Digital, emissions during the usage of products account for half of the business unit's Scope 3 emissions. This is due to the volume of electricity consumed by power devices needed within the digital system, such as edge and cloud computing. This is followed by employees' business travel at 20% and then purchased goods and services at 17%. The magnitude, however, is small compared to the other two business units.



As shown in the figure to the left, the Scope 3 emissions are concentrated in two categories: the purchase of goods and services (64%) and upstream transportation and distribution (24%). Additionally, capital goods, business travel, and the use of sold products will also contribute considerable volumes of emissions. Going forward, we will target these hotspots for action. We will also improve our data availability to measure the value chain footprint more comprehensively and accurately.

* The hotspot analysis on Scope 3 emissions relies primarily on financial spending data. In the future, we will focus on collecting more accurate and detailed data to enable a more comprehensive measurement of the Scope 3 emissions.

Our Actions & Commitments

To reduce emissions across our value chain, we will take a two-pronged approach: focusing internally on product optimisation and externally on supplier engagement.

Internally, we will refine product design to improve energy performance and reduce emissions from product usage. We will also source lower-carbon production materials, including recycled or regenerative materials where possible, for products like our wind turbine blades. Externally, we will help our supplier partners explore energy-efficient opportunities and support their journey towards net zero using Envision's solutions, reducing the carbon footprints of their manufacturing operations over time.

We will set science-based targets aligned with the Paris Climate Agreement and submit our commitment to the Science Based Targets initiative (SBTi).

Through climate actions across our operations and value chain, we will set ourselves on the path toward achieving value chain-level carbon neutrality by 2028. As the global response to climate change requires large-scale application of green technologies to reach net zero globally around 2050, Envision's business will continue to grow as we provide more smart wind turbines, smart energy storage, power batteries, and smart IoT technologies and solutions. We will work closely with our partners up and down the value chain to realize a low-carbon transformation.

Impact

Net Zero Technology

As a green technology company, Envision is not only focused on reducing its own emissions. We are committed to becoming the world's leading net zero technology partner for enterprises, governments, and institutions, equipping them with the technology and expertise to move the world towards a smarter clean energy system.

Through smart wind turbine products, Envision powers millions of households and factories with clean energy. With our smart IoT solutions, Envision helps customers realise intelligent control, efficient operations, and carbon reduction. By providing batteries, energy storage, and charging services, Envision makes green mobility possible.

Making green electricity more affordable, accessible, and smart

Since 2008, more than 12,500 wind turbines designed and manufactured by Envision Energy have been installed globally. The cumulative output of clean electricity has reached over 150,000 GWh, which exceeds Beijing's electricity consumption in 2020.

The clean electricity generated has helped prevent the use of 18 million metric tonnes of coal and reduced emissions by 100 million metric tonnes of carbon dioxide equivalent (tCO2e). Beyond our main market in China, our wind turbines have also been sold to countries such as Argentina, France, India, Kazakhstan, Mexico, Montenegro, India, and Vietnam, supporting the global transition to clean energy.

As 98% of the wind turbines were installed in China in 2020, we applied China's average grid emission factor for all the electricity generated with Envision's turbine to calculate the avoided emissions.

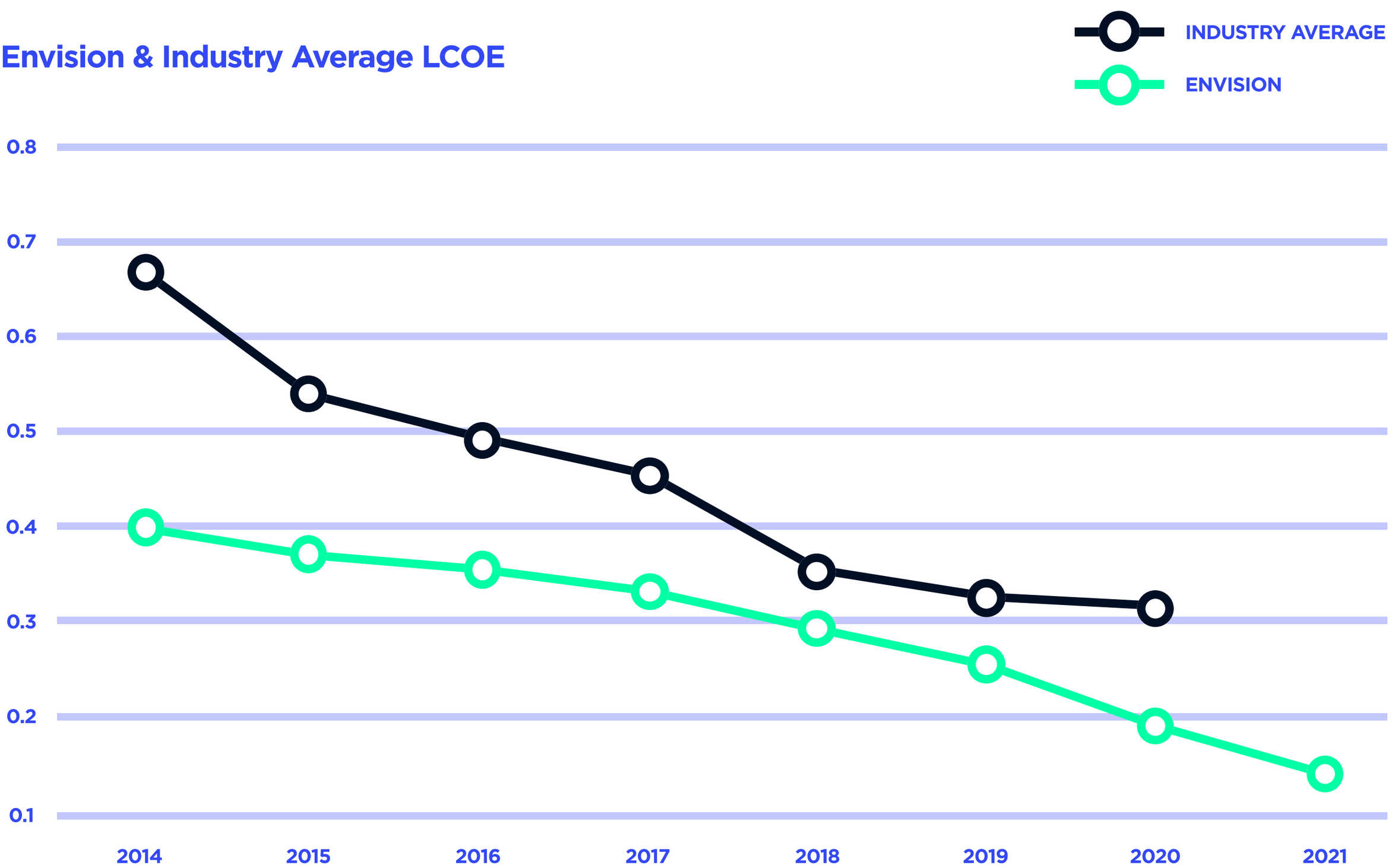
Through technological innovation, Envision Energy is continually driving down the cost of renewable electricity, while expanding access to it and improving overall efficiency.

