Value creation

Sustainable production

As a manufacturing company, we face the challenges of climate change and resource conservation. With our environmental management system, we aim to develop, manufacture and maintain engines and modules in a way that is as energy-efficient as possible and minimizes emissions and raw material consumption. We view environmental and climate protection as our corporate responsibility. That applies not only to our manufacturing operations, but also to our products and services. We include the upstream supply chain in a sustainable process of creating value.

11.6 million euros spent on climate protection

448,000 metric tons of CO₂ saved for our Munich location

➡️ Environmental management
➡️ Conservation of resources
➡️ Emissions
➡️ Supply chain
Climate protection in production & maintenance

**Environmental management**

Climate protection is an important maxim guiding how we do business. At all MTU sites around the globe, we aim to be efficient in our use of energy and resources, limit our emissions and avoid environmental risks. We strive for continuous improvement in all these areas.

We ensure compliance with statutory requirements and internal standards through regular measurements and tests, for example on environmental samples.

Climate protection is an important principle guiding our corporate behavior and is implemented in our business processes. It is also enshrined in the global **Code of Conduct** for all employees, where we express our commitment to a policy of integrated environmental protection that starts at the causes of pollution and evaluates the environmental impact of our production processes and products in advance. We integrate insights from this into corporate decisions. We apply the precautionary principle so as to keep negative environmental impact to a minimum. The most significant way we can help protect the climate is by means of ecologically efficient products, as the environmental impact (energy consumption and CO₂ emissions) of our products is greatest during their use. → **Climate & flying**

Integrated environmental protection covers:

- Making continuous improvements
- Precautionary principle
- Involving employees
- Limiting environmental impact
- Carefully complying with statutory limits and requirements
- Using resources and energy sparingly
We spent around EUR 11.6 million on climate protection in 2019; investments into improving the environmental compatibility of our sites accounted for around half of this amount.

Furthermore, we have embedded our environmental responsibility in the MTU Principles in the section entitled “Environment and society,” and our annual corporate objectives held us to high standards of climate protection again in 2019. Responsibility for company-wide climate protection is assumed by the Executive Board. Uniform high standards are applied across the MTU Group through an environmental management system that defines processes, responsibilities and targets at the site level. Environmental protection is part of our → Integrated management system (IMS). Internal standards are binding for MTU’s sites and, in some cases, exceed the legal requirements. The stringent environmental criteria apply to all divisions and processes and are laid down in documented process flows and special company standards. Minimum operating standards for our machines and facilities, such as engine test cells, are stipulated by national legislation and local specifications. For machines and facilities with environmental implications, this body of rules and regulations is supplemented by approval from the authorities. We conduct measurements, tests and inspections at regular intervals to ensure our machines and facilities are operating invariably in accordance with these rules and regulations.

Our environmental management approach is not centralized. All of MTU’s production sites have a dedicated environmental department and take care of implementing measures on a local level. The Executive Board receives a quarterly report on environmental KPIs; up until 2019, this included the energy and water consumption at all production sites. As of 2020, we have now switched this internal reporting metric to CO₂ emissions per production hour. Individual site managers are directly responsible for climate protection; they receive advice and support from the local environmental departments. The environmental departments regularly share their innovations and best practices with each other. We regularly train employees on matters relevant to the environment, such as the safe handling of hazardous goods or chemicals.

Some of our sites are certified to ISO 14001, the international standard for environmental management systems, and/or to the EU Eco-Management and Audit Scheme (EMAS). → Overview of our certifications. We plan to align the structures at our Munich site with an ISO 50001 energy management system, as we have done in Hannover.
Our contribution to the SDGs

Through our environmental management system, we continually improve energy and resource efficiency and minimize emissions of CO₂ and pollutants in production and maintenance. In this way, we meet the expectations of our shareholders. In doing so, we also want to help fulfill the Sustainable Development Goals (SDGs) of the UN's 2030 Agenda, specifically SDG 9 on “Industry, innovation and infrastructure,” SDG 12 on “Responsible consumption and production” and SDG 13 on “Climate action.”

We use various measures to achieve improvements in our energy and carbon footprints. In the reporting year, we spent some EUR 11.6 million in total on investments and ongoing expenses in a bid to increase our environmental compatibility. These include, for example, wastewater treatment, safe waste disposal, use of renewable energies, energy-saving measures and noise abatement. Energy-saving measures accounted for the company’s largest single investment in environmental protection.

We have our environmental management system regularly reviewed

Our goal is to constantly develop and refine our operational climate protection measures. Independent external auditors and environmental consultants conduct annual reviews at our German sites to confirm our implementation of and adherence to the applicable climate protection management requirements, and provide recommendations for improvement. We always pass these reviews with flying colors. This monitoring is supplemented by internal inspections and audits. The same applies to our production facilities. MTU's management regularly conducts reviews to monitor and steer environmental management in the company and to influence its further development.

Emergency management plans have been prepared to deal with interruptions to operations with a negative environmental impact, and a crisis committee has been set up. We also hold regular staff drills and provide instructions on what to do in the event of an emergency. MTU has comprehensive fire protection measures in place that comply with legal directives.

