















Sustainability report
2017

Content

 Introduction
<hr/>
 Holistic approach to sustainability
<hr/>
 Ethics and compliance
<hr/>
 Organizational super segment
<hr/>
 Operational super segment
<hr/>
 Commercial super segment
<hr/>
Glossary
<hr/>
Corporate information
<hr/>

 Introduction	3	 Organizational super segment	21
Sustainability and why we care about it	4	Sustainability-related organization	22
CEO statement	5	Stakeholder engagement	23
Key impacts, risks and opportunities	6	Science Based Targets initiative	25
About this report	7	Collaboration at industry alliances	26
Reporting standard	7	Customer satisfaction rating	26
Report boundaries	7	Sustainability supply chain management	27
Report format	7	Conflict minerals	28
Report validation	7	RoHS / REACH	28
Report content	7	Corporate social responsibility	29
Reporting metrics	7	Labor and human rights	29
Identified material aspects	7	Employee diversity	29
About ADVA Optical Networking	8	More facts and figures	30
Fiber-optic transport	8	Girls' Day 2017	32
Ethernet	8	Global Sustainability Challenge update	33
Software	8	Health & safety	34
Synchronization	8	Further benefits	36
Monitoring	8	Training and development	36
Company key facts	9	ADVA University	37
ICT and its environmental impact	10	Social engagement / volunteerism	38
 Holistic approach to sustainability	11	 Operational super segment	39
Our approach	12	Environmental management	40
Mission	13	Resource efficiency	40
Sustainability strategy	14	Carbon emissions (Scope 1-3)	41
 Ethics and compliance	16	 Commercial super segment	42
Our values	17	End-to-end delivery	43
ADVA Optical Networking's compliance management system	18	Transport mode	43
Business partner compliance	19	New transport mode: railway	43
ADVA position on slavery and human trafficking	20	Packaging optimization	43
		Circular economy	44
		Eco design	45
		Portfolio lifecycle assessment	45
		Eco design and the SBTi	46
		Product design guide update	47
		Glossary	48
		Corporate information	50

Introduction





Sustainability and why we care about it

At ADVA Optical Networking, we take sustainability seriously. We have adopted the holistic mindset of “The Triple Bottom Line” – planet, people, and profit – to support sustainable growth worldwide, and to take advantage of related opportunities by reducing the associated risks. For us, sustainability means protecting the environment, enriching our people and growing our businesses. We take responsibility for supporting sustainability in terms of business practices, through the actions of our employees, in relationships with our business partners and in the products and solutions we design, develop, market and support.

Our commitment to sustainability is not a recent development. Since our beginnings in the 1990s, we have focused on our impact on employees, communities, suppliers and the environment. In-line with our growing size and organization, ADVA adopted a continuously broader and more holistic view of sustainability, always trying to find the best approach for supporting its sustainability goals.

Continuous improvements of ADVA’s sustainability performance are getting more and more important in particular also for economic reasons. Our customers want us to demonstrate this every day. Being driven by increasingly tight legislation and the demands of their investors, they often set ambitious goals for sustainability not least to also refine and improve their branding. ADVA’s achievements in sustainability thus also helps our business partners. So called “greenwashing” is not an option.

Finally, our commitment to sustainability also supports reducing costs, e.g., by moving towards a truly circular economy. With that in mind, we are working with customers to reduce surplus inventories, implement just-in-time delivery and take back products for reuse, re-purpose or recycling with the intention to conserve natural resources and reduce emissions.

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

Anyone who believes exponential growth can go on forever in a finite world is either a madman or an economist.

Kenneth Boulding



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

CEO statement

G102-14

Social and environmental practices are important to ADVA Optical Networking because they support sustainable success for our business partners, our company, our children and most importantly our planet helping to maintain a healthy quality of life well into our future.

We follow a Triple Bottom Line approach to support both our and our business partners' people, unburdening our planet and increasing our profits sustainably. Since our products drive our environmental impact through their long-life use, we are continuously innovating – creating better, smaller and more efficient products that help our customers reduce their carbon footprint. This has most recently also become our goal in the Science Based Targets initiative.

In 2017, we again improved many areas of our holistic sustainability approach. Given the group's size, it might seem implausible that we can make a difference. However, we are doing just that, which also helps our customers and other stakeholders. We have implemented formal environmental design requirements for all new products. We are continuously optimizing packaging and transport. The next steps, again in line with the Science Based Targets initiative, will tackle our own sites' emissions.

To be clear, this engagement is not fully altruistic. Of course, we are actually focusing on increasing revenues and building profits. Our goal is enduring business success. Over the long run, sustainable practices are the only way to save resources and reduce many of the related cost.

I take full responsibility for driving ADVA forward with a balanced focus on the Triple Bottom Line. We design, produce and sell the best technology. Our solutions are transforming our customers' networks, and consequently our societies' digital landscape. We also understand business success is not just about making the best technology. To realize true leadership, we take the extra steps along the way to ensure our business success is enduring and we support the success of our people and the wellbeing of our natural world.

This just makes sense – good business that results in the greater good for our world and our business partners.

Brian Protiva
Chief executive officer





Key impacts, risks and opportunities

G102-15, G102-11, G201-2

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

ADVA Optical Networking has adopted a holistic approach towards sustainability, covering all of its different areas. Not all such areas are, however, equally important in terms of their impact on the group's business. In recent years, more and more ADVA customers have asked for testimonials of our sustainability strategy, action plans and performance evaluations, typically focusing on some specific areas. Failure in demonstrating our sustainability leadership would have substantial negative impact on our business. ADVA's focus areas thus largely follow the demand of our customers.

At the same time, legislation related to sustainability may change, requiring immediate attention. This may include reporting obligations regarding non-financial parameters. Moreover, regulation governs the use of substances in ADVA's product components. For example, if substances are moved from the REACH candidates list into Annex XIV of the REACH Regulation, this can have a significant impact on the related components' availability, requiring additional effort on the group's side.

Finally, the main threat that falls under sustainability, global warming, may have unprecedented impact on our business, as well as everybody else's.

Our sustainability work can also lead to increased awareness and reputation. A recent example is our participation in the Science Based Targets initiative (see the [respective chapter](#) in this report). Through our work, we can help to focus others on sustainability issues and the value of sustainable technology. It is in our hands to offer our customers the most energy-efficient technology that produces the lowest levels of emissions. We can also help by increasing the use of carbon-neutral energy, e.g., by purchasing it for an increasing number of our own sites. Finally, but equally importantly, we can indirectly support the IPCC's climate goals through related discussions and interactions with our stakeholders.

Due to the potential need for additional efforts, sustainability also poses some risks to the development of the group. Given our solid sustainability-related performance (see the chapter [Holistic approach to sustainability](#) in this report), those nevertheless seem to be limited to potentially upcoming, more stringent legal requirements.

One example of this would be more stringent requirements for a more-efficient circular economy, e.g., by extending the EU WEEE Directive from B2C to B2B business. This would necessitate material upfront investment in reverse logistics and parts of the upstream and downstream value chain resulting in short-term costs. The potential net impact is estimated to be below EUR 5 million on the group's pro-forma operating profit for three accumulative years. The net likelihood of occurrence is estimated to be smaller than 25%.

Moreover, there is a certain likelihood that new legislation may be limited to certain regions, resulting in a cost advantage for competitors located in regions where said obligations do not apply. The potential net impact and the net likelihood of occurrence is the same as for the aforementioned risk.