In China, for example, roughly 60% of the wind resources are in low wind speed areas. In order to maximise the utilisation of low-speed wind as an energy source, Envision Energy designed the world's first smart wind turbine to cater to these local conditions. Separately, Envision's strong digital capabilities power the performance of smart wind farms built with Envision solutions, increasing the volume of energy captured by an average of 15%. Such digital solutions have helped bring down customers' costs for construction, management, and maintenance.

Envision Group is striving to reduce the costs of renewable energy generation and clean energy systems.

Envision Group develops, manufactures and tests core parts of the smart energy storage system, including the cells, battery management system (BMS), power conversion system (PCS) and energy management system (EMS). Over 100 smart energy storage projects are currently in operation globally, and it is estimated that around 2 million KWh of smart energy storage projects will be delivered to our global clients by the end of 2021.

Envision & Industry Average LCOE



Based on Envision's technology, we predict that by 2023 the LCOE of wind power and power-generation-end energy storage power in China's northern regions can drop to 0.1 CNY. This means that the LCOE of stable green electricity generated by "wind/PV+energy storage" will be reduced to 0.2 CNY.

Building the Envision Net Zero Industrial Park

Achieving net zero is not only an energy revolution, but also a new industrial revolution with the potential to make a lasting global impact. It is a historic opportunity for China to shift its growth path and become a global leader in sustainability. Net zero industrial parks will be key to the green revolution.

With our innovative software and hardware products, Envision Group is fully committed to improving the cost competitiveness of renewable energy. In regions with abundant wind and solar resources, we will build the "Envision Net-Zero Industrial Park", which will utilize products and services such as smart wind turbines, smart energy storage, and hydrogen power to optimize operations for the parks.

Using the EnOS™ smart AIoT operating systems, Envision Group will equip industrial parks with an integrated system that combines wind power, solar power, energy storage and hydrogen energy. Coordinated by Envision's Ark Carbon Management System and Enweather, the green industrial parks can be efficiently powered by green electricity. This will attract high energy consumption industries such as data centers, electrolytic aluminum factories and cell manufacturers to form industry clusters. Envision Group's green industrial park solution is designed to ensure that economic growth will not be compromised by decarbonization requirements.

Currently, the price of green hydrogen produced with low-cost green electricity is becoming competitive with gray hydrogen produced with coal. In the future, green hydrogen chemical engineering can be applied to metal smelting, as well as the coal and biosynthesis industries.

