






STEERING TRANSITIONS

2021 SUSTAINABILITY REPORT

TNO innovation
for life

TNO.NL

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PREFACE

TNO connects people and knowledge to create innovations that boost companies' competitiveness and that sustainably increase wellbeing across society. We are the largest non-profit institution for applied research in the Netherlands. Our employees use their expertise to improve society through innovations and partnerships – hence our motto: 'Innovation for life'. TNO is proud to be part of the growing international community that strives for sustainability. Last year, we submitted our first Communication on Progress report as part of our participation in the United Nations Global Compact. We hereby declare our continued support for the United Nations (UN) Global Compact and its principles, as well as our commitment to the UN Sustainable Development Goals. In the coming years, we will further embed the 10 principles of the UN Global Compact in our organisation in a process of continual improvement. We have designated 'social responsibility' as one of the cornerstones of our new 2022–2025 TNO Strategy.



Paul de Krom, CEO

INTRODUCTION

With the Corporate Social Responsibility policy adopted in 2020, TNO has laid the foundation for its ambitions in the area of social responsibility in its operations. TNO aims to make its operations climate neutral by 2040, takes its supply chain responsibility towards its suppliers and customers, and commits to the 10 principles of the UN Global Compact regarding socially responsible business practices.

When it comes to sustainability, the world did not stand still in 2021. The impact of climate change is felt on multiple fronts, and citizens and governments are increasingly challenging companies on their responsibilities. The European Commission is working on new legislation (the Corporate Sustainability Reporting Directive) that will raise awareness and set more stringent reporting requirements to compel companies to gear their business practices more specifically towards the climate targets. A high-profile civil suit brought by an environmental organisation against a multinational company led to more stringent sustainability requirements for business operations and a best-efforts obligation for supply chain partners (customers and suppliers).

TNO feels responsible for its fair share in the area of sustainable business practices. The new TNO strategy for the 2022-2025 period sets 'social responsibility' as one of the priorities. Partners and customers are calling on TNO to help shape the major transitions towards a sustainable society. TNO does exactly that not only through its mission as an institution for research and innovation, but also internally through its own operations, based on the principle of practising what we preach.

In 2021, further steps were taken in the 'Energy & Sustainability' and 'Supply chain responsibility' domains.

TNO has, for example, explored ways to achieve climate neutrality by 2040, the outcome of which will be captured in a roadmap with milestones. Efforts to decarbonise TNO's property also continued as we installed solar modules on various of our buildings. Another key step is the adoption of a new sustainable mobility policy. This new policy reimburses employees in full for travel on public transport, accelerates the electrification of TNO's fleet of leased cars, implements charges for emissions from air travel, and makes it compulsory to use the train for distances up to 700km. In the area of supply chain responsibility, socially responsible procurement practices have been reinforced by tightening the sustainability requirements for certain procurement categories. In 2021, TNO has also started implementing the Business Relationship Due Diligence process to support well-considered decision making with respect to what business relationships to enter into, which extends to customers, partners, and joint projects. These steps were communicated to TNO employees through a sustainability campaign, which also provided scope for feedback and comments in the form of interactive sessions and on social media.

In this second year of the Covid-19 pandemic, TNO was again committed to ensuring 'a safe, healthy and connected way of working.' Concrete steps were also taken with respect to diversity and inclusive employment practices (see also the section entitled 'Working conditions'). What continues to be a cause for concern, however, is the high rate of burnout-related symptoms among employees that emerged from the annual employee engagement survey in 2021. Finally, we feel it is significant that the international community is increasingly finding its way to TNO's publications: use of the open-access repository rose further in 2021, when it was consulted nearly 1.6 million times.

› AMBITION

TNO is the largest independent research organisation in the Netherlands. It makes innovations applicable to our society. TNO is aware that its credibility and its social licence to operate depend on how it fulfils its role, assumes its responsibilities and, in keeping with these, organises its operations. For society at large rightly expects TNO to make recommendations on the basis of its expertise and to practice what it preaches. The Corporate Social Responsibility (CSR) policy, derived from the TNO strategy, serves as the guiding principle.



STRATEGY

Since 2008, TNO has structurally embedded CSR within its organisation in an approach based on continual improvement. The new TNO strategy for 2022–2025 was adopted in 2021. Sustainable operations is one of the foundations for reaching the strategic goals. ‘Social responsibility’ occupies a central place within that foundation, as do compliance and a focus on health, safety and the environment (see table below). The CSR priorities are thus strongly linked to TNO’s strategic goals. Priorities are set in accordance with the ‘practice what we preach’ principle:

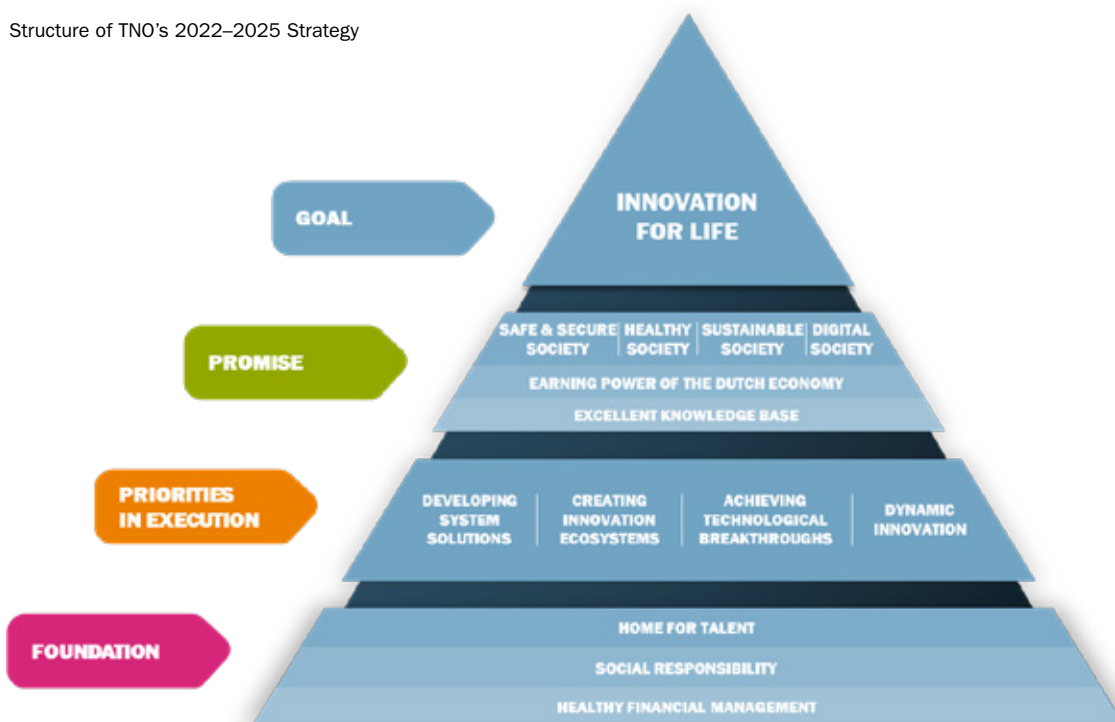
TNO's own expertise and the associated way of working also serve as guiding principles within TNO's overall operations. Based on these principles, two KPIs for CSR have been defined that will be monitored at overall company level: 1) the carbon footprint (see the 'Energy & Sustainability' section) and 2) TNO's rating on the EcoVadis assessment scale (see separate box).