Finally, risks related to product eco design are not broken down in detail but are included in the various risks related to our innovations, as described in detail in the group's financial statements. For all material risks, the group not only assigns a dedicated risk owner but also implements robust strategies and processes for risk mitigation.

In summary, it is clear that sustainability-related requirements have a high impact on the group's success. ADVA's proven track record means that sustainability thereby offers many opportunities that clearly outweigh the described limited risks. Such opportunities can consist of competitive advantages through cost advantages, lower environmental footprint (e.g., CO₂ footprint), or simply better reputation. Moreover, the group's opportunities may extend into the segment of sustainability-related supply-chain management, e.g., in cases where the group supports some of its suppliers in getting better related performance. This would not only help the respective suppliers, it would also lead to potentially better relationships.



About this report

G102-2, G102-7, G102-46, G102-47, G102-54, G102-56

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

Report obligation

This sustainability report is used to fulfill the obligations of HGB §289b ff., §315b ff. (German Commercial Code) on non-financial (company) reporting.

Reporting standard

This report is based on the Core option of the Global Reporting Initiative (GRI) Sustainability Reporting Standard.

Report boundaries

The report covers the period from January 1, 2017, to December 31, 2017. It contains data relating to ADVA Optical Networking SE including all wholly-owned subsidiaries. Together, these are referred to, collectively, as “we”, “us”, “our”, “the company”, “the group”, “ADVA” or “ADVA Optical Networking” hereinafter.

Report format

As part of our commitment to reduce our corporate carbon footprint, this sustainability report and the associated GRI index file are available as electronic copies only.

Following new reporting obligations, the text document of the sustainability report is also available in German. The GRI index file is available in English and German as well. Note, however, that due to the translation of the indices themselves, the German index file is not identical to the one sent to us by GRI. An official German version was not available when finalizing this report.

Report validation

This report is the group’s fourth stand-alone sustainability report. It has been validated externally by Quality Austria in April 2018. The external assurance statement can be viewed on our [Sustainability webpage](#).

Report content

This report provides an overview of our sustainability strategy, actions and achievements and the focus areas that are of greatest importance to our stakeholders and have major influence on our business success. The content structure follows the QuEST Forum sustainability model that is explained later. This is done to emphasize the relevance of that model to us, as a means for providing a structured approach and identifying material aspects.

Reporting metrics

Our reporting of environmental key performance indicators (in first place, carbon dioxide equivalent (CO₂e) emissions) has been changed from revenue-related intensity metrics to value-added-related intensity measures, e.g., GEVA (Greenhouse-gas Emissions per Value Added). This is in line with requirements from the Science Based Targets initiative.

Identified material aspects

Our sustainability materiality analysis approach and the identified material aspects are explained in the chapter [Stakeholder engagement](#).

Our [Sustainability webpage](#) contains additional general information on our sustainability programs, specific policies, and the GRI index file which is part of this report.



About ADVA Optical Networking

G102-2

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

ADVA Optical Networking develops, manufactures and sells solutions for a modern telecommunications infrastructure. The group’s addressable market encompasses several applications for fiber-optic transmission technology, Ethernet access technology and solutions for network virtualization, synchronization, and monitoring. The demand for the group’s solutions is driven by the global megatrends of the information and communication technology (ICT) “cloudification” and “mobility”, which in turn fuel the demand for universally available bandwidth.

Fiber-optic transport

Optical fiber is the optimum physical medium to transmit large amounts of data over long distances. The bandwidth-over-distance capabilities of fiber by far exceed those of any other physical medium such as copper or wireless technologies. Therefore, fiber-optic transport is the unchallenged foundation for all high-speed networks. ADVA’s optical transmission solutions are based on wavelength division multiplexing (WDM). With WDM, multiple data streams are transmitted simultaneously over a single pair of optical fibers by modulating, per direction, each stream onto an individual wavelength (i.e., color) of laser light. Every wavelength (more than 100 in total) carries different applications such as voice, video, data or storage traffic. Combining (i.e., multiplexing) these wavelengths at one end of the fiber, transmitting them over distance and then separating (i.e., demultiplexing) them at the far end maximizes the fibers’ capacity and makes transmission more efficient. WDM supports all data protocols and transmission speeds, and is the natural foundation for all high-capacity networks.

Ethernet

Ethernet is the dominant OSI-Stack Layer-2 data-link protocol for today’s networks, supporting virtually all communication applications. ADVA provides feature-rich Ethernet transmission and demarcation solutions for fiber-based networks used to interconnect enterprises and mobile-network base stations with carrier networks. Features include aggregation, synchronization, monitoring, encryption, and virtualization.

Software

The importance of software in networking technology is increasing rapidly. On the one hand, network operation and monitoring are automated by means of intelligent software. This increases user friendliness and simplifies network control and maintenance. On the other hand, more and more network functions are virtualized (network function virtualization, NFV). With NFV, the tight coupling between hardware and software in network elements is dissolved, and individual network functions can be developed and provided independently of the underlying hardware. NFV is also one of the key technologies in data centers that enables reductions in energy consumption and therefore greenhouse gas (GHG) emissions.

Synchronization

Reference clock sources that deliver highly precise frequency and time-of-day information are crucial to the effective transmission of digital signals in several applications and network domains. Especially in mobile networks, the availability of highly accurate synchronization and timing information is crucial for network-capacity increase and therefore, best end-user experience. With a complete end-to-end solution portfolio sold under the Oscilloquartz brand, ADVA Optical Networking can offer a smooth evolution across multiple generations of synchronization technologies.

Monitoring

Monitoring is not restricted to digital performance monitoring, as it is done in our transport and Ethernet-demarcation gear. It can be extended to the passive fiber plant, in particular in the fiber-rich access space. Here, it helps guaranteeing fiber integrity and supervising complex fiber plant, even if the respective fibers are not yet lit by active gear. This enables, for example, certain service-level agreements. With the Advanced Link Monitoring (ALM) product line, ADVA Optical Networking can offer cost-effective and unique solutions that help our customers in not losing the view on their valuable passive fiber assets.



Company key facts

G102-4, G102-7

- Employees**
 1,894 worldwide as of December 31, 2017.
 For our global presence, please see the picture below.
- Quality and environmental commitment**
 ADVA is TL 9000, ISO 9001, ISO 14001, ISO 22301 and ISO 50001 certified.
 We also perform product lifecycle assessments (LCA) according to ISO 14040/14044.
- Public listing**
 ADVA Optical Networking is stock-listed as ADV in the Prime Standard segment at Frankfurt Stock Exchange.

You can find more about ADVA in our [Annual Report 2017](#).

For any questions or comments regarding sustainability, please contact us at sustainability@advaoptical.com.

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



Global presence of ADVA Optical Networking



ICT and its environmental impact

G102-29

ADVA Optical Networking products are part of the global Internet, or ICT sector. As such, they are part of a sector that contributes approximately 2% of global greenhouse gas (GHG) emissions. On the other hand, this same sector potentially enables GHG emissions abatement that is up to 10 times higher than its own emissions. This is sometimes also referred to as Green-by-ICT. It is one of very few known ways of substantially reducing global energy consumption.

The global ICT sector can be split into three areas: data centers, networks, and end-user devices. The networks segment in turn splits into two approximately equally large parts, wireline and wireless networks. ADVA Optical Networking products, including data center interconnect (DCI) solutions, fall into the wireline networks category. The ICT data-centers segment mainly consists of servers, switches and storage.

The relative and absolute impact of the wireline networks segment on global ICT GHG emissions can be derived from the following picture. It shows that in particular the emissions of the networks segment are predicted to grow significantly over the next couple of years, highlighting the need to continue to optimize the impact of the related products.