In 2019 as in previous years, there were no incidents at the production sites with a negative environmental impact, nor were any fines levied against the company for breaches of statutory requirements relating to the environment. No non-monetary sanctions were brought against MTU.
Climate protection in dialogue with stakeholders

We maintain a dialogue with our stakeholder groups about MTU’s environmental impacts. Stakeholders can use the available media channels to direct complaints and report abuses to us, which we will immediately follow up. This applies to employees, suppliers, residents and other stakeholders. In the reporting year, we received a complaint at our Hannover location from an industrial neighbor regarding an unpleasant odor and vibrations from the test stand. We responded to this by taking successful countermeasures. Stakeholders can consult environmental officers at the German sites with any questions or comments. → More about Stakeholder dialogue

Our → Environmental statements for Munich, Hannover and Ludwigsfelde provide information to the public annually about our environmental impact and environmental management. In addition, we offer stakeholders the opportunity to make use of an → Online survey on sustainability to give feedback. We are a member of the Climate Management 2.0 Peer Learning Group in the UN Global Compact’s German network. In this group, we share experiences with other companies and work together to develop solutions to the major climate action challenges.

We promote greater climate protection in industry and business through the following global and local initiatives:

• UN Global Compact
• Been-i Bavarian energy-efficiency network
• Munich Business Climate Pact (Klimapakt Münchner Wirtschaft)
• YVR Vancouver Airport Authority’s Environmental Management Plan

We involve our employees in active environmental protection endeavors and promote environmentally conscious behavior through awareness events, information campaigns and training courses at all our production sites. Raising the awareness of all employees in production and administration is part of our Code of Conduct regarding climate protection. At our Munich headquarters, we want the Zero mission to reduce resource consumption and emissions and promote environmentally conscious behavior among our employees.

All fully consolidated production sites of the MTU Group worldwide (Munich, Hannover, Ludwigsfelde, Rzeszów and Vancouver) are included in our environmental reporting for this Sustainability Report. By comparison, smaller sites are not relevant for our environmental impact and are therefore not included.
Outlook

In 2019, we analyzed new concepts for climate action at several of our sites, the evaluation of which is still ongoing at the time of writing. Potential implementation of such a concept at the site or group level is therefore still to be determined.

In line with the Zero vision from our eponymous Zero mission, we are also setting up a new environmental program for the 2020–2022 period at our Munich site.

**GRI:** 102-11, 102-12, 102-43, 103-2, 103-3, 307-1

**UNGC:** 7, 8
Responsible conduct

Conservation of resources

When producing engine modules or engines in our plants, or when maintaining them in our maintenance shops, we aim to conserve resources as far as possible. Using processes that are efficient in terms of energy and raw materials, we aim to minimize consumption of scarce resources and reduce emissions. In this way, we are able to contribute to climate action and protection.

We protect resources—this also applies to bodies of water at our locations, such as the Schwabenbächle stream (pictured here) that runs past our headquarters in Munich. We release rainwater from our shops and a small part of the groundwater we obtain into the stream in accordance with our permit from the authorities.

With the help of our environmental management system, we aim to advance our resource-conserving production processes, and gradually improve energy efficiency in the manufacture of our products and in the maintenance of engines and modules. Our goal is highly efficient production and maintenance with minimal use of resources. We use raw materials, water and energy sparingly. This is set out as a guideline for all employees in our Code of Conduct and our MTU Principles. Conserving resources is also a way for us to reduce our production costs. The use of resources depends on batch sizes in production and maintenance. In 2019 we were again ramping up production at all sites, which poses a particular challenge for us when it comes to reducing or consumption or resources and energy.
Our contribution to the SDGs

In making our process as resource-conserving as possible, we support two global Sustainable Development Goals (SDGs): SDG 9 on “Industry, innovation and infrastructure” and SDG 12 on “Responsible consumption and production.” A secondary objective of SDG 9 calls for sustainable industry with more efficient use of resources and increased use of environmentally friendly technologies and industrial processes. Our sustainable waste management system contributes in particular to SDG 12, which calls for a significant reduction in global waste generation by 2030. All the measures we take to protect resources, reduce our energy requirements, and above all use renewable energies, ultimately also benefit SDG 13 on “Climate action.”

Energy

MTU relies on a mix of renewable and non-renewable energy sources and chooses energy resources based on security of supply, cost effectiveness and environmental considerations. Regarding non-renewable primary energy, we use natural gas, the aviation fuel kerosene and a very small amount of diesel and heating oil (together accounting for less than 5%). In Munich, we generate electricity and heat using a cogeneration plant (BHKW). Compared to conventional power plants, cogeneration plants are much more efficient and emit less pollution. In addition, we use biomethane for the BHKW. The Hannover site makes use of solar energy with the aid of a solar thermal power plant and, in 2019, commissioned a BHKW cogeneration plant comprising three micro gas turbines for generating electricity and heat. We also achieve greater energy efficiency by having the sites use waste heat from compressed air generation as thermal energy (combination principle).