ECOVADIS RATING

EcoVadis is an agency that rates companies' sustainability performance on a rating scale of four sustainability themes (environment, labour & human rights, ethics, and sustainable procurement). The maximum score on each theme is 100 and the overall rating is the average of the scores on the four themes. The rating is determined by answers to a questionnaire, supported by documentation on policy and other matters provided by the company that is being assessed. This documentation is inspected and assessed by international experts.

In its most recent update (December 2020), TNO's average score across the four themes was 38 out of 100, slightly below the 'Scientific research and development' industry average of 44. Especially when it comes sustainable procurement, there is room for improvement. Recent measures presented in this report will be reflected in the next rating update. Our aim is to gradually improve our rating over the coming years and ultimately make it into the top 50% of companies assessed by the end of the 2025 strategy period, which will require us to achieve a rating of at least 50.

Structure of TNO's 2022–2025 Strategy



CSR POLICY

The five key points of TNO's Corporate Social Responsibility policy are the following:

- TNO aims for climate-neutral operations by 2040.
- TNO is committed to the international framework of the UN Global Compact, and endorses the 10 principles of ethical and sustainable business practices (see box).
- TNO recognises its supply chain responsibility with respect to both suppliers and customers.
- In its operations, TNO focuses on the following themes: integrity, energy and sustainability, diversity and inclusion, and working conditions.
- TNO intends to include the CSR priorities in the annual plans of the relevant departments.

In terms of content, this policy has various levels of ambition. TNO has chosen focus areas where it wants to distinguish itself in terms of sustainable operations. This is done through an incremental improvement cycle (similar to Plan-Do-Check-Act) to decide on meaningful steps, carry them out and adjust them where necessary. The focal point for 2022 will be the preparation of an integrated plan for the various departments on what contributions they will make to achieving climate neutrality by 2040, including attainable milestones.

TNO INTERNATIONAL

Research and innovation do not stop at national borders. TNO can strengthen the knowledge base in the Netherlands only by working closely with leading international knowledge partners, companies and public authorities. TNO does so increasingly on a European scale, but also globally. Knowledge that TNO develops for and gains at or with international partners benefits Dutch industry and helps solve societal issues in the Netherlands.

In line with this policy, TNO joined the UN Global Compact (UNGC) and is committed to the 10 universal principles of ethical and sustainable business practices. Implementation of these principles affects many aspects of TNO's operations, such as customer and supplier acceptance, working conditions and sustainability. Every year TNO confirms its continued support for these principles and submits a Communication on Progress, i.e. this sustainability report, in which it reports on the progress it has made in the measures it is implementing.

The report focuses, among other things, on the core areas of the UN Global Compact: human rights, labour, the environment and anti-corruption. The present report links these core areas to TNO's CSR focus areas. The box on the right shows the 10 CSR priorities that TNO has chosen in working out these focus areas.

As this policy is carried out, it will further embed CSR in the organisation. [Appendix 1](#) sets out how TNO does this. The present Sustainability Reporting Standards of the Global Reporting Initiative (GRI). [Appendix 2](#) contains the GRI table, which in turn provides references to the main topics.

CSR focus areas	The 10 CSR priorities
Supply chain responsibility	1. Socially responsible procurement
	2. Business relationships
	3. Integrity and anti-corruption
Energy & sustainability	4. Carbon footprint
	5. Business mobility
	6. Sustainable property
Working conditions	7. A safe, healthy & connected way of working
	8. Diversity & inclusion
Innovating responsibly	9. Responsible research and innovation + open access
	10. Research involving human subjects and animal testing

UN GLOBAL COMPACT

Since November 2020, TNO has been part of the United Nations Global Compact (UNGC: <http://www.unglobalcompact.org>), the world's largest grouping of companies and institutions that are committed to promoting human rights and decent labour conditions, combating corruption and working on issues related to the climate and the environment. In joining the UNGC, TNO has committed itself to the 10 UN principles on socially responsible business practices. This was one of the steps TNO took following the adoption of the CSR policy by the Executive Board. Starting in 2021, TNO will report annually on initiatives related to the Sustainable Development Goals (SDGs) and on its progress in helping meet them.

Read more about Global Compact Network Netherlands (gcnetherlands.nl).



MEASURING OUR IMPACT

TNO uses its innovativeness to help create a safe, healthy, sustainable and digital society. It takes the UN Sustainable Development Goals (SDGs) as its starting point in reporting on the impact its work is having. The SDGs are a universal reflection of the social challenges the world is facing. TNO's research helps meet the SDGs. In 2020, the Executive Board decided to focus on seven SDGs that are most relevant to TNO, based on its knowledge portfolio and the influence it can wield. These SDGs cover areas where TNO can achieve the greatest societal impact, thanks to its knowledge and the position it occupies. On tno.nl, you can find engaging examples that illustrate TNO's contribution to the seven SDGs.

However, TNO's business operations also have an impact on these goals. The SDGs can offer guidance in setting specific goals for the business operations and in measuring progress. A clear link has already been made between TNO's CSR focus areas and the SDG targets, as shown in the illustration on the right. TNO is thus linking its business operations to the global agenda for sustainable development. To define indicators, TNO took part in the [SDG Ambition accelerator programme](#) in 2021 and will again 2022. The SDG Ambition accelerator programme translates the SDGs to benchmarks for companies.



SUPPLY CHAIN RESPONSIBILITY

TNO is linked to other stakeholders in the innovation process, for instance through purchasing, the customers it works for, and the results it delivers. TNO is a key link in the process of making an impact as businesses and in society. Because TNO's ambition is to innovate in an ethical and responsible way, it also looks at how, and for whom, innovation comes about.

This concerns both the suppliers from whom TNO get products and services (what is termed the upstream supply chain responsibility) and the customers to whom it delivers products and services (the downstream supply chain responsibility).

Supply chain responsibility is becoming increasingly important for TNO following the signing of the UN Global Compact, but also in view of developments at its customers. TNO sees this as a way of promoting sustainability and preventing substandard practices.





SOCIALLY RESPONSIBLE PROCUREMENT

In 2021, TNO implemented the ISO 20400 standard for sustainable procurement. Implementing this standard directly helps make the TNO organisation and its supply chains more sustainable. The sustainable procurement ambitions and follow-up actions are recorded in the updated TNO procurement policy that was presented in 2021.

TNO's general terms and conditions of procurement were also updated last year, setting two additional requirements for suppliers that TNO itself, based on the principle of practising what we preach, has also committed to comply with: 1) the supplier must pursue an active climate policy in line with the Paris Agreement that sets a specific date by which the supplier aims to achieve climate neutrality, and the supplier must report on progress, and 2) the supplier has implemented a sustainable procurement policy in compliance with ISO 20400.

Finally, TNO came fourth in the final for the 2021 Best Practice Award organised by the Code of Responsible Market Conduct in the cleaning and window cleaning industry. This award focused specifically on collaborative practices between supply chain partners during the Covid-19 pandemic. During the Covid-19 lockdowns, TNO respected its existing cleaning contract to prevent uncertainty among cleaners about their job or contract. Together with GOM Offices, work under the contract was done in alternative, flexible, and cost-neutral ways over the Covid-19 period.

In 2022, an impact analysis will be made of the various procurement categories that will capture the CSR objectives in specific category strategies, with the main aim being to maximise the contribution to realisation of TNO's ambition of climate neutrality by 2040. The year 2022 will also see efforts to further embed sustainable procurement into the procurement

process, such as by rolling it out across more procurement categories, setting up the reporting and improvement cycle, and analysing the supplier base in the context of supply chain responsibility.