A brief description of our main products for better understanding was given before. More details in particular on the energy efficiency of our products (which is the major parameter influencing GHG emissions) can be found in the [Eco design](#) chapter.

Within the wireline networks sector, ADVA ranks amongst the top 10 suppliers in the optical-networking and access-switching sub-segments. Since the wireline-networks segment also contains copper and passive optical access networks, routing and switching, none of which is covered by the group's portfolio, the total impact of our products to this sub-segment is <1%.

Following comprehensive GHG reporting or lifecycle assessment (LCA, explained in here later), energy consumption and the related emissions are ICT's primary environmental impact. However, there are other, less important impacts. Examples include resource depletion, (eco-) toxicity and some more, all of which can be calculated with LCA. Finally and less environmentally related, there are the aspects of labor, health and safety, and conflict minerals. Together, all of these mandate a holistic approach to sustainability in ICT.

Introduction

Holistic approach to sustainability

Ethics and compliance

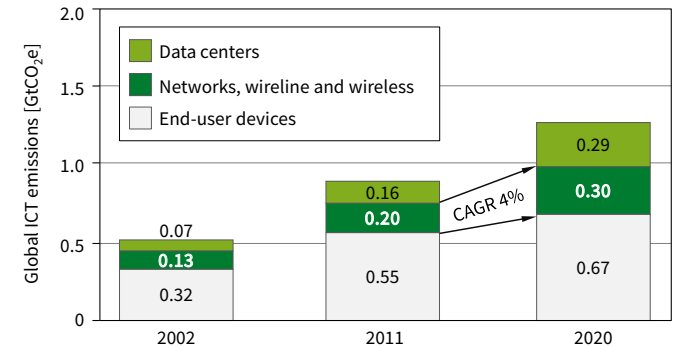
Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



Global ICT GHG emissions projections [GeSI SMARTer 2020: The Role of ICT in Driving a Sustainable Future, GeSI and BCG, 2012]



🌍 Holistic approach
to sustainability



Our approach

G102-11, G102-12, G103-1, G103-2, G103-3

ADVA Optical Networking’s sustainability program is based on a holistic model which covers all related aspects:



The sustainability model used in the QuEST Forum Sustainability Initiative

The model has been developed by British Telecom for sustainability assessments in their supply chain. It has been adopted by the QuEST Forum Sustainability Initiative, and consequently, it is used by several other companies in telecommunications. The group uses the model since five years due to its QuEST-Forum-proven capability to provide structure and prioritizing guidance throughout all relevant aspects of sustainability.

The model is organized into three superordinate segments:

The **Operational super segment** covers aspects which are mainly related to the (production) sites of the reporting company. Details are defined in the three segments: Environmental Management, Resource Efficiency Optimization, and CO₂ Footprint & Ozone Depletion. These segments consider the planet aspect of the Triple Bottom Line, they can be regarded, e.g., by compliance with the ISO standards ISO 14001 and ISO 50001, and GHGP CO₂ reporting and associated reduction strategies.

The **Organizational super segment** contains the aspects that are related to people and business partners. The segments Stakeholder Engagement and Supply Chain Management describe the sustainability-related interactions with several groups of business partners. The segment Corporate Social Responsibility (CSR) covers the Triple-Bottom-Line aspect of (our) people.

The key aspect of the **Commercial super segment** is circular economy (CE). CE aims at a drastic reduction of raw-material intake as well as of the resulting waste. This includes engaging all relevant business partners in the related business models, e.g., take-back or second life.

The basic concept behind CE is longevity. This is the combination of extended product lifetime, product second life, parts reuse, and optimized recycling. Such recycling must be supported by product eco design that eases disassembly and avoids certain materials and material composites. These recycling capabilities must be complemented by optimized logistics that efficiently support the take-back of the related products.

The sustainability model is complemented by the QuEST Forum Sustainability Assessor, a web-based tool which supports straightforward sustainability (self-) assessments. Its use in ADVA’s supply-chain management has started in late 2016. It helps developing our suppliers’ sustainability performance and strategy, if required. In addition, the group itself is regularly rated using the Assessor tool.

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

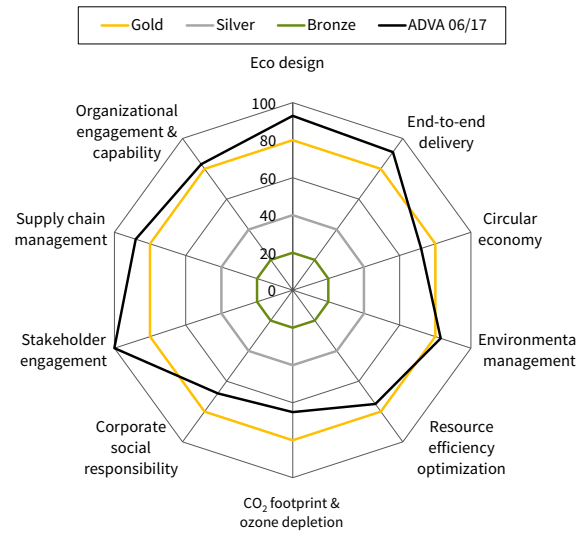
Commercial super segment

Glossary

Corporate information



The latest group's results of 2017 showed our first "Gold" ranking across all segments of the sustainability model:



Assessor sustainability ranking results as of June 2017

Furthermore, the group is regularly assessed regarding its sustainability performance on behalf of large customers on other independent platforms. These include the **Carbon Disclosure Project (CDP)** and **EcoVadis**.

In 2017, we also achieved our first EcoVadis "Gold" ranking. The assessment aspects fall into all three super segments of the QuEST Forum sustainability model.



Within the annual CDP assessments, aspects related to water and deforestation are not included. Following an initial comprehensive analysis and related declaration, these areas are not considered material for the group.

Mission

Since its foundation in 1994, ADVA Optical Networking has grown into a mid-sized corporation with subsidiaries and business partners around the world. In line with our mission to be the trusted partner for connecting, extending and assuring the cloud, we develop, produce, install and service products that are incremental for the optical networks of hundreds of telecommunication and internet service providers, and thousands of international corporations and research and government institutions.

Sustainability has become a ubiquitous requirement worldwide. This is reflected by our sustainability strategy and actions. It led to our holistic sustainability approach. This approach allows us to maintain and support sustainable business and growth in the sense of the Triple Bottom Line, thus unburdening the planet, appreciating people, and increasing profit.

Regarding the planet, the single most critical aspect currently is global warming, or the necessity to reduce CO₂ emissions worldwide drastically in order to be able to achieve the IPCC climate goal of a maximum global temperature increase of 2°C, compared to the pre-industrial status. This is reflected by the group's participation in the Science Based Targets initiative, as one of the first 200 companies worldwide.

In the people segment, the respective stakeholder groups must be considered regarding their relevant sustainability needs. This primarily relates to our employees, our business partners and our communities. This area is also served under the term corporate social responsibility. With our more holistic view, CSR is complemented by the sustainability-related aspects in our supply-chain management and stakeholder engagement.

Finally, profit itself ought to be sustainable. This leads to the necessary renunciation of the non-scalable take-make-use-forget economy, and the associated change towards the concept of circular economy. This concept leads to new business models like take-back and re-use which need to be prepared for large-scale rollout. This must be supported by product eco design, efficient (reverse) logistics, and sustainable manufacturing.

Here, our holistic view on sustainability comes full circle.