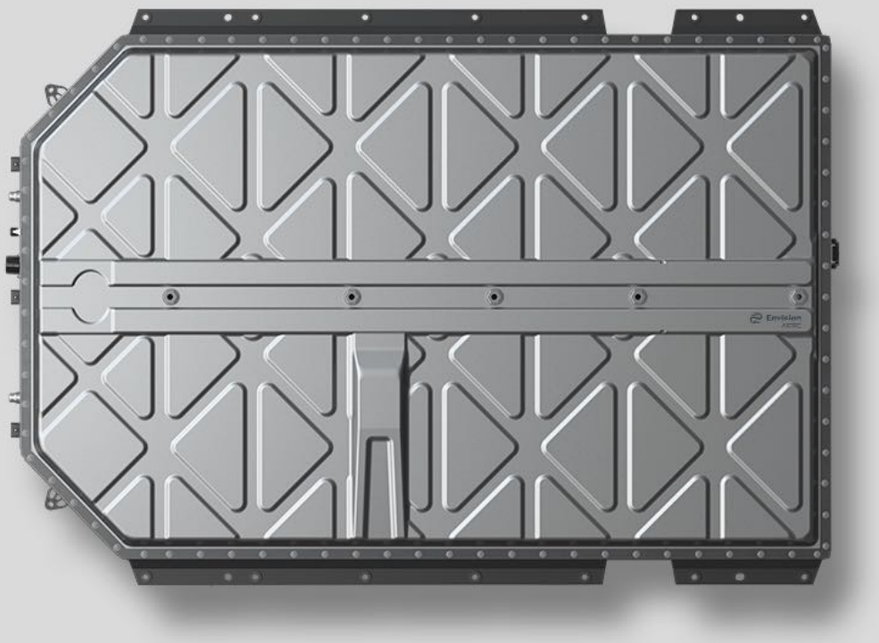
Accelerating green transpor with safe batteries and smart charging products

A carbon neutral future demands a sustainable transportation system, and electric vehicles are proving to be the key drivers.

As batteries replace traditional fossil fuels (e.g. petroleum, diesel) to power vehicles, tailpipe emissions – which may account for as high as 64% of the lifecycle carbon emissions of a conventional internal combustion engine (ICE) vehicle – can be brought to an absolute zero.

Envision AESC prides itself in developing world-class lithium-ion batteries for over a decade and powering nearly 600,000 electric vehicles worldwide.

Envision AESC marries the technical excellence of its products with state-of-the-art IoT technologies. With over 450,000 traceable data points per battery pack, Envision AESC develops solutions to optimise the management of its batteries throughout the life cycle – the powerful data analytics enable the circular use of batteries as they retire from primary application in automobiles. By accurately measuring AESC batteries' reliability and longevity, Envision swiftly turns used batteries into power storage units that can further enable the optimisation of power usage among commercial entities, industries, and even households.



Each AESC battery-powered electric vehicle is expected to cut emissions by 1.1tCO2e annually on average when compared to a conventional ICE vehicle.

This translates to a 54% reduction in emissions across all markets where our batteries are sold. As countries decarbonise their grids more aggressively, the emissions from AESC battery-powered electric vehicles – both in terms of the manufacturing-related and use-phase emissions (by way of electricity consumption) – can be expected to continue decreasing. Additionally, our Group-level carbon neutrality roadmap will help Envision AESC significantly reduce emissions generated from its manufacturing processes, thus further reducing the carbon footprint. In short, not only does Envision AESC manufacture batteries that power vehicles of the future, but it also leads the way in greening battery manufacturing and bringing low-carbon approaches into the mobility industry.

Beyond passenger cars, there is also a great potential in the electrification of vehicles in the heavy trucking industry.

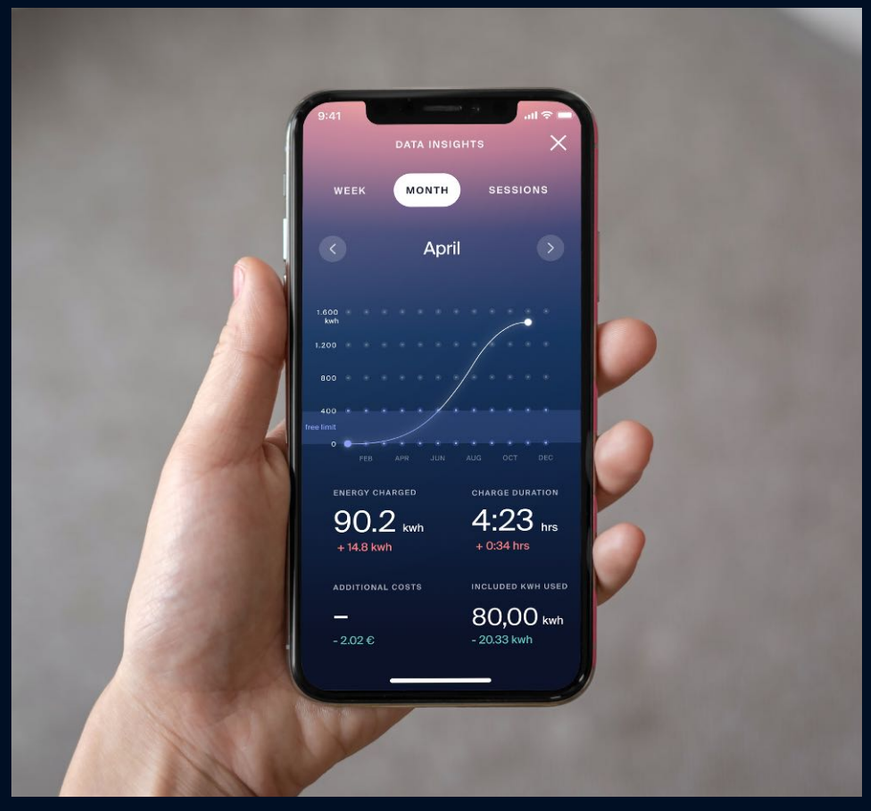
In Ordos, Inner Mongolia, Envision is providing electrification solutions for over 100,000 heavy duty trucks, which will transform the local fuel stations into power charging and storage centres. The electrification of heavy trucks is expected to not only cut emissions by 30 million tCO2e but also introduce high-end equipment manufacturing technology and talent to Erdos.