BUSINESS RELATIONSHIPS

In 2020, TNO adopted a Business Relationship Due Diligence (BRDD) process (formerly: customer acceptance policy) ([see page 35 of TNO's 2021 Annual Report](#)) to support careful decision making on customers, partners, and projects. By implementing the BRDD process, TNO ensures the required level of meticulousness and prudence. Following the first steps to this effect in 2021, the initial implementation is to be completed in 2022. One aspect of implementing this policy is to specify which environmental, social and governance (ESG) risks TNO wants to know about before entering into a business relationship, so as to be able to make a well-considered decision on whom TNO does business with. These risks were identified and selected in 2021, and the next step in 2022 will be to further flesh out the details of these specific ESG risks. The aim is to automate the Business Relationship Due Diligence process as much as possible.

TNO wants to be a transparent organisation, especially towards its business associates. In order to facilitate this, TNO has set up a new information point that customers can contact if they have questions. This will improve the findability, transparency, and consistency of answers to information requests from customers and suppliers. In 2021, initial steps were also taken in applying the EU's proposed Corporate Sustainability Reporting Directive (CSRD), a new EU directive that sets more stringent requirements for companies' reporting on ESG topics. In this context, TNO aims to present an integrated annual report for the 2022 financial year, i.e. to incorporate the sustainability report into the annual report. Finally, it is worth mentioning that TNO has made

good progress on the Transparency Benchmark for 2021 (see separate box) by increasing and improving its reporting on its operations.

TRANSPARENCY BENCHMARK FOR 2021

Transparency is of key importance in reporting, according to the Dutch Ministry of Economic Affairs and Climate Policy. Every two years, the ministry compiles the [Transparency Benchmark](#), ranking around 500 Dutch companies based on the level of transparency in their reporting. The classification of companies by industry puts TNO in a peer group with eighteen Dutch universities and knowledge institutions. The results of the benchmark for the 2020 reports were presented in November 2021.

With a score of 35 out of 100, TNO came sixth in the [ranking](#) in its peer group, which is a fine improvement of nearly 25 points compared to the 2019 benchmark. In fact, together with Radboud University, TNO was one of the biggest risers in the peer group. This score will be a starting point from which TNO will explore where it can and wants to be even more transparent.



INTEGRITY AND ANTI-CORRUPTION

Developments in integrity and anti-corruption measures are presented at length in the annual report ([see page 35 of TNO's 2021 Annual Report](#)).

ENERGY & SUSTAINABILITY

Within the Energy & Sustainability focus area, TNO focuses on emissions caused by mobility, and on energy consumption both in its buildings and related to the procurement of products and services. This is reported on annually as part of the TNO carbon footprint. Aside from that, TNO reports on steps taken over the past year in the area of business mobility and sustainable property.





CARBON FOOTPRINT

TNO takes responsibility for the greenhouse-gas emissions that result directly or indirectly from its business activities. TNO's goal is to ensure that its business activities are climate neutral by 2040. This is more ambitious than the Paris climate agreement, which sets this as a goal for 2050. In 2021, the definition of climate neutrality and the underlying principles were adopted for TNO. TNO will consider its emissions to be net zero if its carbon emissions are offset by 'negative' emissions that eliminate CO₂ from the atmosphere. In order to make this happen, TNO has adopted the 'Trias Energetica' model of reducing, decarbonising, and only then offsetting. Furthermore, TNO's initial decarbonisation focus is on the largest emission sources (fair share), and the aim is to get the entire organisation involved by compiling a roadmap that specifies milestones. This roadmap will be presented in 2022.

CO₂ EMISSIONS IN THREE SCOPES

Emissions can be broken down into three scopes, with various ambitions:

- **Scope 1:** direct emissions from TNO's own operations (fuel for lease cars and gas consumption in buildings). TNO aims to reduce these emissions to zero by 2040.
- **Scope 2:** indirect emissions from TNO's own operations (business travel, the use of electricity and heat in buildings). TNO aims to reduce these emissions to zero by 2040.
- **Scope 3:** indirect emissions from other activities in the supply chain (commuting and the procurement of goods and services such as materials and transport). In order to prevent an undesired shift of CO₂ emissions from our own activities (Scopes 1 and 2) to the supply chain (Scope 3), the total carbon footprint per euro of revenue, expressed as a five-year average, must also go down.

CARBON FOOTPRINT IN KILOTONNES (CO₂EQ)

Scope 1 DIRECT EMISSIONS

2021 vs **2019**
6.9 -7%
0.5 CO₂ ↓

2020 6.4*
2019 7.4*
2018 6.5
2017 6.2

Scope 2 INDIRECT EMISSIONS

2021 vs **2019**
17 -25%
-6 CO₂ ↓

2020 20*
2019 23*
2018 24
2017 21

Scope 3 EMISSIONS IN THE SUPPLY CHAIN

2021 vs **2019**
138 -6%
-9 CO₂ ↓

2020 137*
2019 147*
2018 130
2017 129

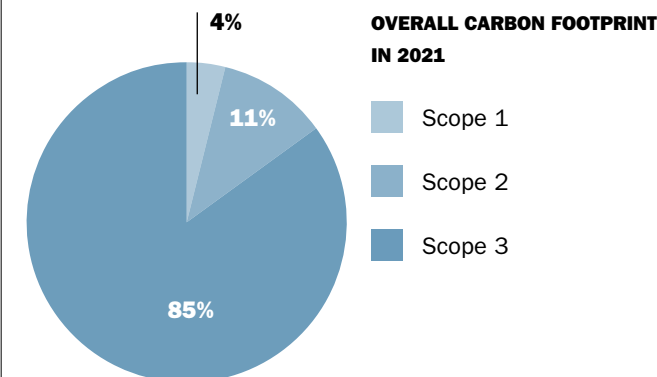
Total SCOPES 1, 2 AND 3

2021 vs **2019**
162 -7%
-15 CO₂ ↓

2020 163*
2019 177*
2018 160
2017 156

The carbon footprint is determined annually to provide measurement data and enable adjustments. In 2021, a number of indicators were again recalibrated based on the most recent insights. The footprint is expressed as metric tonnes of CO₂ equivalent (CO₂eq) so that other greenhouse gases can be included in the calculation. Further explanation of the method is provided on the [TNO website](#). In the above overview, the footprint is broken down into three parts known as scopes.

In 2021, TNO's total carbon footprint was 163 kilotonnes of CO₂ equivalents, down 7% on the pre-Covid-19 year of 2019. Looking at the separate scopes, what stands out is the slight increase in Scope 1 emissions, caused by the fact that there is now more complete data available on natural gas consumption at TNO's leased sites. The drops in Scope 2 emissions (-25%) and Scope 3 emissions (-6%) are in line with the climate neutrality targets. It is furthermore worth mentioning that the share of Scope 3 emissions in TNO's overall carbon footprint has remained roughly the same (85% of the total in 2021).