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



Sustainability strategy

G102-14, G103-2

The aim of our sustainability strategy is to balance the different aspects of sustainability, in the sense of the Triple Bottom Line, and according to the different sustainability requirements of all relevant groups of stakeholders. This is supported by the sustainability model we use, and it is reflected in the group’s sustainability materiality analysis.

This does not mean that there are no specific focus areas. In the QuEST Forum sustainability model, the different segments do have different weight. The three segments that relate to CO₂ emissions and global warming the most – product eco design, circular economy plus CO₂ footprint and ozone depletion – have a combined weight of 45%, thus underlining the importance of emissions reductions. Consequently, emissions reductions are the number-1 goal of the group, and the only area with numerically defined performance indications. The latter has been submitted to the Science Based Targets initiative (SBTi) in 2017 for formal approval.

Our SBTi goals cover all GHGP Scopes. In Scope 1, car-fleet emissions are envisaged. In Scope 2, the goal relates to reductions in purchased-electricity emissions. In Scope 3, we set an ambitious goal for the sold-products use-phase emissions, since this is by far our largest emissions contribution (despite the fact of long-term eco design which led to energy-efficient products). For details, refer to the [SBTi](#) chapter in this report. It must be noted that the new SBTi emission-reduction targets have run-times of up to 15 years, which is recommended by the SBTi. From the moment of official approval, they replace the group’s older emission-reduction goal as stated in the last Sustainability Report.

The SBTi targets are intensity-related, i.e., the emissions reductions do consider company growth. Relevant SBTi references require that targets, if they are not defined in terms of absolute reduction, be related to the company’s value added. This leads to goals that are defined as GHG Emissions per Value Added, or GEVA. This concept has been used for our targets.

The group’s sustainability strategy is focused at CO₂ emissions reductions. This covers the planet pillar of the Triple Bottom Line. It is underpinned by numerical KPIs, namely the ones defined for the SBTi. For other environmental areas such as water, waste or deforestation, no externally communicated KPIs have been set. This is because the impact that the group causes in these areas is smaller by orders of magnitude when compared to GHG emissions. For water and waste, year-over-year reduction is targeted. This can be followed in the sustainability reports.

In order to also consider the other pillars of the Triple Bottom Line, two further strategic initiatives have been started in 2016 already. These initiatives relate to circular economy, and people and partners, respectively.

Regarding circular economy, the strategic goal is its preparation for broad-scale application. We already follow certain circular-economy processes, including refurbishment, parts reuse and of course WEEE recycling. However, a massive shift from linear to circular economy requires further strategic consideration, e.g., with respect to the related business models and logistics. No externally communicated numerical KPIs have been set here. Instead, successful preparation of broad-scale circular economy in good time is the goal.

Reduce GHG intensity emissions (GEVA) in all GHGP scopes with Science Based Targets

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



Finally, strategic initiatives relate to people and partners. Obviously, this can be assigned to the Triple-Bottom-Line people pillar. In the QuEST Forum model, it falls into the Organizational super segment.

Regarding partners, this addresses improvements in sustainability-related supply-chain management and supplier diversity. Regarding our employees, several complements to our ongoing CSR activities are under planning and implementation. Again, no externally communicated numerical KPIs have been set here.

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

Category	Key objectives	Key initiatives / activities	Status
CO ₂	Decrease intensity-related global ADVA CO ₂ footprint (GEVA)	Have SBTi targets approved by SBTi, adopt GEVA concept Achieve SBTi KPIs within stated target runtime	Ongoing Started
Circular Economy	Prepare broad scale CE business	Identify and prepare internal processes that need to be scaled up Select further partners for reverse logistics, refurbishment and reuse Improve recycling, in particular by applying the Design Guide	Started Ongoing Ongoing
People & partners	Improve different sustainability aspects in the people & partners area	Improve sustainability SCM by Assessor roll-out and audits Complement procurement, e.g., by diversity aspects Integrate sustainability into our Employee Satisfaction Survey Complement our CSR by relevant standards (ISO 45001)	Started Started Started Planned

Ethics and compliance





Our values

G102-16, G205-2

Our sustainable success is based on strong core values, modelled by the top and demonstrated by example. All (line) managers are aware of their respective responsibilities. Specific leadership principles foster such understanding. Taken together, the following core values and leadership principles (collectively: “Values”) support sustainability in everything we do.

Teamwork. We embrace open communication and collaboration. We are committed to promote an inclusive work environment that values diversity of people and thought. With 1,894 employees at year-end 2017 located in more than 30 different sites and representations around the globe and an international ADVA Works Council without trade-union ties, teamwork is what makes ADVA exceptional.

Excellence. We are striving towards excellence in whatever we do. This includes our commitment to consistently exceed customer expectations. In order to measure our respective success, annual surveys are conducted measuring the group’s Net Promoter Score. Throughout the last years, significant improvements were achieved yielding high scores. They are shown in the detailed overview in the [Customer satisfaction rating](#) chapter in this report.

Accountability. Our strategic goals “Growth and profitability”, “Innovation”, “Operational excellence” and “People” are the cornerstones of our corporate development. They are tied to specific performance indicators and updated on an annual basis. Meaningful departmental, team and employee objectives support the achievement of our strategic goals and are reviewed and updated every six months.

Motivation. The group strives to engage and motivate its employees. Besides anonymous satisfaction surveys, regular breakfast meetings with a member of ADVA’s board are organized and allow for a personal discussion of areas of concern. Resulting action items are followed up with by the board.

Integrity and honesty. Compliance with applicable laws and regulations and the adherence to the company’s ethical standards and principles (“Compliance”) is essential for establishing trust with our customers, suppliers, partners and colleagues. Our commitment to integrity and honesty translates into our [Group Code of Conduct](#) and a clear and precise allocation of responsibilities for ensuring compliance.


Decisiveness. Timely and informed decision-making is essential for keeping up with our industry’s ever increasing pace of innovation. To ensure continuous personal development, we implemented a holistic management training program which is mandatory for all concerned employees.


Respect. The group takes on an active role in the local communities that we are operating in. This includes humility in our manners and respect and courtesy when treating others. The same applies also internally and regardless of the level of hierarchy involved.

 Introduction

 Holistic approach to sustainability

 Ethics and compliance

 Organizational super segment

 Operational super segment

 Commercial super segment

Glossary

Corporate information



ADVA Optical Networking's compliance management system

G205-2, G206-1, G404-1, G415-1

Our values are the cornerstone of who we are. They translate into the ADVA Group Code of Conduct ("Code") which sets forth the ethical standards that every employee, manager, director and officer of the company (collectively "employee/-s") needs to comply with. Ensuring compliance requires an organizational framework based on applicable laws and regulations, international standards and industry best practices. While such may deviate from country to country, they are very similar in terms of the required compliance management system (CMS). Considering this, we implemented a CMS in particular consisting of:

- A corporate culture characterized by integrity, accountability, transparency and a strong "tone from the top" ("Leadership")
- Periodic identification of the company's compliance risks ("Risk assessment")
- Proportionate risk mitigating processes ("Documented procedures")
- Adequate training and communication of all compliance elements and measures as well as respective processes ("Training and communication")
- Means for in-person as well as anonymous reporting of potential compliance violations including clear internal reporting lines, an external ombudsman and a third party Ethics and compliance helpline ("Reporting and whistleblowing")
- Proportionate responses to compliance violations in line with our principle of zero tolerance ("Investigations and response")
- Continuous improvement of the CMS based on identified weaknesses ("Monitoring and auditing")

The group's CMS is supported by a central compliance department located in Munich, Germany, and six regional compliance officers (RCO/-s) that support compliance in addition to their regular function at the company. The RCOs strengthen ADVA's local culture of compliance, erase any potential boundaries preventing employees from reporting concerns, and contribute their specific functional expertise to the group's CMS. Their activities are coordinated by ADVA's chief compliance officer who reports to the chief executive officer and the supervisory board. Whenever employees have questions or suggestions related to compliance or suspect incidents of non-compliance, they are encouraged to speak up. Besides a variety of clearly defined and actively communicated internal points of contact, an external ombudsman and an externally operated [Ethics and compliance helpline](#) enable confidential and anonymous reporting.