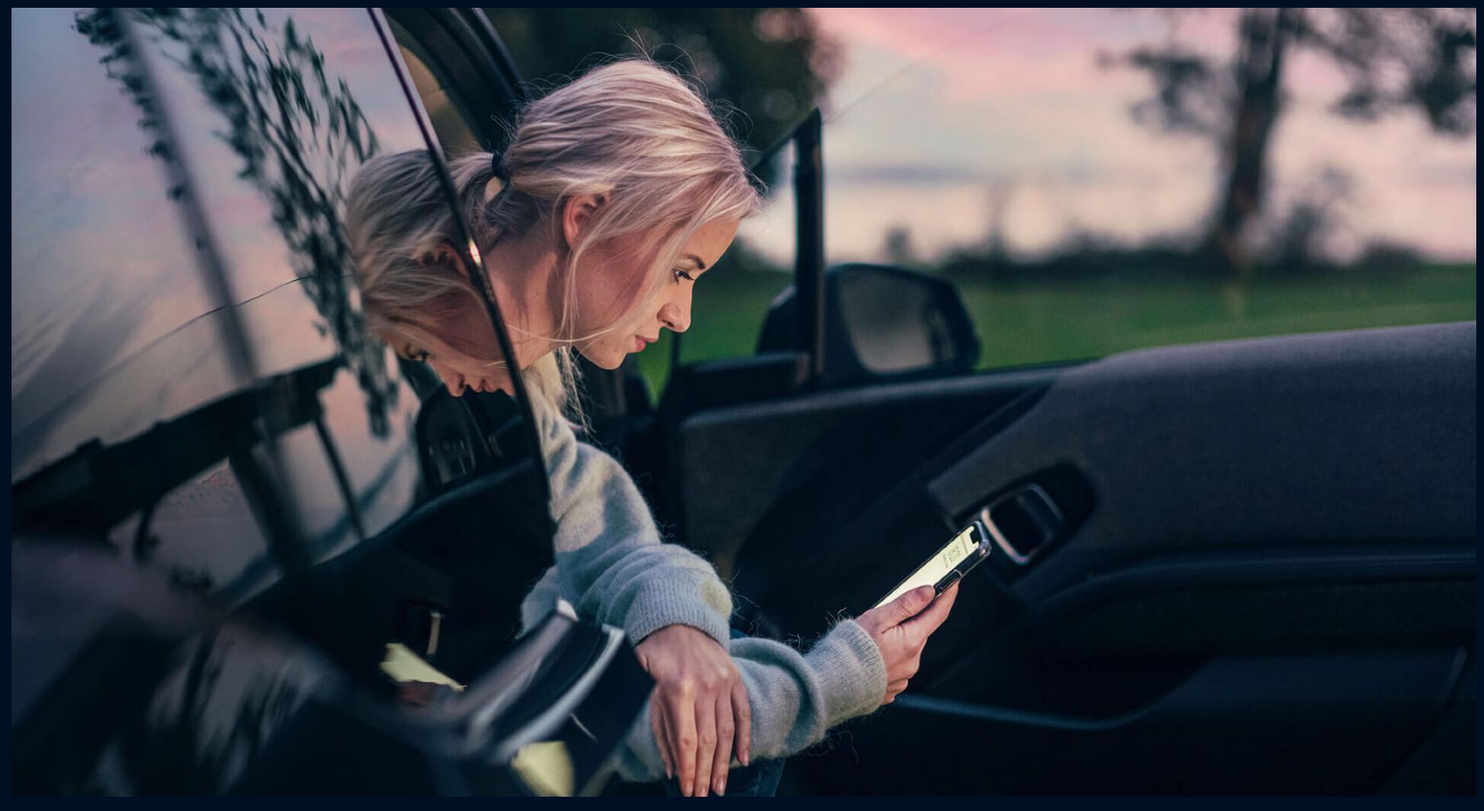
Case #3: Creating a 100% green smart charging solution in Germany

As a major market for electric vehicles, Germany registered 194,163 new electric vehicles (EV) in 2020, reflecting a year-on-year increase of 206.8%. As a result, the need for charging infrastructure for the growing number of EVs has become a pressing concern for Germany. Up to 50% of local respondents expressed serious concerns about the availability of charging.[4]

Envision Digital has formed a strategic partnership with Deutsche Telekom, one of the largest telecommunications operators in Europe, to offer German EV drivers a smart charging solution. Envision Digital's all-in-one package is called Charging by EnOS™ and combines all relevant components such as hardware, installation services, as well as an electricity tariff with 100% green energy.

Envision Group's EnOS™ connects and manages over 200GW of renewable energy assets globally. This access to renewable energy sources helps to achieve a 100% green transportation system. It is estimated that every electric vehicle that uses Envision's smart charging solutions will reduce its emissions by the equivalent of 2,400 kg of carbon dioxide per year.





Driving Decarbonisation through Digitisation

The digitisation of energy systems holds significant potential in enabling the shift towards a low-carbon economy.