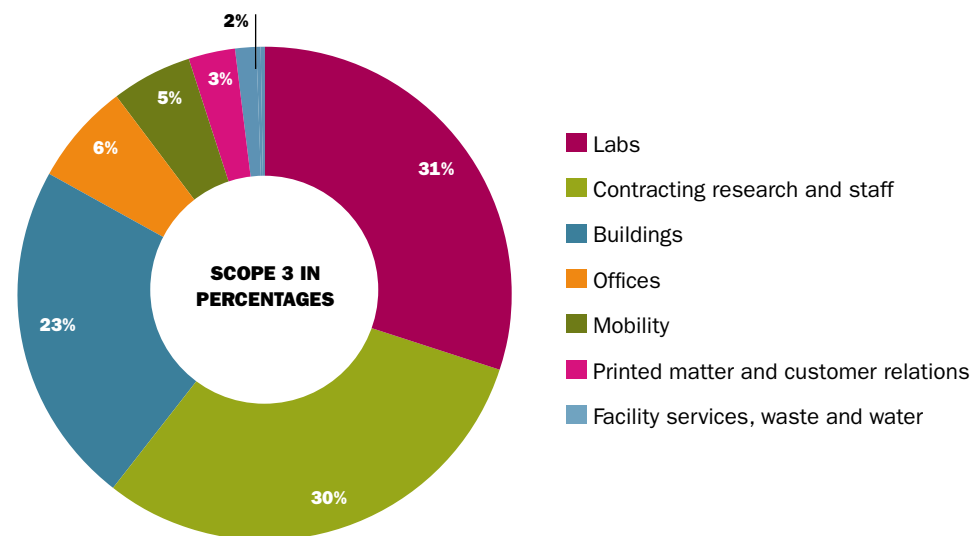
This is in line with TNO's objective of tracking the shift of emissions from Scopes 1 and 2 to Scope 3, i.e. carbon offsetting, as a result of leasing or purchasing services. Emissions data for the years 2019 and 2020 has been corrected based on updated consumption data.

* Emission data for 2019 and 2020 has been corrected based on updated consumption data.

EMISSIONS IN SCOPE 3 (IN TONNES OF CO₂EQ).

Emissions category	2016	2017	2018	2019	2020	2021
Labs	24,224	23,414	31,476	39,173	39,834	42,359
Contracting research and staff	43,104	45,165	41,235	47,588	42,926	41,695
Buildings	21,184	35,425	32,068	28,196	31,304	31,290
Offices	9,006	7,738	7,596	9,728	9,465	8,937
Mobility	9,514	9,489	9,829	13,773	8,159	7,494
Printed matter and customer relations	4,394	4,973	4,409	4,861	3,939	4,178
Facility services	2,454	2,561	2,493	3,095	1,416	1,871
Waste	464	466	507	546	575	594
Water	14	14	15	16	17	17
Total	114,358	129,244	129,629	146,977	137,635	138,435

The emissions in Scope 3 are of several kinds. What is striking is that more than three-quarters of the emissions are related to the contracting of research and staff, labs and other buildings. The Covid-19 restrictions have not led to a significant reduction in this. In 2021, two labs were renovated, which led to a slight increase. For the other categories, there were no significant changes compared to the previous year.

**Total****EMISSIONS IN SCOPE 3 (IN TONNES OF CO₂EQ)****2021****138,435****vs 2020****0.6%****0.8 TONNES**

It is also important to consider the total carbon footprint (Scopes 1, 2, and 3) in relation to TNO's size in terms of the number of employees (FTEs) and the revenue generated (in euros). The tables on the right present this relative carbon footprint over the last five years. In order to closely monitor the Scope 3 goal, the five-year average of the total footprint per euro of revenue is reported.

This shows that relative carbon emissions dropped from 50.4 tonnes to 49.6 tonnes per FTE. The five-year average remained unchanged. This was achieved in a year in which both the number of FTEs and revenue increased. This is a positive result that is probably partly due to the Covid-19 restrictions. For TNO, the priority for 2022 is to make a clear and feasible plan for the necessary reduction in CO₂ emissions in order to achieve climate neutrality by 2040.

CARBON FOOTPRINT IN RELATION TO WORKFORCE AND REVENUE

NUMBER OF EMPLOYEES (FTEs)

2021 vs **2020**
3,278 +1%
 +35 FTEs ↑

2020	3,243
2019	3,079
2018	2,860
2017	2,627

RELATIVE EMISSIONS (TONS OF CO₂EQ/FTE)

2021 vs **2020**
49.6 -2%
 -0.8 CO₂ ↓

2020	50.4
2019	57.5
2018	55.5
2017	59.8

REVENUE (MILLIONS OF EUROS)

2021 vs **2020**
560 +2%
 +13 million ↑

2020	547
2019	517
2018	482
2017	426

FIVE-YEAR AVERAGE FOR EMISSIONS (KG CO₂EQ/EURO)

2021 vs **2020**
0.33 unchanged
 unchanged

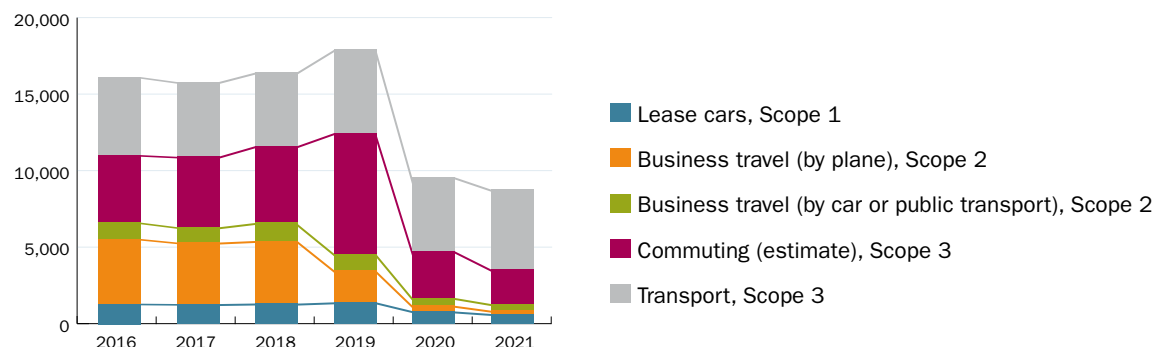
2020	0.33
2019	0.34
2018	0.34
2017	0.34

BUSINESS MOBILITY



In 2021, a new mobility policy was adopted for TNO, which will take effect in 2023. The year 2022 will be used as a run-up period for implementation and the tendering procedure. One of the pillars of the new policy is sustainability of all travel, i.e. both business mobility and employees' commute to and from work. The policy includes a number of new measures intended to increase sustainability over the coming years.

- The pace of electrification of TNO's fleet of leased vehicles will be upped and employees will be offered attractive alternatives to leasing a car.
- Employees who commute to and from work by public transport will see the costs involved covered in full by TNO.
- Employees will be offered a one-off grant to go towards the purchase of an electric vehicle.
- TNO will offer a higher allowance for zero-emission mobility (walking, cycling).
- International business trips of up to 700 kilometres must be made exclusively by train.
- A CO₂ charging scheme will be introduced for air travel for customers, so that they can take this into consideration in their decision on whether or not they want to meet in person. The resulting revenue will be used to fund sustainable investments and/or carbon offsetting.