Any employee is eventually responsible for his/her own actions. This understanding is acknowledged and documented by all employees when signing the company's compliance acknowledgements and supported by in-person compliance trainings. At the time of this report, 99% of all employees had committed in writing to comply with the group's code and all group-wide policies. This included employees from newly acquired companies. Moreover, nine dedicated compliance trainings were conducted within 2017 counting close to 500 participants. Finally, no confirmed incident of corruption or anti-competitive behavior had taken place within the reporting period and no such case had been brought against the company at the time of this report.

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



Business partner compliance

Our commitment to compliance extends to our suppliers, service providers and intermediaries (“business partners”). As we could be exposed to substantial legal as well as reputational risks in this area, a two-step approach ensures effective risk mitigation. First, risk-based due diligence is exercised for any (new) business partner. Second, robust contracting and continuous monitoring aims to further mitigate our related risks. Business partners provide a broad variety of different services. The risk of unethical behavior differs accordingly and may involve corruption, labor law violations, product compliance concerns or other unwanted conduct. In order to allow for a targeted and risk-based due diligence prior to entering into a business relationship, specific business partner categories and proportionate financial thresholds were defined. As for anti-corruption, relevant types of business partners in particular include the following:

- Sales reseller and sales agents
- Customer service provider
- Logistics service provider
- Marketing/event service provider
- Organizations or associations

In order to ensure robust and standardized evaluations, we implemented a tool-based due diligence process which is semi-automated as far as possible. This typically includes a first high-level risk assessment on the basis of predefined criteria, an internal feedback loop and a rigid questionnaire, which has to be completed and signed by the concerned business partner’s management. Besides non-disclosure agreements (NDAs), no contractual relationship is entered without the prior closure of the required due diligence activities.


ADVA Optical Networking is subject to the 2015 Modern Slavery Act and must report annually on the steps that we have taken during the financial year to ensure that slavery and human trafficking are not taking place in our supply chains or in our own business.

 Introduction

 Holistic approach to sustainability

 Ethics and compliance

 Organizational super segment

 Operational super segment

 Commercial super segment

Glossary

Corporate information



ADVA position on slavery and human trafficking

At ADVA Optical Networking (“ADVA”), we are committed to running our business responsibly. We strive to live up to our ethical standards embodied in our values and documented in our [Group Code of Conduct](#) (“Code”). Our efforts are supported by periodic training sessions for all employees and a dedicated team with clearly allocated responsibilities within the areas of compliance, sustainability and corporate social responsibility. In addition, we actively encourage all individuals to report any perceived deficiency either to our ombudsman or via our [Ethics and compliance helpline](#).

Our standards include certain policies and practices to address slavery and human trafficking issues. This aligns with the United Kingdom Modern Slavery Act of 2015, the California Transparency in Supply Chains Act of 2010 (SB 657) and other laws and regulations that require businesses to be transparent about the efforts they have undertaken to eradicate slavery and human trafficking within their supply chain.

ADVA takes multiple actions to ensure that slavery and human trafficking does not occur within our supply chain, including the following:

- **Our code and supplier code of conduct**
Our Code derives from our values and sets forth the ethical standards that every employee, manager, director and officer of ADVA (collectively “Employees”) needs to comply with. All Employees receive periodic training and need to acknowledge their adherence in writing. Our commitment extends to our business partners and we strive to work with companies that operate under similar principles. In addition to our Code, our [Supplier Code of Conduct](#) addresses specific issues for our strategic suppliers and is modeled on the EICC’s framework. We do not tolerate any form of forced or compulsory labor.
- **Risk assessment**
Risk profiling helps us effectively assess our focus with regard to all different types of business partners, including strategic suppliers. Our analysis in particular depends on the type of product, service or the business partner’s location.

- **Screening, qualification and contracting**
ADVA implements screening, qualification and contracting processes for strategic suppliers and other selected business partners. Our measures include questionnaires, technical and operational support and contracting according to predefined master purchasing agreements that require compliance with our ethical values, applicable laws or regulations.
- **Auditing and monitoring**
ADVA utilizes online assessment and auditing tools to evaluate strategic suppliers. In addition, clear and specific key performance indicators help us to continuously evaluate our strategic suppliers’ performance and to drive improvements where required. Furthermore, on-site audits are conducted where needed.

Ethical conduct does not simply happen. It is the product of a corporate culture based on integrity and accountability which is modelled by the top management and demonstrated by example. Constant reinforcements and improvements are required. This statement describes the key measures for preventing slavery and human trafficking in our supply chains as applicable for the period January 1, to December 31, 2017. It has been approved by the management board of ADVA Optical Networking SE.

Brian Protiva
Chief executive officer

February 2018

Introduction

Holistic approach to sustainability

Ethics and compliance

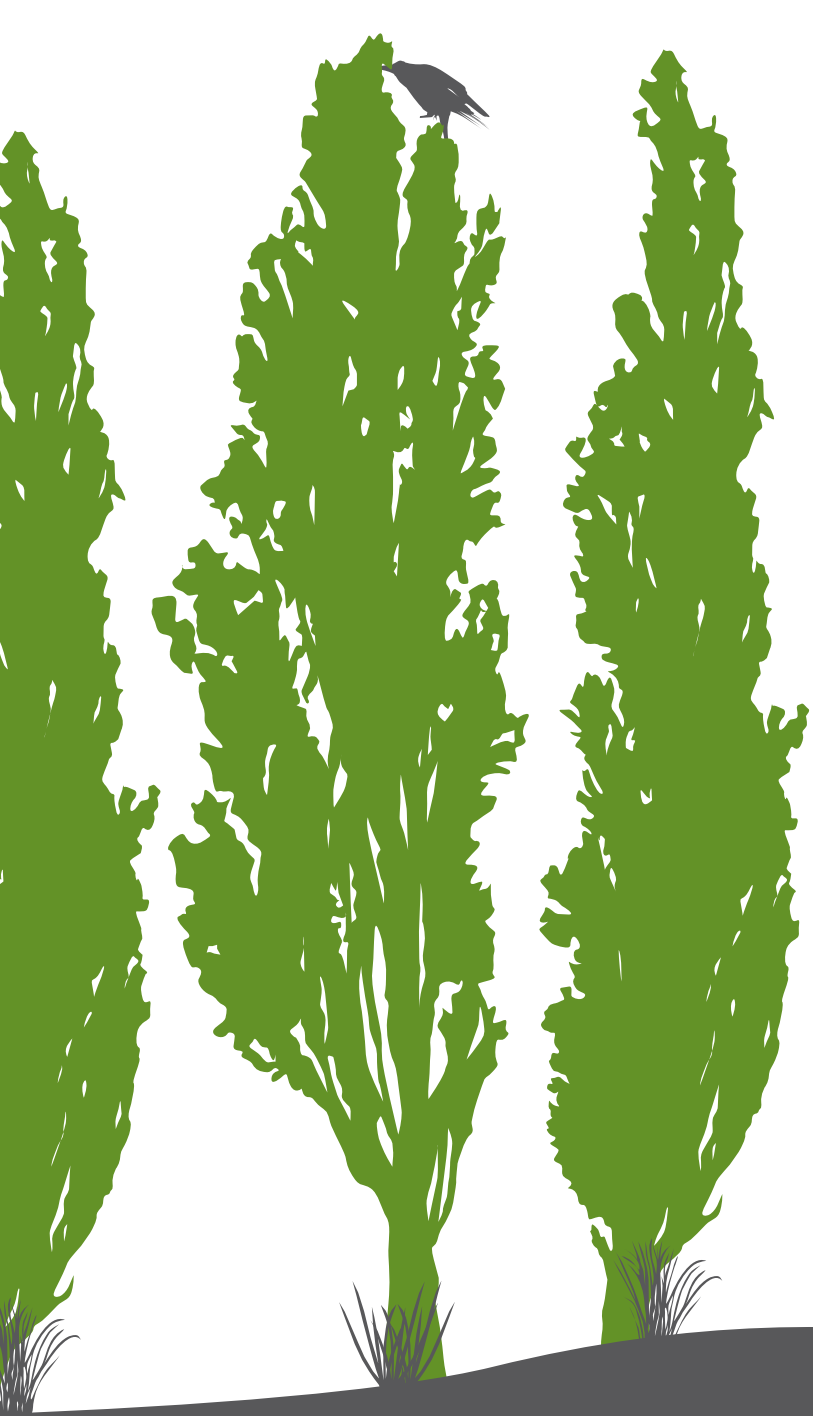
Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