In the reporting year, we invested some EUR 1.4 million in energy-saving measures. The main driver of these measures was a renovation of the facade to make it more energy-efficient and a switch to high-efficiency pumps in Hannover.
Energy sources used in 2019
Scope 1 and 2 (consumption in MWh; share in %)
GRI 302-1

<table>
<thead>
<tr>
<th>Source</th>
<th>MWh</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural gas</td>
<td>78,200</td>
<td>26.3%</td>
</tr>
<tr>
<td>Kerosene</td>
<td>66,000</td>
<td>22.2%</td>
</tr>
<tr>
<td>Biomethane</td>
<td>20,800</td>
<td>7.0%</td>
</tr>
<tr>
<td>Diesel</td>
<td>3,400</td>
<td>1.1%</td>
</tr>
<tr>
<td>Fuel oil</td>
<td>200</td>
<td>0.1%</td>
</tr>
<tr>
<td>Electricity</td>
<td>124,200</td>
<td>41.7%</td>
</tr>
<tr>
<td>District heating</td>
<td>4,800</td>
<td>1.6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>297,600</strong></td>
<td></td>
</tr>
</tbody>
</table>

Measures for energy-efficient production/maintenance

- Well water for cooling purposes
- District heating network modernization
- Improvements to thermal insulation
- Building automation systems
- Heat recovery systems
- Renewable energy
- Energy-efficient compressed air supply
- Energy-efficient lighting systems
- Waste heat from compressed air generation
- Electric transport in the plants
- Machine shutdowns during disruptions of production to reduce the base load
Our energy consumption

Our Scope 1 energy requirement (direct energy consumption) remained at the previous year’s level in 2019—despite the ongoing production ramp-up production at our sites. MTU’s total Scope 1 energy consumption totaled 168,600 megawatt hours (MWh) compared with 162,200 MWh for 2018 (+3.9%). Scope 1 primarily concerns the energy sources natural gas and kerosene. Kerosene is used as a fuel for testing engines on the test stand, so consumption depends on how extensive the tests are and on engine size. MTU has no influence on the type and duration of test runs. All newly maintained as well as manufactured engines must complete a test run prior to delivery for safety reasons and to demonstrate their performance. Our digitalization strategy is making strides toward increasing the use of simulations in development and manufacturing in order to reduce the amount of development testing for new engines. To this end, a number of projects in the area of development and technology are already underway. This is an important contributor to resource conservation. Regarding renewable energy, we used 20,800 MWh of biomethane for our cogeneration plant, a slightly larger share than in the previous year (2018: 18,100 MWh).

In 2019, we procured a total of 129,000 MWh of external energy (Scope 2), somewhat more than in the previous year (2018: 125,600 MWh). Purchased energy is mainly electricity, with a share of 96.3%. Our use of green electricity is determined by the extent to which our chosen suppliers feed it into the grid. Our selection is based on economic and environmental considerations. MTU Maintenance Canada gets all its electricity from hydroelectric power stations and therefore 100% from renewable resources. This corresponds to a share of around 3% of MTU’s total electricity procurement.

### Energy supply, production, Scope 1 and 2 (in MWh)

<table>
<thead>
<tr>
<th>GRI 302-1</th>
<th>2019</th>
<th>2018</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>297,600</td>
<td>287,800</td>
<td>277,600</td>
</tr>
<tr>
<td>Direct energy consumption, natural gas, kerosene, other = Scope 1</td>
<td>168,600</td>
<td>162,200</td>
<td>151,100</td>
</tr>
<tr>
<td>Indirect energy consumption, electricity, district heating = Scope 2</td>
<td>129,000</td>
<td>125,600</td>
<td>126,500</td>
</tr>
<tr>
<td>Covered by Scope 1: non-fossil fuels = biomethane</td>
<td>20,800</td>
<td>18,100</td>
<td></td>
</tr>
</tbody>
</table>

Production sites only; the vegetable-oil-powered BHKW was decommissioned in 2017 and a new facility powered by biomethane went into operation in 2018.

The total energy requirement for Scope 1 and 2 was 297,600 MWh in 2019, which, even with the production ramp-up, was only just above the previous year’s level (+3.4%). With a systematic energy management system, we manage primarily the consumption of our main energy sources electricity and natural gas and implement improvements.
Our progress in energy management in 2019

- Renovation of lighting in several production facilities, Munich
- Switch to LED lighting, several production sites
- An end to computers in stand-by mode, Munich, Vancouver
- Switch from pneumatic tools to electrically operated tools, Ludwigsfelde
- Renewal of pumps and systems, renovation of facade and roof, Hannover
- Preparations underway to recover compressor heat to use for heating rooms, Rzeszów
- Remote working from home, Munich, Vancouver

Water

Water is a valuable resource that we use sparingly. We have effective water management systems in place at all production sites. Our water consumption also fluctuates depending on production volumes. In keeping with the precautionary principle, we treat wastewater properly and in accordance with the applicable legal requirements. One of the aims of the Zero mission at our Munich site is to decrease water consumption overall (absolute reduction) or, when production increases, to keep the increase in water consumption at a lower rate (relative reduction). In 2019, we invested some EUR 1.1 million in improved wastewater management.

Our fully consolidated production sites are in Germany, Poland and Canada, so they are not located in water-stressed regions as determined by the World Resources Institute's Aqueduct Water Risk Atlas (water risk for those countries: low or low/medium). Water-stressed regions are regions in which water is a scarce resource. We monitor the development of water availability in the regions in which we operate, which allows us to make decisions about additional measures to take, if required.