EMISSIONS PER TYPE OF MOBILITY (IN TONNES OF CO₂EQ)

	Scope	2016	2017	2018	2019	2020	2021
Lease cars	Scope 1	1,357	1,281	1,315	1,399	817	636
Business travel (by plane)	Scope 2	4,227	4,020	4,090	2,085	357	211
Business travel (by car or train)	Scope 2	1,069	999	1,180	1,080	505	434
Commuting (estimate)	Scope 3	4,413	4,611	5,023	7,896	3,061	2,254
Transport	Scope 3	5,101	4,878	4,806	5,452	4,831	5,240
Total tonnes of CO₂eq		16,166	15,789	16,413	17,912	9,571	8,775
<i>Total tonnes of CO₂eq/FTE</i>		<i>6.18</i>	<i>6.01</i>	<i>5.74</i>	<i>5.82</i>	<i>2.95</i>	<i>2.62</i>
<i>Difference with respect to 2016 benchmark</i>	<i>benchmark</i>		<i>-3%</i>	<i>-7%</i>	<i>-6%</i>	<i>-52%</i>	<i>-58%</i>

TOTAL MOBILITY
(TONNES OF CO₂EQ)

2021	8,775	vs 2020	-8% -796	↓
2020	9,571			
2019	17,912			
2018	16,413			
2017	15,789			

TOTAL PER FTE
(TONNES OF CO₂EQ)

2021	2.72	vs 2020	-8% -0.26	↓
2020	2.98			
2019	5.83			
2018	5.05			
2017	5.29			

The measures proposed are expected to lead to TNO achieving its targeted 25% reduction in carbon emissions per FTE by 2025 and 50% by 2030 (compared to the 2016 benchmark year) in line with the ambitions of the Travel Differently Coalition (*Coalitie Anders Reizen*). This objective of the Travel Differently initiative and the plan to achieve climate neutrality by 2040 had major influence on TNO's new mobility policy.

Not surprisingly, TNO again saw relatively little mobility in 2021 because of the Covid-19 restrictions. TNO used its Covid-19 protocol (which was adjusted regularly) to encourage working from home and online meetings wherever possible, and to discourage domestic business trips. At the same time, air travel for business purposes dropped sharply due to government advice not to travel to other countries. As a result, TNO's business mobility-related carbon footprint was halved in 2021 compared to 2019, dropping to under 9,000 metric tonnes (see table). It must be noted, however, that emissions were partly shifted from our offices to our employees' homes as they consumed more electricity and heat at home compared to when they were not working from home. As shown in the table, this sharp decline can be seen across all types of mobility. This applies in particular to air travel (-90%), domestic business travel (-60%), lease cars (-55%), and commuting (-71%) (see also the separate box on commuting). The fleet of lease cars (289 vehicles in total) was also further decarbonised, with over half of all vehicles now fully electric vehicles or hybrids (150 vehicles).

Compared to the 2016 benchmark year (see two separate tables), the 2021 emission figures are already down 46%, again as a result of reduced business air travel and commuting due to the Covid-19 restrictions. Emissions per FTE fell even more sharply (-58%) compared to 2016.

COMMUTING IN 2021

TNO does not record data on commuting (number of kilometres and type of transport), instead estimating them based on the number of employees, working days, and place of work. The breakdown by type of transport (car, train and other) is an estimate based on an employee survey from 2016. As a result, TNO reported the maximum emissions from commuting through to 2019. The full calculation method is available on TNO's website ([see link](#)).

However, due to the Covid-19 restrictions measures, this is not an accurate reflection of the actual commuting. The 2020 report provided supporting information to substantiate that 40% of normal commuting was reported. In order to keep the figures consistent and comparable, the same calculation method was used for 2021. In terms of actual kilometres, employees would have travelled over 37 million kilometres for their commute to and from work. Given that 40% of this figure is about 14 million kilometres, we calculated and reported the CO₂ emissions from commuting based on this figure of 14 million kilometres.

In all likelihood, this calculation will turn out to be an overestimate of the actual kilometres travelled in 2021. Since April 2021, employees have been able to claim their travel days in order to be eligible for a homeworking allowance (or higher homeworking allowance). Over the final three quarters of the year, roughly 8 million kilometres were recorded for commuting, putting the figure for the whole year at under the 14 million figure reported by TNO.

The Covid-19 pandemic is expected to lead to a lasting reduction of about 25% in business mobility in the coming years. At the same time, the restrictions will have an increasingly strong impact within the new mobility policy. The introduction of a better registration system will enable better reporting on the sustainability of all travel (business travel and commuting) from 2023. This is in line with impending Dutch legislation.



SUSTAINABLE PROPERTY

When it comes to TNO's buildings, work continued in 2021 on fulfilling the ambition of making TNO climate neutral by 2040. There is now a roadmap of how the buildings and labs are to be upgraded over the coming 20 years. Based on this roadmap, it has been determined what investments will be needed over the coming 30 years and a decision has been made as to how to allocate this funding. This means that TNO will be investing heavily in the sustainability of its accommodation portfolio. Another outcome is that leased properties in the portfolio will have to meet gradually more demanding sustainability requirements in order to ultimately be at the level of the ambition by 2040. Aside from that, a project was launched to capture the connection between operational carbon emissions and material usage and emissions across the supply chain in specific policy.

Over the past year, a lot of work has gone into conveying the sustainability ambitions to employees. An internal Sustainability Campaign focused on buildings, mobility, and procurement made it clear what challenges we face. The tendering procedure for solar panels on the roofs at TNO sites has meanwhile been completed and installation of the solar panels has started. In Delft, the first project was completed with Energyra solar modules, which will generate approximately 100,000 kWh of power on an annual basis, which roughly equals 36 households. Developed by TNO, these solar modules use metal wrap-through (MWT) technology. The Solar Visuals façade modules – which TNO also had a hand in developing – for the new Solar Lab in Petten was also completed this year. These are two fine examples of how we practise what we preach in terms of sustainable accommodation.

As part of the 'Energy & Sustainable Property' programme, progress of the transition is monitored to enable adjustments as and when needed. For the sake of transparency, the dashboard

BUILDING-RELATED ENERGY CONSUMPTION (SCOPES 1 AND 2) (IN TONNES OF CO₂)

Scope 1 CONSUMPTION OF NATURAL GAS

2021 vs 2019
6,251 4%
235 ↑

2020 5,617
2019 6,016
2018 5,196
2017 4,914

Scope 2 ENERGY, ELECTRICITY

2021 vs 2019
15,347 -18%
-3,442 ↓

2020 17,534
2019 18,789
2018 17,635
2017 15,066

Scope 2 ENERGY, HEAT

2021 vs 2019
1,237 11%
126 ↑

2020 1,176
2019 1,111
2018 897
2017 909

tracking energy consumption and emissions will be shared with our employees, providing clarity on what steps are being taking and what impact can still be made.

Energy consumption levels across the TNO portfolio show a mixed picture: on the one hand, emissions caused by the use of natural gas were up 4% and those caused by heating were up 11% in 2021. This is mainly due to the more complete registration of consumption at leased sites. On the other hand, emissions from energy usage were down 18% compared to 2019. This reduction is due primarily to the effects of the Covid-19 crisis (more working from home) and the impact of energy-saving measures. The energy figures for 2019 and 2020 in the table have been corrected based on the most recent complete data set of most of the TNO sites. For sites for which no data was available yet, the average for the years 2019–2021 was used.

It is worth noting that TNO's actual emissions are lower because a number of sites have been using renewable power since 2010. The sites in question are the larger sites owned by TNO or those for which TNO itself purchases electricity and natural gas. The renewable power procured comes from Dutch wind and biomass sources. Aside from that, TNO's own solar modules generated power from Dutch sunshine. This mix of renewable sources of power is in keeping with the subjects to which TNO contributes through its research. In 2021, TNO bought 15,826 Guarantees of Origin (50% NL Wind / 50% NL Biomass and 61 self-generated NL Solar GOs), thus offsetting more than 100% of its consumption of self-procured electricity.