In an energy system of the future, the smart IoT will serve as the 'new grid' to coordinate the use of distributed renewable energy.

In a traditional energy system, the value chain is concentrated in power generation, the infrastructure is inflexible, and the energy transmission is linear. With IoT-based technologies, Envision's smart grids break away from this tradition and provide a customer-centred, renewables-powered solution. To date, EnOSTM has helped manage over 200 GW of energy assets and connected over 100 million sensors and smart devices globally; it now processes more than 70 billion energy transactions on a daily basis.

Envision Digital is currently working closely with world-leading enterprises, institutions, as well as governments to design and implement the digital transformation of their energy systems.

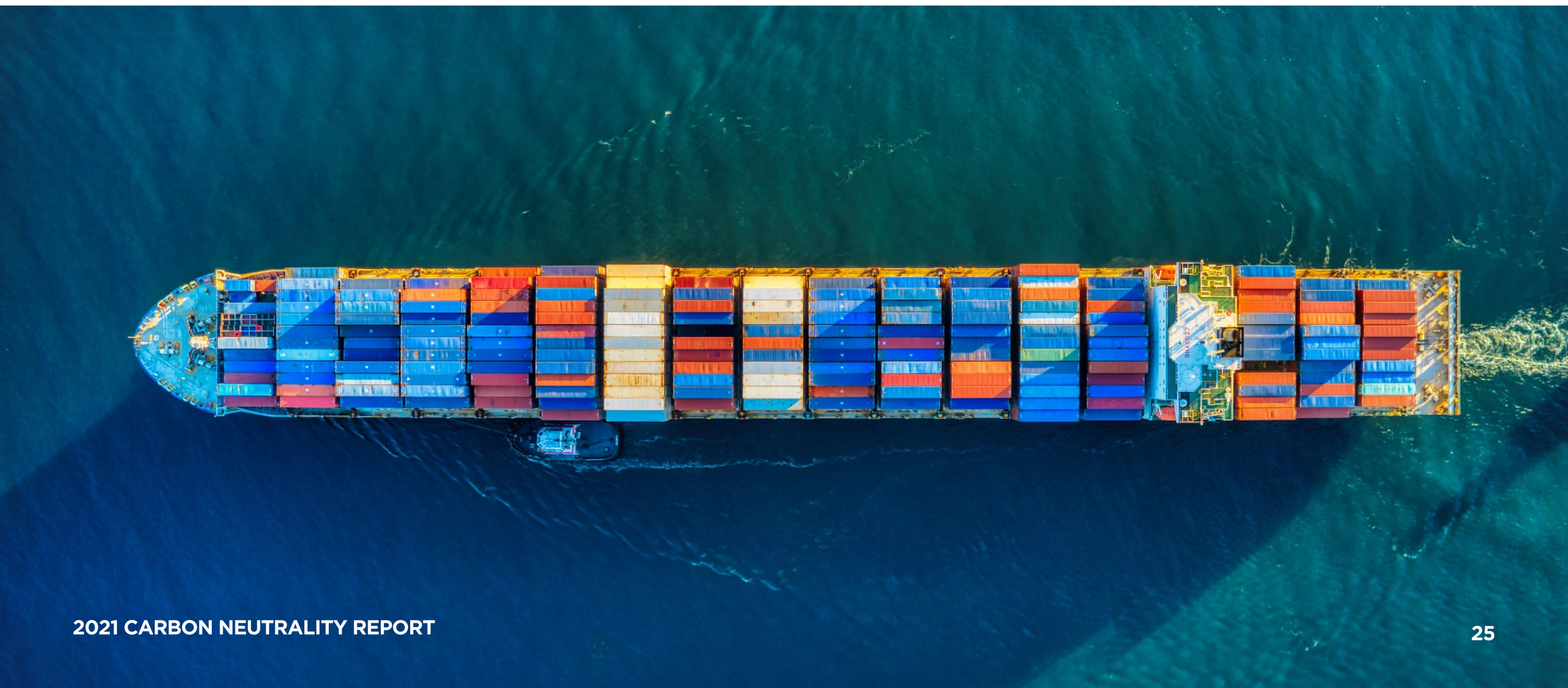
Case #4: Helping PSA Singapore become the world's first 'net zero' superport

Envision is working with PSA Singapore to help the Singapore port become the world's 'net zero superport'. Based on the EnOS™ platform, Envision has customised five smart energy applications for PSA: micro-grid control, energy efficiency management, virtual power plant (VPP), power trading, and green certificate trading.

Envision's micro-grid solution will optimise the port's coordination among distributed solar PV, energy storage units, and load-side devices. Meanwhile, the energy efficiency management solution will reduce energy costs per container by 20%; in the future, the solution can be easily connected to the port's smart grid management system.

The VPP solution aggregates distributed energy and flexible loads, turning equipment such as PV, energy storage units, and automated guided vehicles' batteries into virtual trading units. These units participate in PSA's ongoing cross-port virtual trading scheme and provides flexible capacity to the Singapore electricity market.

In addition, Envision will help PSA to source for Renewable Energy Certificate, certified by APX, in order to offset PSA's carbon emission and reach its goal of 100% renewable energy as soon as possible.