 Organizational
super segment



Sustainability-related organization

G102-20, G102-29

To maintain and further strengthen the group's focus on sustainability, a dedicated global sustainability department directly reports to the chief technology officer (CTO). The team sets ADVA Optical Networking's sustainability strategy in close cooperation with the respective peers in other departments, e.g., HR, QM, Engineering or Facility. It acts as primary point of contact, e.g., for CDP queries, dissemination activities and provides content in the form of collateral, coordinates activities and provides content in the form of collateral, disseminates at conferences, etc., and contributions to research projects. It also answers sustainability assessments and provides the related reporting and input to respective tender sections or similar requests for information on the group's sustainability strategy, efforts, and performance. The team also actively participates in the QuEST Forum Sustainability Initiative.

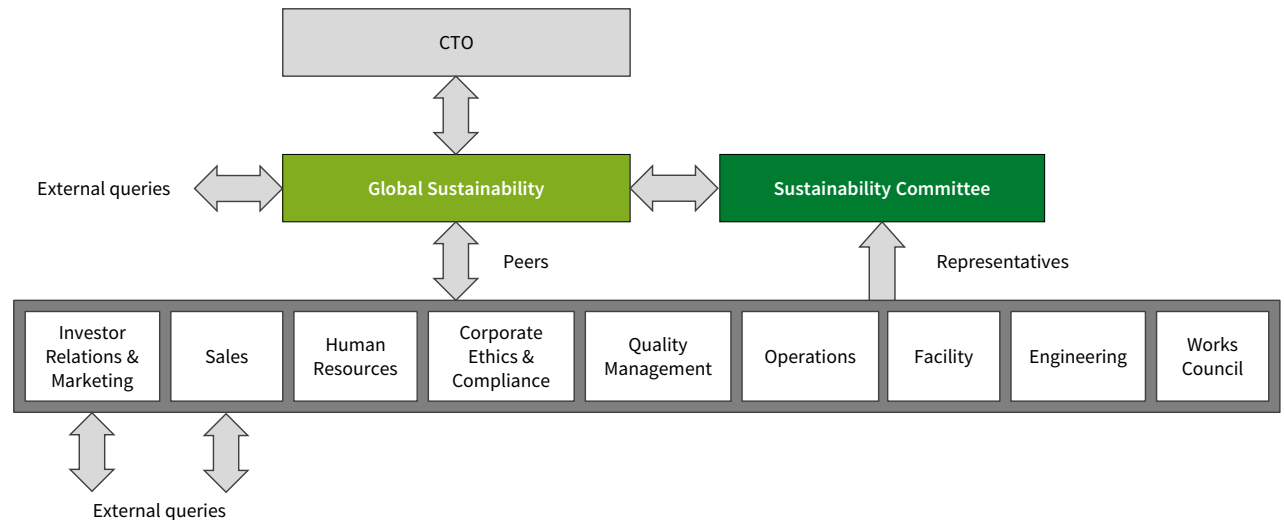
The sustainability department is the central point of contact for external sustainability-related queries. Further queries may arrive at certain other departments, as indicated below. Responses are compiled in cooperation with the peers of the respective departments. Examples include the cooperation with sales in answering sustainability sections in tenders or RFIs, or the compilation of the sustainability report, where input from several departments is required.

The global sustainability department is responsible for defining the group's sustainability strategy including the necessary steps to be taken short or long-term. It creates internal awareness for the different aspects of sustainability through different campaigns, provides training, and engages externally with various groups of stakeholders. It is also responsible for collecting, together with the related peers, the various tracked sustainability data, and oversees the related reporting and assessments.

Further responsibilities include the ownership of the entire product portfolio lifecycle analyses, the respective feedback into R&D and other departments, and content ownership of the group's product eco-design guide, which is part of the product lifecycle process.

Finally, the global sustainability committee is responsible for decisions on proposals, which have been submitted in our Global Sustainability Challenge (see the [CSR](#) chapter). It also has an advisory capacity on certain aspects and questions regarding sustainability, where it meets on demand.

A view on the sustainability-related organizational structure is given below.



The group's sustainability organization

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



Stakeholder engagement

G102-40, G102-42, G102-43, G102-44, G103-1, G103-2, G103-3, G102-47

Stakeholder engagement is relevant in the sustainability context as it helps identifying the different stakeholders' expectations and updating the prioritization of the sustainability-related activities.

Regarding sustainability, relevant groups of stakeholders are those who have an interest in, or influence, the group's actions, strategy, or reputation in that area. The following groups of stakeholders have been identified:

- Customers
- Suppliers
- Logistics partners
- Shareholders, investors
- Employees
- Associations, alliances
- OEMs, VARs, service partners
- Communities

The group's general approach to stakeholder engagement is to keep in dialogue with the respective stakeholders in a regular fashion. For certain stakeholders, e.g., certain strategic customers, associations, communities, this happens on a daily-business basis. Other stakeholders (e.g., investors, suppliers) are served periodically or even aperiodically via dedicated campaigns.

In 2017, our suppliers were a key area of sustainability engagement. Despite some logistical challenges, we started the rollout of the QuEST Forum Sustainability Assessor tool into our supply chain. Over time, this tool will help in our related supply-chain management, and it will in particular give our suppliers a better view on where they are in terms of their journey to improved sustainability.

We also started an initiative of collecting photonics-components LCA data from selected suppliers. The background is that we need more precise data than currently existing to improve our portfolio's LCA results. The common databases such as ecoinvent or GaBi lack this data. During this initiative, it turned out that not all suppliers contacted are already able to provide LCA components data. Despite delaying our LCA work, this also opens the opportunity to engage with the respective suppliers, highlighting the need to compile such data (which may also help their REACH activities), and supporting them in taking the first steps towards such compilation.

This work was complemented by continued engagement with the QuEST Forum Sustainability Initiative, and by several projects related to our communities.