In order to offset the natural gas procured, TNO has chosen CO₂ emission allowances through Gold Standard VERs (Verified Emission Reduction), purchasing 3,477 VERs and thus offsetting 3,477 metric tonnes of CO₂ in 2021.

In 2021, the same offsetting method was also applied to natural gas and electricity consumption across the whole accommodation portfolio (including leased sites). With 1,815 VERs and 22,500 Guarantees of Origin, 85% of the natural gas procured has been offset. Offsetting for 2021 and the 2022–2025 period is still part of an ongoing tendering procedure.

For 2022, there are many concrete projects in the pipeline. The roll-out of solar panels on the roofs of TNO buildings will continue, various buildings will get additional insulation, and facilities services will renew several contracts with a stronger focus on sustainability. The new audiovisual contract, for example, is centred on energy efficiency, long-term use (longer than 5 years), high-quality reuse, and recycling. And for deliveries in The Hague and surrounding area, TNO uses the local logistics hub called The Hague Urban Logistics, cutting carbon emissions and reducing traffic in the city caused through combined deliveries. Collaboration on the pillars of ‘mobility’ and ‘procurement’ with the support departments will be reinforced. This has to be combined with the structural embedding of the strategic objectives within the regular business operations. An annually returning awareness and behaviour change campaign is intended to get employees even more involved in the required transition.

APPLYING INNOVATION PROGRAMME

The Applying Innovation initiative helps TNO to use its own innovations to improve its buildings and make them more sustainable. It also opens up avenues to accelerate implementation of innovations and thus speed up the development. In 2021, two projects got underway that had previously come through a feasibility study. Social VR Connec2 offers virtual meeting capability using 3D cameras in the current hybrid work environment (see photo). Experiments with this new meeting option will be run at four TNO sites over the coming year. The NESTore heat storage system, an innovative heat battery that was partly developed by TNO, will also be tested as a replacement to the current buffer tank of gas-fired boilers. This is expected to greatly reduce natural gas consumption.



The virtual meeting environment of Social VR Connec2

WORKING CONDITIONS

TNO wants to be a 'House for Talent' for current and future employees. Being a good employer means investing in people. After all, the knowledge and employability of its staff are crucial to TNO's ability to reach its strategic goals. TNO is committed to an equal relationship with its employees, based on mutual added value (via the Empower programme, see TNO's 2021 Annual Report, page 33). TNO fosters a safe, healthy and connected way of working that is geared towards the sustained employability of staff.





A SAFE, HEALTHY AND CONNECTED WAY OF WORKING

TNO has a strong ambition to keep working conditions for employees as favourable and safe as possible, and to increase the sustained employability of staff. Especially in view of the Covid-19 restrictions, this proved to be more necessary than ever. TNO puts this into practice under the heading 'A safe, healthy and connected way of working – together'. The priority of 'safety' will be described below and the priorities of 'vital' and 'connected' are covered in TNO's 2021 Annual Report ([see page 33 of that report](#)).

Every organisation in the Netherlands is legally required to identify and assess health and safety risks using the Risk Assessment and Evaluation (*Risico-Inventarisatie en -Evaluatie*) tool. TNO's research practices require it to push boundaries in science and technology time and time again. The nature of and risks involved in TNO's research projects change from one day to the next. With this in mind, TNO has opted to assess risks on the level of individual projects. The resulting project risk assessments address the particular risks involved in a project, challenging the project leader to define and implement preventive control measures during the project. Many departments have focused on this form of risk assessment in 2021, which is a development that will be continued in 2022.

Outsourced work, like maintenance for example, also involves risks. By properly recording agreements, TNO aims to prevent and control the risks to which contractors and TNO's own employees may be exposed. TNO implemented a digital work permit system for that in 2021. After a pilot in 2021, this way of working will be rolled out at more sites in 2022. Aside from that, over the last two years TNO has appointed and trained all the gas users, gas exchangers, and gas managers on safe working practices with gases and gas cylinders.

LEARNING FROM INCIDENTS

More and more incidents and dangerous situations are being reported, thanks to a growing awareness among employees. Good internal communication directly helps raise this awareness. For instance, the regular Quality, Safety, Health & Environment (QSHE) newsletter for prevention officers describes incidents that other TNO employees can learn from. One example of this is the hazard of power strips and power cords lying on the floor in research areas. These present a trip hazard and could cause a short circuit if water ends up on the floor.

TNO wants employees to report dangerous situations and incidents, also because these are learning opportunities. At 277, the number of reports in 2021 was roughly the same as in 2020. Incidents have to be followed up on by taking corrective and, even more importantly, preventive measures. To this end, TNO has set a KPI that tracks timely handling by the owner of the incident. The timely handling of reports of incidents and dangerous situations rose from 95% in 2020 to 98% in 2021. For 2022, TNO has set a new KPI regarding the increased reporting of dangerous situations and incidents. The idea behind this KPI is that more reporting of dangerous situations in particular will also produce more opportunities to improve safety at TNO.



DIVERSITY AND INCLUSION

TNO's 2021 Annual Report presents the most important developments as regards diversity and inclusion. To avoid duplication, the reader is referred to TNO's 2021 Annual Report ([see page 33 of that report](#)).



INNOVATING RESPONSIBLY

Innovation is TNO's stock in trade. How innovations come about falls within the domain of responsible research and innovation and the TNO policy on human and animal research. The TNO publication policy deals with how the results of TNO research are made available to society and how much use is made of this information.





RESPONSIBLE RESEARCH AND INNOVATION + OPEN ACCESS PUBLICATIONS

TNO wants to accomplish its mission of 'Innovation for Life' by innovating in a socially responsible way. TNO thus aims to achieve confirmation of the value of applied research in society in two ways: the impact of TNO in society is valued across the board, and TNO is open to input from society that further enhances the value of applied research. TNO and its stakeholders strive thus to align their innovations with social issues and societal values throughout the programming, execution and implementation of applied research. In this way, TNO can validate its research agenda (our contribution to society) and obtain a check of the organisation and its way of working (sustainable, safe and connected). This requires the research organisation and individual researchers to have a position in line with society's expectations, which in turn strengthens TNO's 'social licence to operate'. As a partner in the European JERRI project (2015–2018), TNO formulated its long-term goal for Responsible Research & Innovation (RRI).

In 2021, the following specific results were achieved relating to this ambition:

- The creation of opportunities to share and harness knowledge and knowledge products more effectively via open source, open access, and open data;
 - In 2021, the content available from the TNO Repository increased (see below).
- The promotion of diversity and inclusion in the workforce;
 - This continued to be one of TNO's strategic priorities in 2021.

- Helping to solve challenges facing society, as defined in the United Nations' Sustainable Development Goals (SDGs); and
 - In 2021, information was provided on the contributions various TNO projects made to achieving the seven SDGs.
 - TNO is on the advisory board for the CO-Change project to support other knowledge organisations in their socially responsible innovations. In 2021, this advisory board met on two occasions.
- The regular facilitation of ethical deliberations within innovation projects, both within TNO and for customers;
 - A scientific article on this approach was published in 2021.¹

Finally, the RRI concept has contributed to the process for TNO's new 2022–2025 strategy. The input from RRI focuses on an adaptive and committed response by TNO to social issues, whereby it plays a clear role in the development of broad prosperity for society.