Case #5: Microsoft's sustainability partner

Envision Group provides comprehensive energy services and smart building solutions to Microsoft's six office spaces in mainland China, HKSAR and China's Taiwan. Envision hopes to assist Microsoft to achieve its net-zero goals in its Greater China operations.

Based on the EnOS™, Envision Group has provided many solutions including distributed power storage stations, rooftop distributed PV power stations, smart EV charging stations and the human body environment comfort level monitoring system. The EnOS™ system also enables the smart coordination of various systems within the industrial parks, such as the building automatic management system, solar power generation system and indoor environment quality sensors. By analyzing the data, the system can improve the overall energy efficiency of industrial parks to reduce carbon emissions.

Envision Group has also designed a building power storage solution for Microsoft. The system can effectively achieve a stable power supply for buildings, with the help of EnLight™ software that can optimize peak low power storage. The system has helped generate over 250,000 USD of profits. The PV power stations can generate a total of 220MWh green electricity in one year, reducing 219 tons of carbon dioxide emissions. In addition, Envision Group has helped Microsoft design a green power charging service, allowing EVs in the industrial parks to recharge using green electricity.

As governments and companies pledge carbon neutrality goals to combat climate change, significant technological support is needed to enable the net zero industrial ecosystem of the future. Envision Digital has long been a trusted net zero technology partner in supporting clients' digital transformation journeys to reach their decarbonisation ambitions, and we will continuously amplify our impact to build a strong digital foundation for industries moving toward net zero.

5%

INCREASE IN BUILDING ENERGY EFFICIENCY / YEAR

-80%

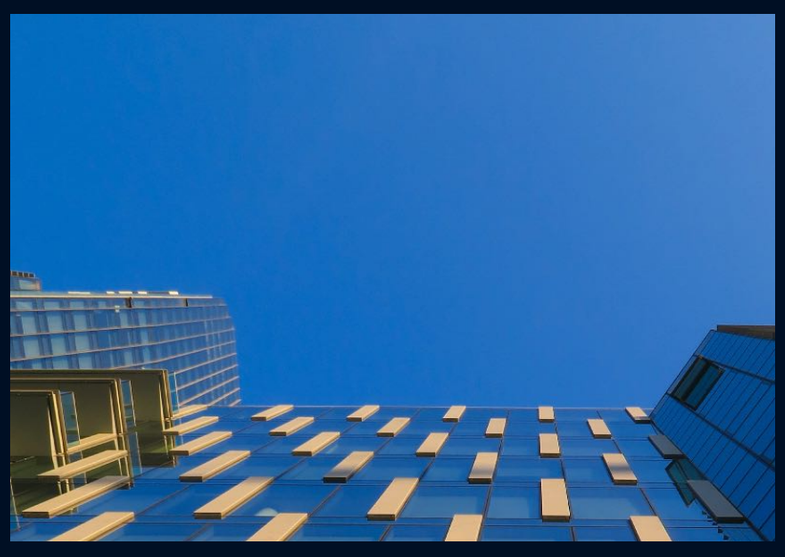
DECREASE IN DISSATISFACTION WITH HEATING AND COOLING

-219t

REDUCED CARBON EMISSIONS / YEAR

2.07

MWH DISTRIBUTED ENERGY STORAGE



1000+

1000+ SMART ELECTRICITY METERS & IEQ SENSORS

258,000

SQM OF FLOOR AREA CONNECTED

20+

SMART EV CHARGING PILES

2,800

SQM OF ROOFTOP PV POWER STATIONS

Endnote

Since the founding of the Envision Group in 2007, we have been committed to solving the challenges of building a sustainable future. As a green energy leader and net zero technology partner, we will inspire and drive global sustainable development through our efforts in the coming years.

The next decade will be a critical period for the world to address climate change. As China and other major economies commit to achieving carbon neutrality by the middle of the century, Envision is releasing its first carbon neutrality report to demonstrate our commitment to supporting these efforts. By working to achieve carbon neutrality throughout our own operations and value chain within this decade, we hope to demonstrate our full confidence in our clean technology solutions to our partners, industries, and society as a whole.

As a green technology company, we consider this carbon neutrality goal to be both a great challenge and a great opportunity. The energy revolution, the industrial revolution, and the digital revolution have advanced humanity and elevated global prosperity. The upcoming green energy revolution will be even more transformative. At Envision, we believe that we are just getting started.

Appendix A: Envision Group's Environmental Data

TABLE 1: ENVISION GROUP'S GREENHOUSE GAS EMISSIONS IN 2020 (TCO2E)	ENVISION ENERGY	ENVISION AESC	ENVISION DIGITAL	ENVISION VIRGIN RACING
SCOPE 1				
Stationary combustion	861	3,300	–	4
Fleet vehicles	328	7	–	–
SCOPE 2 (LOCATION-BASED)				
Electricity	10,214	69,525	574	18
Steam and heat	628	11,819	–	–
SCOPE 2 (MARKET-BASED)				
Electricity	7,691	57,079	554	25
Steam and heat	628	11,819	–	–
SCOPE 3				
Purchased goods and services	1,008,735	178,098	3,114	–
Upstream transportation and distribution	434,286	7,245	8	–
Others	129,014	87,817	15,552	381
TOTAL EMISSIONS FROM SCOPE 1, 2, AND 3 (LOCATION-BASED)	1,584,065	357,810	19,248	402
TOTAL EMISSIONS FROM SCOPE 1, 2, AND 3 (MARKET-BASED)	1,581,543	345,365	19,228	409