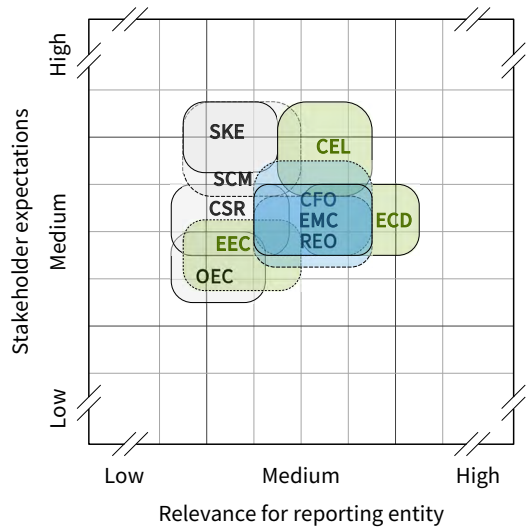
- Introduction
- Holistic approach to sustainability
- Ethics and compliance
- Organizational super segment**
- Operational super segment
- Commercial super segment
- Glossary
- Corporate information



- Introduction
- Holistic approach to sustainability
- Ethics and compliance
- Organizational super segment**
- Operational super segment
- Commercial super segment
- Glossary
- Corporate information

Feedback from stakeholders is one of the main input sources for the **sustainability materiality analysis**. This analysis can be displayed in a two-dimensional diagram. The ordinate axis displays the stakeholders' expectations with regard to sustainability performance, strategy, etc. of the reporting entity. The x-coordinate summarizes two aspects, an external analysis, which is also referred to as environmental analysis (i.e., the consideration of all relevant external conditions), plus an internal analysis covering the reporting entity's strengths and weaknesses.

The update of this analysis is shown in the figure below. Note that the diagram shows a zoom into the center area in order to give a somewhat clearer picture.



REO	Resource efficiency optimization
EMC	Environmental management certification
CFO	Carbon footprint and ozone depletion
SKE	Stakeholder engagement
CSR	Corporate and social responsibility
SCM	Supply chain management
OEC	Organizational engagement and capability
ECD	Ecological design
EEC	End to end coverage
CEL	Circular economy life cycle

Sustainability Materiality Analysis 2017



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

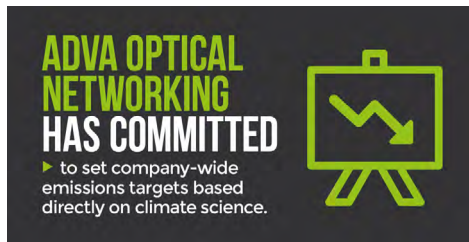
Commercial super segment

Glossary

Corporate information

Science Based Targets initiative

In late 2016, ADVA Optical Networking joined the Science Based Targets initiative (SBTi), as one of the first 200 companies worldwide. The SBTi is a partnership between the Carbon Disclosure Project, UN Global Compact, the World Resources Institute and the World Wide Fund for Nature. It aims at helping companies determine how much they must cut emissions to prevent the worst impacts of climate change. Carbon-reduction targets adopted by companies to reduce GHG emissions are considered "science-based" if they are in line with the level of decarbonization required to keep global temperature increase below 2°C compared to pre-industrial temperatures, as described in the Fifth Assessment Report of the Inter-governmental Panel on Climate Change (IPCC AR5). Any company participating in the SBTi must submit GHGP Scope-1 and Scope-2 targets. If total emissions are dominated by Scope 3, a Scope-3 target is required as well. This is the case for ADVA, see the Carbon emissions chapter in here. Targets must cover a minimum of five years and a maximum of 15 years from the date of announcement of the target.



In Q3/2017, the group submitted its Scope-1, Scope-2 and Scope-3 targets proposals to the SBTi for official evaluation and approval. When this report was finished, approval was still due.

Our Scope-1 and Scope-2 targets are scheduled to run over the maximum period of 15 years. In absolute terms, the reduction translates to 20% over the target runtime. The Scope-1 target refers to the company's car fleet. We proposed GEVA reductions enabled by less consumption per car, less mileage, and possibly smaller pool size. For Scope 2, we proposed purchased-electricity GEVA reductions. These will be enabled by purchasing electricity with higher amount of renewables, and/or installing solar panels at sites that we own. This is also supported by our ISO 50001 activities.

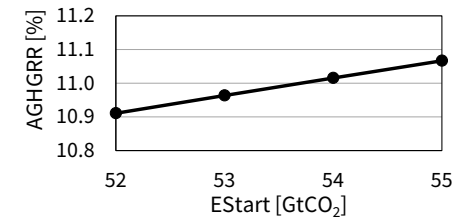
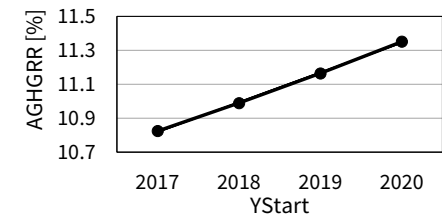
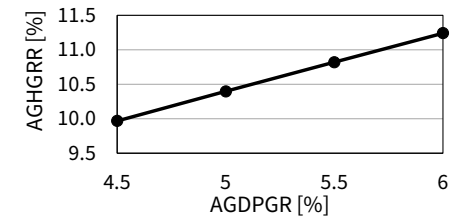
In accordance with relevant SBTi references, all group targets are so-called GEVA targets, i.e., they define target reductions of GHG emissions per unit of value added (VA). This intensity normalization accounts for future company growth.

The reduction can be derived from one of the SBTi's relevant references, by analyzing the following equation:

$$AGHGRR = 100 \left[1 - \frac{\left(\frac{E_{1990} \left(1 - \frac{\Delta Total}{100} \right)^{\frac{1}{2050 - Y_{Start}}}}{E_{Start}} \right)}{1 + \frac{AGDPGR}{100}} \right]$$

Here, AGHGRR is the target annual GHG reduction rate, AGDPGR is the annual GDP growth rate that is considered for the target runtime, YStart is the start year of the respective target, DeltaTotal is the absolute reduction to be achieved in 2050 compared to 1990 levels (i.e., 80%), and E1990 and EStart are the total global GHG emissions in 1990 and in the start year, respectively.

When analyzing the equation given above, GEVA reduction in the range of 11% p.a. results, as shown in the following diagrams.



Annual GHG reduction rate in dependence of annual GDP growth rate, target start year, and start-year global GHG emissions, respectively (from top to bottom).



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

In line with SBTi references, the reduction rate is reduced if the company growth is above the GDP-growth assumption. This applies to ADVA.

The group's Scope-3 target relates to GHGP sold-products use-phase emissions. This is our largest GHG contribution, and consequently deserves attention. Our target is to increase energy efficiency of our products such that intensity-related emissions do not increase substantially, despite exponential Internet bandwidth increase and related ICT GHG emissions-increase forecast (see the GeSI ICT emissions chart in the [ICT and its environmental impact](#) chapter earlier in this report).

For more details on our SBTi Scope-3 target, please also refer to the [Eco design](#) chapter in this report.

Collaboration at industry alliances

G102-13

ADVA Optical Networking regularly contributes to sustainability-related industry alliances. One example is our collaboration with the QuEST Forum Sustainability Initiative. Here, we periodically share best practice and contribute to the Assessor Metrics Team.

For the past couple of years, ADVA has been a supporter of the Carbon Disclosure Project (CDP). The CDP is one of the platforms used by the group for carbon-emissions reporting.