The [TNO Repository](#) has been online since 2013. It is a free database that now contains almost 52,000 TNO publications. Of these, about half are directly available in their entirety, while the rest are available on request. The figure below shows the increase in the number of digitally available publications over the years. The Research Information Support (RIS) department helps make publications available digitally, also retroactively ('legacy literature').

The TNO Repository had just under 2 million visits in 2021. Around 1.6 million TNO publications were downloaded in 2021. In total, a document was downloaded from this free open-access database on nearly 7 million occasions since the go-live.

¹ A Method for Rapid Ethical Deliberation in Research and Innovation Projects
<https://www.igi-global.com/gateway/article/281078>

OPEN ACCESS

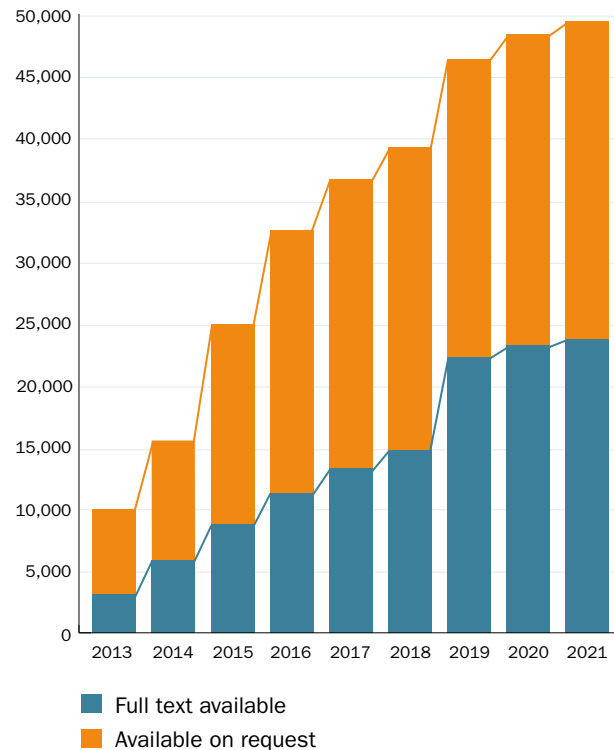
Publishing in accordance with the open-access principle means making scientific information freely available (free of charge) – usually online. This means that the author, and any rights holders such as the publisher, agree to the distribution of the work, but also that there is a suitable platform to support that distribution. TNO's publication policy promotes FAIR (Findable, Accessible, Interoperable, and Reusable) publication and availability of scientific information, including underlying research artefacts, to the maximum degree possible. As regards open access, TNO applies the principle of 'open if possible, closed if necessary', as detailed in TNO's publication policy ([see page 34 of TNO's 2021 Annual Report](#)). This policy ensures that publicly funded research is protected by intellectual property rights, where necessary. The publication policy stipulates, for example, that research artefacts are made available through open-access repositories in accordance with the FAIR principles. TNO also checks publications for originality (i.e. absence of plagiarism) and the correctness of references using iThenticate. To facilitate the principle of openness, TNO publications are made available via various platforms.

In 2021, the number of downloads was up on 2020, probably on the back of the increasing focus on open access, as well as an update of the Repository website that has improved findability and searchability. Since 2016, a record has been kept of the countries visitors are from. It turns out that visitors come from more than 200 countries. The table below shows that the vast majority of downloads in 2021 were in the Netherlands and the United States, followed by China, Germany, and the United Kingdom.

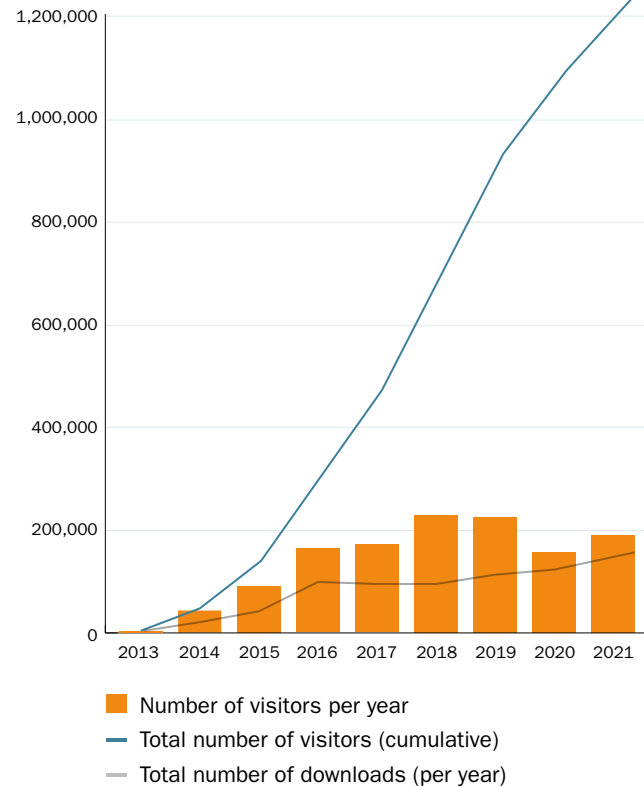
TOP 10 COUNTRIES BY NUMBERS OF DOWNLOADS

2021	Country	Number	Total %
1	Netherlands	1,061,896	64.66%
2	United States	296,024	18.02%
3	China	67,550	4.11%
4	Germany	48,423	2.95%
5	United Kingdom	21,207	1.29%
6	Belgium	19,874	1.21%
7	Russia	9,407	0.57%
8	France	9,141	0.56%
9	India	5,900	0.36%
10	Canada	4,974	0.30%

CONTENT IN THE TNO REPOSITORY



VISITORS AND DOWNLOADS



RESEARCH INVOLVING HUMAN SUBJECTS AND ANIMAL TESTING

Relevant developments in research involving human subjects and animal testing have already been presented in TNO's 2021 Annual Report ([see page 35 of that report](#)).

LOOKING AHEAD

Further meaningful steps have been scheduled for 2022.



STRATEGY

TNO is preparing for implementation of the Corporate Sustainability Reporting Directive (CSRD), determining, based on the value creation model and a materiality assessment, which topics TNO should report on in the new strategy period (2022–2025).



SUPPLY CHAIN RESPONSIBILITY

TNO aims to determine specific ESG criteria based on which it can assess clients. TNO also plans to further tighten the sustainability criteria for the products and services it purchases.



ENERGY & SUSTAINABILITY

TNO wants to specify a concrete roadmap for the journey to climate neutrality by 2040. What is the pathway to reducing carbon emissions, what milestones can we set, and what activities can help achieve them? The priority is to reduce the largest emission sources.



WORKING CONDITIONS

TNO wants to improve employee 'vitality' (physical and mental health and fitness) and implement the strategic plan for diversity and inclusion.



INNOVATING RESPONSIBLY

TNO wants to make more open-access publications available where possible, and hold sessions to deliberate the ethics around socially sensitive subjects.

› APPENDICES

TNO innovation
for life



PREFACE
INTRODUCTION

AMBITION

SUPPLY CHAIN
RESPONSIBILITY

ENERGY
& SUSTAINABILITY

WORKING
CONDITIONS

INNOVATING
RESPONSIBLY

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APPENDICES

APPENDIX 1. ORGANISING CORPORATE SOCIAL RESPONSIBILITY (CSR) WITHIN TNO

Within TNO, CSR is the responsibility of the Marketing and Communication Department. At the board level, the Chief Operations Officer (COO) is responsible for CSR. At the operational level, the CSR Officer is responsible for initiating and coordinating the development of CSR policy. On the basis of their own annual plan, the CSR Officer coordinates the various sustainability initiatives within the organisation, develops the policy, and is responsible for reporting on the priorities around energy and sustainability and on working conditions. In 2021, a total of 800 hours were spent on these activities, mainly by the CSR Officer.