TABLE 2: ENVISION GROUP'S ENERGY USE IN 2020	UNIT	ENVISION ENERGY	ENVISION AESC	ENVISION DIGITAL	ENVISION VIRGIN RACING
FACILITIES ENERGY USE					
Electricity	kWh	16,864,709	152,640,429	1,196,802	75,943
Steam and heat	kWh	1,622,820	67,153,309	–	–
Natural gas	m^3	415,061	1,630,754	–	1,868
Diesel	litres	56,551	1,322	–	–
Petrol	litres	84,718	517	–	–
Liquified natural gas (LNG)	kg	8,460	–	–	–
Liquified petroleum gas (LPG)	kg	–	972	–	–
LOW CARBON ELECTRICITY					
Low carbon energy use	kWh	4,258,676	17,897,027	81,920	4,531
% Low carbon energy	%	25%	12%	7%	6%

1.Envision Virgin Racing has been certified by the Carbon Trust as carbon neutral for 2020. Its emissions disclosed in Appendix A have been offset through measures recognized by the Carbon Trust.
2.The 2019/2020 reporting period for Envision Virgin Racing covers October 1st 2019 to September 30th 2020, which aligns with Formula E season six. It differs from other business units who follow the calendar year.
3.Emissions from refrigerants have been excluded in the footprinting since the data was not available across all sites. We will collect relevant data more systematically in the following footprinting exercises.
4.Scope 3 carbon footprint for 2020 was based on a hotspot analysis that relies primarily on spend data. Due to data unavailability, several categories of carbon emissions were not accounted for. As we are committed to accuracy and transparency, we will revisit our methodology and engage our suppliers for more accurate data in future years to develop full value chain modelling and hold ourselves to higher accountability standards.
5.Due to rounding, the total emissions reported do not necessarily equal the sum of the disclosed items above.
6.Envision AESC's facility in the UK has procured the nuclear-based electricity product 'Blue for Business 100%'.

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Appendix B: Carbon Footprint Boundary and Modelling Methodology

The boundary setting and footprinting of Envision Group's carbon emissions have been conducted under the advisory of the Carbon Trust, whose methodology is closely aligned with the internationally recognised GHG Protocol. We have adopted the recommended methodology as permitted by our data availability.

ORGANISATIONAL BOUNDARY

The organisational boundary defines the businesses and operations that constitute the company for the purpose of accounting and reporting greenhouse gas emissions. Companies can choose to report either the emissions from operations over which they have financial or operational control (the control approach) or from operations according to their share of equity in the operation (the equity share approach). Envision's carbon footprint uses the operational control approach. As such, it includes the Group's four business units: Envision Energy, Envision AESC, Envision Digital, and Envision Virgin Racing.

OPERATIONAL BOUNDARY

Defining the operational boundary involves identifying emissions associated with certain operations and categorising them as either direct or indirect emissions. The following definitions are used:

DIRECT GHG EMISSIONS

- **Scope 1:** Emissions from sources that are owned or controlled by the reporting entity (i.e. any owned or controlled activities that release emissions directly into the atmosphere).

INDIRECT GHG EMISSIONS:

Indirect emissions result from an organisation's activities but are from sources that are owned or controlled by another entity. These are classified as:

- **Scope 2:** Indirect GHG emissions from the consumption of purchased electricity, heat, steam or cooling.
- **Scope 3:** Indirect GHG emissions from other activities. A detailed Corporate Value Chain (Scope 3) Standard, as outlined per the GHG Protocol, exists that sets out the rules for 15 categories of Scope 3 emissions.

The operational boundary for Envision's carbon footprint report includes the following, as indicated in blue on page 30):

- **Scope 1:** Company facilities and company owned vehicles.
- **Scope 2:** Purchased electricity and steam for own use.
- **Scope 3:** Purchased goods and services, capital goods, upstream transport and distribution, fuel and energy related activities, waste generated in operations, business travel, employee commuting, downstream transportation and distribution, use of sold products and end of life treatment. Several categories have been excluded from the hotspot analysis for reasons outlined in Table 3.

TABLE 3: OVERVIEW OF EXCLUDED EMISSION CATEGORIES FOR SCOPE 3 EMISSIONS FOOTPRINTING IN 2020*

EMISSION CATEGORY	EXCLUSION STATEMENT
Cat10: Processing of sold products	The category is not applicable to Envision Digital. As to Envision Energy and Envision ASEC, the category is assessed as immaterial.
Cat 13: Downstream leased assets	The category is assessed as immaterial based on the historical data of 2019.
Cat 14: Franchises	No franchise activity was reported across Envision Group, and therefore this category is not applicable.
Cat 15: Investments	Data unavailable at the time of footprinting

In pursuit of continual improvement, Envision will review the footprint boundary annually and continue to explore opportunities (such as the inclusion of emissions from the investment portfolio) to expand its reporting scope.