Our water consumption

We use drinking water for production and maintenance processes, in sanitary facilities and in the cafeteria. In addition, we use well water for cooling processes. We record water consumption locally as an absolute value. Water withdrawal amounted to around 9.7 million cubic meters for all production sites (2018: 8.7 million m$^3$). The higher water usage figure is due primarily to more groundwater at the Munich site (where we use Quaternary groundwater from our own wells). The water used was 97.9% groundwater and only 2.1% came from the municipal drinking water supply. Using well water contributes to climate action and protection, as it eliminates the need for energy-intensive cooling processes such as compressor cooling systems.
We use recirculated water as much as possible in chemical process baths for applying protective coatings to blades and also for the process water in installations for testing component damage. Thanks to this recirculation, we have to treat only a small amount of wastewater before discharging it into the municipal sewers. This enabled us to save around 614,000 m$^3$ of water in the reporting year. We also use recycled water for the chemical cleaning of engine parts. Our sustainable water management also includes systematic inspection and renovation of the well water and sewer networks.

### Water balance (in m$^3$)

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>9,691,000</td>
<td>8,682,000</td>
<td>8,820,000</td>
</tr>
<tr>
<td><strong>Intake</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potable water</td>
<td>204,000</td>
<td>186,000</td>
<td>173,000</td>
</tr>
<tr>
<td>Groundwater</td>
<td>9,487,000</td>
<td>8,496,000</td>
<td>8,647,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>9,652,000</td>
<td>9,176,000</td>
<td>9,018,000</td>
</tr>
<tr>
<td><strong>Discharge</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sewer system</td>
<td>133,000</td>
<td>140,000</td>
<td>132,000</td>
</tr>
<tr>
<td>Surface water</td>
<td>1,634,000</td>
<td>1,519,000</td>
<td>1,290,000</td>
</tr>
<tr>
<td>Groundwater</td>
<td>7,885,000</td>
<td>7,517,000</td>
<td>7,596,000</td>
</tr>
</tbody>
</table>

Production sites only; no water withdrawal or discharge in water stress areas; data presented in line with official wastewater and well reports and may deviate from previous publications. At the Munich site, a small proportion of the well water and some of the rain water collected from the roofs is discharged as surface water via the Schwabenbächle stream. Rainwater is discharged into the municipal sewer system only in the event of heavy rainfall. As a result, the sum of the volume discharged into groundwater and surface water may not correspond to the volume withdrawn.

### Water quality

We treat wastewater in suitable sewage systems according to the type and extent of pollution. The quality of the discharged wastewater complies with the official requirements issued for the respective sites. We carry out strict monitoring at the sites to ensure that legal limits are observed and comply 100% with all local authority requirements. Neither water sources nor water surfaces were negatively impacted or polluted by our operating activities, and again no harmful substances were leaked in 2019. This also applies to our site in Canada in particular, which is located directly on Sea Island in the Fraser River estuary in Richmond, British Columbia. The surrounding nature conservation areas are crucial for salmon migration and the Pacific route of migratory birds.
Material and waste

The long service life of our products and the continuous improvement of our maintenance processes ensure our demand for raw materials is reduced. Aircraft engines as a rule spend 30 years in service before they are decommissioned. In all of our production methods, we pay attention to efficiency in the use of materials and seek to avoid waste. We develop our own production and repair methods that are characterized by their high material efficiency. With its “repair beats replacement” philosophy, MTU Maintenance achieves a truly impressive depth in aircraft engine repair. Using special techniques the company has developed in-house, we repair engine components that in other maintenance shops would have to be replaced with new parts. For example, we manage to give around 70% of all engine blades a second, third or even fourth lease on life. We are gradually expanding this product recycling approach to include new processes with an eye to achieving even longer service lives and thus greater material efficiency. For instance, in the case of life-limited parts, we have succeeded in repairing integrally manufactured engine blades and disks, known as “blisks.” This is important because the number of blisks being installed in engines is increasing. We are one of the world’s leading companies in the field of blisk production and repair.

We have abolished single-use cups at our Munich and Hannover sites and replaced them with returnable or deposit cups. This means we already avoid using 400,000 single-use cups per year; our site in Ludwigsfelde also plans to make the switch.

We achieve greater material efficiency in the production of new parts by using additive processes such as 3D printing of metals. This manufacturing technology enables the rapid 3D production of highly complex components and allows for more freedom in designing them. Components are laser-melted directly from a powder bed according to CAD data—with just 5-10% of the powder ending up as excess material that cannot be used. This significantly reduces the amount of resources used.
Harmless materials: REACh regulation

Wherever possible, we avoid using materials that are hazardous to the environment or to health in our manufacturing processes and products. According to the European REACh (Registration, Evaluation, Authorisation and Restriction of Chemicals) regulation, certain substances of very high concern (SVHCs) containing chromium(VI) are subject to authorization. We implement all provisions of the EU regulation for protecting employees and the environment. We use the REACh-listed material chromium trioxide for wear and corrosion protection. The European Chemicals Agency EChA authorized MTU to continue its use in several of our processes until 2029 on the basis of the extremely safe workplace standards in our surface coating activities. At the same time, we are pushing ahead with the long-term elimination of SVHCs that require authorization. Two technology projects are currently underway with which we are looking for chromic acid/chromium(VI) substitutes. We oblige our suppliers to comply with the EU’s legal requirements (registration, authorization, etc.) via the General Terms and Conditions of Purchase if they use REACh substances in their auxiliary or operating materials.