The CSR Officer is supported by, and is accountable to, the CSR Board, which is chaired by the Director of Marketing & Communication. In 2021, this board had three virtual meetings because of the Covid-19 restrictions that were in place. The CSR Officer also has meetings with the Chair of the CSR Board and the COO every four to six weeks.

In line with the annual planning cycle, the CSR officer liaised with the Procurement, Legal, Compliance, and Facilities departments in directing the implementation of sustainability activities. The CSR officer was also involved in the new Business Relationship Due Diligence process as an adviser on ESG risks, thus contributing to the embedding of supply chain responsibility.

For the priority of Integrity, the Integrity Officer and the Integrity Advisory Board are in charge of the development and monitoring of this theme, as well as of reporting on it in the UN Global Compact. For the Diversity & Inclusion priority, the Diversity & Inclusion Officer takes the lead under the supervision of the Diversity & Inclusion Steering Committee, which is chaired by the CEO.

CURRENT COMPOSITION OF THE CSR BOARD

Ms R. van Hoof	Director of Marketing & Communications (Chair of the CSR Board)
Ms I.C. van den Broek	Director of Human Resources
Mr L.N. van der Burg	Business Developer, Energy Transition Unit
Ms T.M. van Daalen	Market Director, Energy Transition Unit
Mr L.J.M.G. Dortmans	Science Director, Circular Economy Unit
Mr R.J.A. Kersten	Director of Operations, DSS Unit
Mr M. Schuringa	Director of Corporate Real Estate & Facilities
Mr J.W. Streefkerk	CSR Officer, IT Unit
Mr M.G.L.H. Tossings	TNO Chief Operations Officer
Mr M. Boone	Director of Procurement

APPENDIX 2. GRI TABLE

GRI INDICATOR	DESCRIPTION	EXPLANATION OR REFERENCE	PAGE NUMBER	EXPLANATORY NOTES
ORGANISATIONAL PROFILE				
102-1	Name of organisation	TNO	cover and 1-27	
102-2	Brands, products and/or services	Introduction	3	
102-3	Location of headquarters	Anna van Buerenplein 1 2595 DA The Hague, Netherlands	30	
102-4	The number of countries in which the organisation operates	Internationally active	6	Within the EU research programmes, TNO works across borders with partners from various European countries. More information on TNO's international activities and locations can be found at: TNO as an international partner
102-5	Ownership structure and legal form	Introduction	3	The Dutch Organisation for Applied Scientific Research (TNO) was established by law in 1932. TNO's aim is to make knowledge useful for companies and public authorities. As a public organisation, we have an independent position.
102-6	Sales markets	Introduction	3	
102-7	Size of the organisation	Working conditions	19	TNO's 2021 Annual Report, pages 48 and 49.
102-8	Composition of the workforce	Working conditions	19	TNO's 2021 Annual Report, page 33.
102-9	Supply chain information	Supply chain responsibility	9	
102-10	Significant organisational changes during the reporting period			None
102-11	Explanation of the use of the precautionary principle	Innovating responsibly	21	TNO's 2021 Annual Report, page 29.
102-12	External initiatives that the organisation endorses	Introduction	3	TNO's 2021 Annual Report, page 19.
102-13	Membership of associations and interest groups	Organising Corporate Social Responsibility (CSR) within TNO	26	
STRATEGY				
102-14	Statement from the most senior decision-maker about the relevance of sustainable development to the organisation	Preface	3	
102-15	Key impacts, risks and opportunities	Introduction Ambition	3 4-8	
ETHICS AND INTEGRITY				
102-18	Operational structure of the organisation	Profile Organisation Chart	3 26	TNO's 2021 Annual Report, page 47.

GRI INDICATOR	DESCRIPTION	EXPLANATION OR REFERENCE	PAGE NUMBER	EXPLANATORY NOTES
GOVERNANCE				
102-18	The governance structure of the organisation, including committees under the highest governance body, as well as the committee responsible for decision-making on economic, environmental and social issues	Strategy Organising Corporate Social Responsibility (CSR) within TNO	5-8	
STAKEHOLDER ENGAGEMENT				
102-40	List of stakeholder groups the organisation engages with	–	–	
102-42	Principles for the identification and selection of stakeholders	Ambition	4-8	
102-43	Manner in which stakeholders are kept involved	Ambition	4-8	
102-44	Key topics and issues that have arisen from stakeholder consultations, and how the organisation has responded to them	Ambition	4-8	
REPORTING PRINCIPLES				
102-46	Process for defining the content and specific scope of the report and the assumptions it uses	Ambition Organising Corporate Social Responsibility (CSR) within TNO	4-8 26	TNO's CSR priorities
102-47	Substantive issues identified in the process of determining the content of the report	Ambition	4-8	TNO's CSR priorities
102-48	Consequences of any restatement of information contained in a previous report and the reasons for any such restatement	Not applicable		The carbon footprint was updated and the figures for 2019 and 2020 were adjusted accordingly.
102-49	Significant changes with respect to previous reporting periods in terms of scope and boundaries	Not applicable		No change with respect to scope and boundaries.
102-50	Reporting period	1 January 2021 – 31 December 2021		
102-51	Publication date of the most recent report	June 2021		The 2021 Sustainability Report is TNO's second formal sustainability report
102-51	Response by the organisation to the issues raised as a result of contact with stakeholders	Ambition	4-8	
102-52	Reporting cycle	Annual		
102-53	Contact for questions regarding the report or its contents	csr@tno.nl		This is TNO's second Sustainability Report
102-54	GRI application level	GRI 4 Core (2016 guideline)	27	
102-55	GRI content index		27	

GRI INDICATOR	DESCRIPTION	EXPLANATION OR REFERENCE	PAGE NUMBER	EXPLANATORY NOTES
MATERIAL TOPICS				
203-1	Impact of procurement	Socially responsible procurement	10	
205-1	Anti-corruption	Integrity and anti-corruption	10	
206-1	Anti-competitive behaviour	Business relationships	10	
302-1	Energy consumption within the organisation	Energy & sustainability	11-18	
302-3	Energy intensity	Energy & sustainability	11-18	
302-4	Reduction of energy consumption	Energy & sustainability	11-18	
305-1	Direct emissions (Scope 1)	Energy & sustainability	11-18	
305-2	Indirect emissions (Scope 2)	Energy & sustainability	11-18	
305-3	Other indirect emissions (Scope 3)	Energy & sustainability	11-18	
305-4	Intensity of emissions	Energy & sustainability	11-18	
305-5	Reduction of greenhouse gas emissions	Energy & sustainability	11-18	
401-1	Employee intake and turnover	Working conditions	19 and 20	
403-2	Health and safety at work	Working conditions	19 and 20	
404-1	Training and education	Working conditions	19 and 20	
404-2	Programmes for improving the skills of employees	Working conditions	19 and 20	
405-1	Diversity within governing bodies and staff	Working conditions	19 and 20	

› ABOUT THIS PUBLICATION

› If you would like to find out more about TNO, or have questions after reading this report or any ideas you would like to share, please drop us a line:
csr@tno.nl.

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