The Carbon Trust did not verify the authenticity and accuracy of Envision's activity data (such as energy use) for the carbon footprint calculation.

* Due to the unavailability of data on Envision AESC batteries' end-of-life treatment, the related emissions were not accounted for.

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Overview of Envision Group's Emission Categories

REPORTING PERIOD COVERED

For Envision Energy, Envision AESC, and Envision Digital, the reporting period for 2020 covers 1 January 2020 to 31 December 2020.

Separately for Envision Virgin Racing, the reporting period is 1 October 2019 to 30 September 2020 for 2019/2020 to align with the time period of Formula E racing season 6.

The inconsistency of reporting periods covered across business units is due to the fact that the carbon footprinting of Envision Virgin Racing was conducted separately.

MODELLING METHODOLOGY

The GHG Protocol is recognised as the most widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas emissions. The carbon footprint calculation has been structured in alignment with the GHG Protocol with emissions grouped under each scope. In details:

- A Corporate Accounting and Reporting Standard
- Corporate Value Chain (Scope 3) Accounting and Reporting Standard

The carbon footprint has been built up from numerous data sources, of varying detail and quality, with a specific calculation methodology applied to each. The Carbon Trust as our technical advisor supported Envision in identifying the relevant GHG emissions sources and calculated emissions from each source for each Business Unit. This was aggregated to the corporate level for Envision's total carbon footprint. It should be noted that the footprinting of Scope 3 emissions is based on a hotspot analysis, which relies primarily on financial spend data instead of more primary data. We are working toward collecting primary data to support future Scope 3 carbon footprinting that will yield more accurate and comprehensive results.

TABLE 4: VALUE CHAIN FOOTPRINT CATEGORIES AND METHODOLOGY

EMISSION SCOPE	EMISSION SOURCE	METHODOLOGY
SCOPE 1	Natural Gas	Calculated using fuel consumption and relevant emission factors
	Owned vehicles	Calculated using fuel consumption and relevant emission factors
SCOPE 2	Purchased electricity, steam and heat	Calculated using purchased electricity, steam and heat to multiple with the relevant emission factors
SCOPE 3	Category 1: Purchased Goods & Services Category 2: Capital Goods Category 4: Upstream Transportation & Distribution Category 5: Waste Generated in Operations Category 6: Business Travel Category 8: Upstream leased assets	Calculated by taking financial spend multiplied with EEIO emission factors
	Category 3: Fuel and Energy related activities	Calculated using fuel and energy consumption data
	Category 7: Employee commuting	Calculated using number of employees per country
	Category 9: Downstream Transportation & Distribution	Estimated based on financial spend of transportation and distribution from Envision to clients
	Cat 11: Use of sold product	Calculated by product sales volumes multiplied with emissions per unit for each product
	Cat 12: End of life treatment	Calculated by product sales volumes multiplied with waste treatment emissions per unit for each product

EMISSION SOURCES AND ACTIVITY DATA

Activity data is a quantitative measure of activity that results in GHG emissions. For scope 1&2, it is mainly primary data (e.g. the amount of natural gas used or the electricity purchased and consumed). For scope 3, we started with a hotspot analysis, mainly using the financial spend data to estimate the emissions and identify the most significant categories. Looking forward, Envision will explore more quantitative data for the most significant categories to develop a more detailed value chain footprint.

EMISSION FACTORS

Emission factors are calculated ratios relating GHG emissions to a measure of activity at an emissions source. They are used to convert activity data to carbon emissions. The internationally recognised databases and government-issued emission factors are used. Table 5 provides an overview of the main emission factor sources used for modelling Envision's carbon footprint.

TABLE 5: OVERVIEW OF THE ACTIVITY DATA AND EMISSION FACTORS

EMISSION SCOPE	EMISSION SOURCE	ACTIVITY DATA TYPE	SOURCE OF EMISSION FACTORS
SCOPE 1	Natural Gas	Volume of natural gas consumed	• BEIS 2020
	Owned vehicles	Volume of fuel consumed for mobile combustion	
SCOPE 2	Purchased electricity	Volume of electricity consumed	• IEA 2020 • European Residual Mixes 2019 • 2020 Green-e® Residual Mix Emission Rates • BEIS Fuel Mix Disclosure Data Table • Emission factors from specific electricity suppliers of Envision
	Purchased steam and heat	Volume of steam and heat consumed	• Japan: Tokyo Gas • China: China NDRC GHG Accounting and Reporting Guideline (Other Industry), • BEIS CHPQA
SCOPE 3	Category 1: Purchased Goods & Services	Financial spend data	• Carbon Trust modified Open EEIO data
	Category 2: Capital Goods		
	Category 4: Upstream Transportation & Distribution		
	Category 5: Waste Generated in Operations		
	Category 6: Business Travel		
	Category 8: Upstream leased assets		
	Category 3: Fuel and Energy related activities	Volume of fuel/energy consumed	• BEIS 2020
	Category 7: Employee commuting	Number of employees by country	• BEIS 2020
	Category 9: Downstream Transportation & Distribution	Estimated spend data	• Carbon Trust modified Open EEIO data
	Cat 11: Use of sold product	Amount of sold products	• IEA 2020
	Cat 12: End of life treatment	Amount of sold products	• BEIS 2020

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