Our material consumption

The consumption of production materials (alloys, spray powder and steel) amounted to 4,340 metric tons in the past financial year, while the quantity of consumables and supplies was 10,080 metric tons. In total, we needed 16,030 metric tons of materials in 2019, slightly up from the previous year (15,110 metric tons) due above all to a greater requirement for production materials as a result of the ramp-up. Of this total, 10% were made from renewable materials. As part of our Zero mission in Munich, we switched to recycled paper for all printers in 2019, which meant that we were able to obtain just under 1% of our material from recycled sources.

### Material consumption (in tons)

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>16,030</td>
<td>15,110</td>
<td>12,490</td>
</tr>
<tr>
<td>Production material</td>
<td>4,340</td>
<td>3,760</td>
<td>2,520</td>
</tr>
<tr>
<td>Consumables and supplies</td>
<td>10,080</td>
<td>10,030</td>
<td>8,920</td>
</tr>
<tr>
<td>Other materials</td>
<td>1,610</td>
<td>1,320</td>
<td>1,050</td>
</tr>
</tbody>
</table>

Externally sourced material for production sites; production material comprises titanium and nickel alloys and spray powder; consumables and supplies include oils, cooling lubricants, chemicals, lubricants, gases and kerosene and diesel used as fuel; the other material comprises paper, cardboard packaging and wooden pallets and boxes. For the period mentioned above, we compiled our material consumption according to new parameters. As a result, it may deviate from earlier data published for the years 2017–2018. For engine parts, MTU uses returnable packaging that can be reused several times.

Our products require the use of materials that are classified as conflict minerals due to their possible origin in Central Africa and can be problematic with regard to human rights violations. Rather than procuring these mineral raw materials directly, we have implemented appropriate processes in our supplier management in order to comply with our human rights due diligence.  

→ More information about Human rights
Waste management

MTU practices sustainable waste management with the safe disposal of waste sorted according to waste type and recycling process. First and foremost, we try to avoid waste, reuse leftover materials and use waste either for its materials or as energy; if recycling is not possible, waste is disposed of properly. In this way, we seek to minimize material consumption and waste disposal volumes. This is how we achieve high recycling rates over the years. We have abolished single-use drinks cups at our Munich and Hannover sites and replaced them with returnable or deposit cups. As a result, we can avoid using almost 400,000 paper cups per year. Our site in Ludwigsfelde near Berlin also plans to cease using single-use cups.

<table>
<thead>
<tr>
<th>Waste footprint (in t)</th>
<th>GRI 306-2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2019</td>
</tr>
<tr>
<td>Total waste</td>
<td>8,370</td>
</tr>
<tr>
<td>Recycled</td>
<td>7,320</td>
</tr>
<tr>
<td>Disposed of</td>
<td>1,050</td>
</tr>
<tr>
<td>Share of hazardous waste</td>
<td>3,440</td>
</tr>
<tr>
<td>Recycled</td>
<td>2,590</td>
</tr>
<tr>
<td>Disposed of</td>
<td>850</td>
</tr>
</tbody>
</table>

*Production sites only, not including construction waste*

Total waste generation in 2019 amounted to 8,370 metric tons and increased only marginally year on year (+4.5%). Measured against that total, the MTU Group achieved an overall recycling rate of 87.5%. The amount of waste produced and recycling routes depend primarily on production capacity utilization. The share of hazardous waste in the reporting period was 41.1%. In 2019 as in 2018, no soil contamination was found at MTU sites that resulted from the leakage of hazardous materials or pollutants.


UNGC: 7-9
Climate action at our sites

Emissions

We want to continuously reduce the greenhouse gas emissions and airborne pollutants resulting from development, manufacturing and maintenance work in our plants as a contribution to protecting the global climate and improving local air quality. Through numerous measures, we are making progress in these areas.

We support e-mobility solutions: we have installed charging stations on our premises and introduced electric cars and hybrid vehicles to our fleets. We plan to expand the scope of our efforts in this regard in the future.

The use of energy for manufacturing and maintenance in our plants results in emissions of greenhouse gases and airborne pollutants, which contribute to climate change. Additional greenhouse gas emissions occur in the upstream and downstream value chain. The greatest proportion of emissions with an effect on the climate occurs when our products are used. This is why CO₂ and pollutant emissions from our products are of greater relevance to us and form the focus of our sustainability strategy. For a detailed description of how we have used a technology agenda to set ourselves goals for eco-efficient products and how we are striving to achieve emissions-free flight, see the section on → Climate & flying.

We continuously assess greenhouse gas emissions related to the manufacture and maintenance of engines and modules at our plants according to the recognized international Greenhouse Gas (GHG) Protocol. Our aim is to reduce them permanently. Of all the greenhouse gases that the Kyoto Protocol lists as having an impact on the climate—such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFC), perfluorocarbons (PFC) and sulfur hexafluoride (SF₆)—only the CO₂ emissions are relevant for MTU. Our carbon footprint is made up of direct greenhouse gas emissions (Scope 1) from sources owned by the company and of indirect greenhouse gas emissions (Scope 2) that come from the consumption of bought-in electricity and district heating. Upstream and downstream CO₂ emissions, for example generated by suppliers or from business trips and transports in the external logistics chain, fall under Scope 3.
Our contribution to the SDGs

By reducing greenhouse gases, we can contribute to SDG 13 on “Climate action” and live up to our responsibility as a manufacturing company in the face of global challenges such as climate change.

→ Learn more about our contribution to the SDGs

CO₂ emissions

In 2019, MTU emitted a total of 78,800 metric tons (2018: 76,000 metric tons) of CO₂, representing a slight increase in absolute CO₂ emissions of 3.7%. This is due primarily to a rise in Scope 1 CO₂ emissions at almost all sites resulting from higher production volumes. Our Scope 1 emissions are caused mainly by the use of natural gas (which accounts for 20.1% of the overall carbon footprint) and kerosene (also 20.1%); our natural gas requirements are dependent above all on production volume, our kerosene requirement on the type and duration of test runs. At 50.8%, use of electricity (Scope 2) makes up the largest share of CO₂ emissions. Scope 2 emissions have remained at a constant level over the last three years. Our specific CO₂ emissions amounted to 168 kilograms per production hour in 2019.

<table>
<thead>
<tr>
<th>CO₂ emissions (in t CO₂ equivalents)</th>
<th>Scope 1 and 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRI 305-1, 305-2</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>2019</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Total</td>
<td>78,800</td>
</tr>
<tr>
<td>Scope 1</td>
<td>38,200</td>
</tr>
<tr>
<td>Scope 2</td>
<td>40,600</td>
</tr>
</tbody>
</table>

Production sites only. Emission factors according to the GHG Protocol with site-specific emission factors for Scope 2; figures reported here from previous years may therefore deviate from earlier publications. Data on emission reductions from the Munich Business Climate Pact (Klimapakt Münchner Wirtschaft) is calculated according to a standardized emission factor for all companies that differs from our local emission factor.

The Clean Air Industrial Site (CLAIR-IS) program will continue to run at MTU’s headquarters in Munich until the end of 2020. With the help of this program, we want to reduce the CO₂ emissions at the company’s largest plant by 25% (baseline year: 1990). And we aim to do so even though production has quadrupled over the past decade. In total, we have already saved some 448,000 metric tons of CO₂. A new environmental program for the Munich site, with defined reduction targets up through 2022, is being planned.
By the end of 2020, we want to reduce CO₂ emissions at our Munich site by 25%. We have already saved almost half a million metric tons.

Examples of CO₂ savings in 2019

- Using well water for cooling purposes: some 5,600 metric tons
- Turning machines off instead of putting them on standby: 770 metric tons
- Operating BHKW 2.0 cogeneration plant using biomethane: 6,500 metric tons
- Using micro gas turbines: 260 metric tons

MTU is a member of the Munich Business Climate Pact (Klimapakt Münchner Wirtschaft), which entered its second round in 2019 with the slogan “More cooperation—more climate action.” In the first round, we reduced our CO₂ by 7,500 metric tons; now, we have set our sights on cutting a further 5,000 metric tons by 2021. As a manufacturing company, we believe we have a special duty here. This initiative was recognized by the German government as a particularly innovative energy efficiency network at the Hannover Messe 2019. In addition, our in-house Zero mission at our Munich site has launched various actions to minimize consumption and emissions.

Electric driving

Electric cars, hybrid vehicles, electric charging stations—at MTU we are increasingly turning to e-mobility for our transport solutions, and we also support employees in finding a more sustainable way to get to work. We want to increase the proportion of electrically powered vehicles in MTU’s fleet and install more electric charging stations on our premises.

To make our company’s environmental impact still more transparent, we take part in the annual assessment by the international non-profit organization CDP, which collects data on companies’ greenhouse gas emissions, climate risks and climate strategies on an annual basis. By participating, we aim to further improve the climate-related information about our carbon footprint and are currently examining how to communicate business-relevant climate risks and opportunities in the future according to the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). We present our position on TCFD recommendations here.
Electromobility at MTU

We also extend our climate action efforts to cover our transport and logistics chain. Measures include optimizing routes for in-plant transport and using vehicles with better environmental performance or electric motors to reduce fleet consumption. We reduce CO₂ emissions by, for example, setting an upper emission limit for our company vehicles or by using electric cars in our vehicle fleet. In Germany, we have a total of eight all-electric and two plug-in hybrid vehicles in use, representing 6% of the whole fleet. We expect to be able to increase that to at least 10% in 2020. We have installed eight normal charging stations, some of them in employee parking lots. By 2022, we aim to expand the network to as many as 15 charging stations for MTU and employee vehicles, and to offer rapid-charging stations as well. Furthermore, we promote sustainable commuting practices among our workforce, through a special discounted “job ticket” for the local public transportation network or web portals for carpooling. Last year, as part of our Zero mission, we conducted a survey of the 5,527 employees at the Munich site to find out about the transportation they use and sustainable alternatives. We are currently reviewing the results of the survey for potential solutions to put into practice.

Emissions from the transport and logistics chain (excluding company vehicles) fall under Scope 3, for which we do not have complete data. The amount of CO₂ emissions caused by business trips (travel by aircraft, train or rental car) totaled 6,900 metric tons in 2019.

<table>
<thead>
<tr>
<th>CO₂ emissions (in t CO₂ equivalents)</th>
<th>Scope 3 from business travel</th>
<th>GRI 305-3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2019</td>
<td>2018</td>
</tr>
<tr>
<td>Total</td>
<td>6,900</td>
<td>6,600</td>
</tr>
<tr>
<td>Emissions per employee</td>
<td>0.8</td>
<td>0.9</td>
</tr>
</tbody>
</table>

2017–2018: only Germany and Canada, 2019: Germany, the Netherlands and Canada (absolute emissions therefore not comparable with values from the previous year); emission factors according to the GHG Protocol, historical values reported here may therefore deviate from earlier publications.
Airborne emissions

The energy sources we use generate other airborne emissions aside from CO₂ emissions. The use of kerosene, natural gas, electricity and district heating from fossil fuels causes the emission of carbon monoxide, nitrogen oxides, sulfur dioxide and dust. We aim to reduce these emissions as well. For example, generation of electricity and heat in the new BHKW cogeneration plant at the Munich site cuts emissions of nitrogen oxides by 80% and of carbon monoxide by 66% compared to its predecessor. Absolute emissions for 2019 totaled 266 metric tons, which, due to production activities, was above the previous year’s level (+9%). Nitrogen oxides accounted for the lion’s share of these emissions, primarily due to the use of kerosene in test runs.

<table>
<thead>
<tr>
<th>Airborne emissions (in tons)</th>
<th>Scope 1 und 2</th>
<th>GRI 305-7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2019</td>
<td>2018</td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
<td>244</td>
</tr>
<tr>
<td>Carbon monoxide (CO)</td>
<td>42</td>
<td>38</td>
</tr>
<tr>
<td>Nitrogen oxide (NOₓ listed as NO₂)</td>
<td>184</td>
<td>167</td>
</tr>
<tr>
<td>Sulfur dioxide (SOₓ listed as SO₂)</td>
<td>36</td>
<td>35</td>
</tr>
<tr>
<td>Particulates (dust)</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

*Production sites only; data newly recorded for the period detailed above, for which some emission factors were corrected.*
Outlook

In 2019, we analyzed new concepts for climate action at several of our sites, the evaluation of which is still ongoing at the time of writing. Potential implementation of such a concept at the site or group level is therefore still to be determined. It may also be possible to use sustainable aviation fuels across the Group, which would enable us to perform sustainable test runs on our test stands using climate-neutral fuels. We will continue to investigate the feasibility of this approach with regard to economical, technical and approval-related considerations.

GRI: 102-3, 103-2, 103-3, 305-1, 305-2, 305-3, 305-4, 305-5, 305-7

UNGC: 7-9
We work with numerous suppliers around the globe; they play a key role in our value creation. We have a shared goal: to work together as partners to achieve sustainable production. As a basis for this collaboration, we have defined the environmental and social criteria that are important to us.

The value added of an MTU product includes important pre-production stages at external suppliers. We seek to create reliable relationships with those suppliers based on mutual trust. In keeping with our claim of sustainable value creation and the expectations of our stakeholders, we uphold certain standards in purchasing. For us, the pursuit of sustainable supplier management (responsible sourcing) encompasses environmental and social aspects as well as transparency along the supply chain. Key sustainability requirements are mandatory for suppliers. We place the same standards as regards sustainability on the collaboration with our suppliers that we do on our own business activities. To a large extent, the same standards apply to both of MTU’s business segments: new and spare parts (original equipment manufacturer: OEM) and commercial maintenance (maintenance, repair and overhaul: MRO). However, they each have their own organizational units for sourcing production material.

Because today’s supply chains are so global, extensive and complex, we concentrate our efforts regarding sustainability aspects on the supply step immediately upstream (tier 1). However, our direct suppliers are contractually obliged to ensure that their subcontractors also abide by our defined standards. In 2019, our sites worked with 6,253 suppliers around the world; our supplier base was smaller than in the previous year (2018: 6,983), especially regarding OEM suppliers from Germany. Europe is home to 82.9% of the suppliers, with 63.9% of the total number of suppliers located in Germany.
The purchasing volume for production material in the OEM business in 2019 ran to some EUR 611 million for the OEM business (2018: EUR 516 million) and to just under EUR 2.4 billion for MRO (2018: EUR 1.9 billion). In 2019, we purchased non-production material to the tune of EUR 720 million for OEM and MRO combined (2018: EUR 510 million). By and large, we were able to source production and non-production material for the OEM business at our own discretion. By contrast, MRO purchasing volume for spare parts and repair work is subject to strict requirements imposed by the relevant OEMs. As a result, MTU Maintenance has less room for maneuver in selecting suppliers. The sole exception is MTU Maintenance Lease Services (MLS) in Amsterdam.

Measured by purchasing volume, the Western Europe and North American markets, which are so important generally for the aviation industry, account for the lion’s share of MTU’s procurement. In the business for new and spare parts, we procure across the entire breadth of the supply chain, from blanks to finished parts. We always source castings and forgings externally, and the same goes for special materials for which MTU has not built up manufacturing expertise, such as electronic control systems. If possible, we source our supplies directly from the manufacturers of blanks or finished parts, whereby the company procures raw materials itself only to a small extent (→ The measures we take regarding conflict minerals in raw material purchasing). For commercial engine modules, the average proportion of sourced parts lies between 52% (Poland) and 69% (Germany).
Purchasing volume 2019 by region (in EUR m)

Local value creation is particularly important when purchasing non-production material and services, as is the wide variety of goods and services. We procure non-production materials predominantly in the countries in which we operate. The local proportion of the purchasing budget (production and non-production material) was 19.6% in Germany and 44.3% in Poland. Overall, MTU sourced 18.7% of its entire purchasing volume from local suppliers.

Our contribution to the SDGs

Through responsible supplier management, we can help achieve a number of the global Sustainable Development Goals. In particular, we view our commitment to fair, global supply chains for our products through compulsory social standards as a contribution to SDG 8 on “Decent work and economic growth,” and also as an expression of our corporate social responsibility outside our factory walls. Through compliance requirements for suppliers, we support, for instance, SDG 16 on “Peace, justice and strong institutions,” a secondary objective of which calls for reducing corruption and bribery worldwide.

→ Learn more about our contribution to the SDGs
Setting sustainable standards in purchasing

We have established a binding Code of Conduct for Suppliers that is a fixed component of the contracts. The code is informed by the ten principles of the UN Global Compact and contains the following social and environmental standards: respecting internationally recognized human rights, observing the International Labour Organization's (ILO's) core labor standards, protecting the environment and combating corruption. Each contract signed by a supplier includes the commitment to abide by these principles and to communicate them to subcontractors. The Code of Conduct applies to suppliers of the European manufacturing sites and of MTU Maintenance Canada and MTU Aero Engines North America, and therefore to 75% of the Group reporting entity. Moreover, MTU's General Terms and Conditions of Purchase also contain environmental, social and compliance stipulations. In our General Terms and Conditions of Purchase for our European sites, we also insist on compliance with the EU's REACh chemicals regulation. When managing our suppliers, we place a particularly strong focus on safeguarding the respect of human rights. This topic is presented separately in the chapter on corporate governance. → Human rights and conflict minerals in the supply chain

To raise awareness of sustainability standards in the supply chain, we regularly provide purchasers with training on professional compliance matters and on the MTU Code of Conduct, which applies to all the company’s employees and prohibits corruption, bribery, the granting of undue advantage, and anti-competitive behavior. Our purchasers are also trained on the Code of Conduct for Suppliers. In addition, we offer special corporate responsibility training, including bespoke training for purchasers.

Suspicions that the Code of Conduct for Suppliers may have been breached can be reported confidentially to MTU’s Compliance Officer. Reports can also be submitted anonymously via the web-based iTrust system, which is available in several languages. Should a supplier be implicated in charges of corruption, extortion, the granting of undue advantage or the use of child labor in the execution of a contract for MTU, the collaboration agreement will be terminated without notice. If other principles of the Code are violated, the supplier must demonstrate that suitable corrective measures have been initiated and implemented and must guarantee this in writing. MTU reserves the right to carry out on-site audits to verify compliance with the Code of Conduct. No accusations of possible breaches of the Code of Conduct were reported or registered during the period under review. Nor were there any complaints about suppliers. Therefore in 2019, as in previous years, no supplier partnership was terminated because of sustainability deficiencies, confirmed cases of corruption or other complaints.

Risk management and assessment

We believe partnerships based on trust are key to sustainable supplier management. For this reason, we seek out long-term relationships with our suppliers. In the OEM business unit for aircraft engines, for example, a large proportion of the materials and services is based on contracts with a typical term of two or more years. Contractually agreed buffer inventories allow us to respond quickly to fluctuations in demand. In the reporting year, MTU worked with 1,407 new suppliers (2018: 1,019), or 22.5% of the total (2018: 14.6%). All suppliers are vetted before being accepted into MTU’s supply chain. This process includes a binding supplier disclosure and contractual undertaking to comply with the Code of Conduct. MTU’s engine leasing business, Amsterdam-based MLS, has its own separate but similar process. To cover environmental aspects, we request proof of certification to standards such as ISO 14001. Using periodic evaluations, we regularly review existing suppliers, including with respect to their ISO 14001 certification. Once approved, suppliers must regularly demonstrate their ISO 9001 compliance for quality management via re-certifications. We present our analysis of risks relating to human rights in the supply chain in this report under → Human rights. We plan to further develop this in the future.
Outlook

Our plan is to integrate sustainability aspects into supplier audits for the OEM and MRO business.

GRI: 102-9, 102-10, 103-2, 103-3, 204-1, 205-3, 308-1, 308-2, 407-1, 408-1, 409-1, 412-3, 414-1, 414-2

UNGC: 1-5, 8