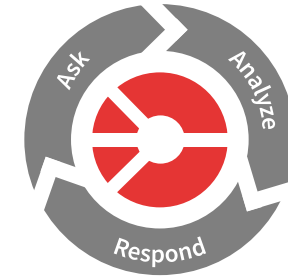


In 2017, we also extended our work with the ExFo (Experts' Forum) at Fraunhofer IPA in Stuttgart. The work of this forum is centered on the areas of REACH, RoHS and the European WEEE Directive. As an industry forum, the main intention is sharing best practice. In addition, the ExFo can provide advanced warnings in cases where the regulations and directives mentioned become updated.

Customer satisfaction rating

G102-43, G102-44, G417-2

Our customer satisfaction is measured by the Net Promoter Score (NPS). For 2017, ADVA's NPS was +56%. This result underlines the company's focus on customer satisfaction and its commitment to continuous improvement. The development of our customer satisfaction is shown in the table below.



This time, we conducted more than 60 interviews and got 850 ratings in eight categories, and more than 1500 specific comments. Per category, one to five questions with answers potentially scaling from 1 to 10 were asked. In particular, we asked for aspects that add most value for our customers, and for the most important things we should improve.

For the 2017 customer satisfaction survey, we started the integration of sustainability-related questions. This time, the sustainability section was informal and aimed at introducing the topic into the satisfaction rating only and was not yet considered for ranking. This will be changed in upcoming surveys.

Net Promoter Score	2017	2016	2015	2014	2013
Overall	56%	60%	41%	40%	21%
1/8 Technology & innovation	25%	38%	20%	8%	-5%
2/8 Product quality & reliability	48%	48%	24%	20%	11%
3/8 Fault correction	49%	60%	32%	34%	4%
4/8 Proposals	74%	70%	59%	63%	34%
5/8 Order management	85%	70%	59%	69%	45%
6/8 Shipping & invoicing (6R)	65%	67%	57%	63%	34%
7/8 Project & account management	82%	76%	62%	64%	43%
8/8 Technical services	41%	73%	44%	47%	30%



Sustainability supply chain management

G102-9, G308-1, G407-1, G408-1, G409-1, G414-1, G414-2

Sustainability-related supply chain management is relevant in that it helps improving upstream sustainability performance and reduces related risks. It requires close cooperation with our suppliers and is one relevant area of stakeholder engagement.

In order to assess compliance with our Supplier Code of Conduct (CoC), which is based on the EICC CoC, ADVA has implemented a supplier assessment process intended to uncover risks and address them. This process consists of a supplier survey that documents compliance on every aspect of our Supplier CoC, a risk assessment performed by us, and finally on-site supplier audits. This process is currently being complemented by the introduction of the Assessor tool into the supply chain.

For your reference, you can find our [Supplier CoC](#) here.

The Assessor tool has already been introduced in the chapters Holistic approach to sustainability, [Our approach](#) section, and [Stakeholder engagement](#). Originally, the tool was developed by British Telecom and epi Consulting. In 2016, it was also adopted by the QuEST Forum Sustainability Initiative for assessments of the participating members in all segments of the sustainability model. The tool consists of sets of questions for each of the 10 sustainability segments. Answers comprise multiple choice, editable text, or attachments of supporting documentary. After completion of an assessment, the respective party gets the results (a radar chart as shown at the beginning of this report), together with recommendations for the next steps that are required in order to improve the result.

In late 2016, we started with the introduction of the Assessor tool as a means for sustainability management into our supply chain. Despite being a relatively simple assessment tool, this introduction proved somewhat more challenging than expected. Therefore, in 2017, we compiled a shortlist of relevant suppliers that cover substantial parts of our components procurement. These suppliers were the first to receive licenses for the Assessor and related training on its usage. Modes, for example on the assessment frequency, are still to be defined. Likewise, the number of suppliers that get Assessor licenses will be increased over time. We will report on progress and relevant findings in upcoming sustainability reports.

Over time, the usage of the Assessor tool in our supply chain will have several advantages. First, the group itself is also using the Assessor for its own (self-) assessments. Hence, the group and its suppliers are treated in one and the same way, which is also consistent with the QuEST Forum Sustainability Initiative approach. Then, as an online tool, the Assessor potentially helps in the sustainability management of a large number of suppliers. It can be used by the respective suppliers alone, or with online support from members of the group's team. Finally, it gives the respective suppliers valuable direction on where they are in terms of their sustainability performance, and where to focus in order to achieve improvements.

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

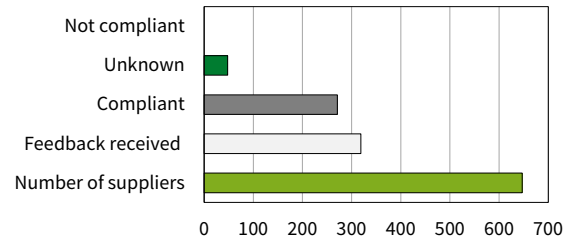
Glossary

Corporate information

Conflict minerals

The most commonly mined conflict minerals are cassiterite, wolframite, coltan, and gold ore, significant parts of which are extracted in Eastern Congo. The Dodd-Frank Wall Street Reform and Consumer Protection Act requires companies to verify and disclose their sources of cassiterite, wolframite, and coltan. In addition, the US Securities and Exchange Commission (SEC) issued the Conflict Mineral Law. It asks for independent third-party supply chain traceability audits and reporting of audit information to the public and SEC.

ADVA Optical Networking is committed to reduce conflict minerals that originate from DRC and follows these US requirements and audits its suppliers accordingly. We have requested information from all of our components suppliers with regard to their compliance. The answers we got were mostly positively, i.e., compliant. However, some of our suppliers answered that they did not yet have the respective information, and a significant part did not answer at all. In total, we assessed ~50% of our suppliers by means of the answers we got. Therefore, this process, which requires substantial effort, is not yet finished.



Feedback from suppliers' conflict-minerals survey

RoHS / REACH

G417-1

Regarding the restriction of hazardous substances (RoHS), all products of the group are fully compliant with the Directive 2011/65/EU. This is ensured by respective engagement with the related business partners, i.e., components suppliers and contract manufacturers. In addition, we also file the RoHS exemption in our internal databases. This allows fast identification and reaction in cases where certain specific exemptions expire.

Registration, evaluation, authorization and restriction of chemicals (REACH) is required according to Regulation (EC) No 1907/2006. The regulation applies to manufacturers or importers of substances, if respective substances amount exceeds 1 t/a. Since the group neither manufactures nor imports such amount of substances, it does not fall under the registration and authorization obligations of the regulation. Instead, the group collects the data on the substances composition of the components it uses. Further actions would become necessary in cases where any substances used in any of these components were moved from the REACH candidates list into Annex XIV of the REACH Regulation. In such cases, the respective substances become subject to authorization and should be replaced. The group has been collecting the respective components data from its supplier now for several years. Due to the high number of components and the slow and often incomplete feedback, the substances composition is known for slightly less than 50% of all components the group is using.



Corporate social responsibility

G401-1, G102-7, G405-1, G407-1, G408-1, G409-1

In this chapter, the material aspects of employee and social interests and human rights are reported.

Labor and human rights

ADVA Optical Networking is an equal opportunity employer and has an ongoing commitment to the creation of a workplace free of discrimination and harassment. No one should be held in slavery or servitude. The company is committed to a zero-tolerance policy. We also expect our suppliers to follow our Supplier Code of Conduct. For your reference, you can find our CoCs here:

[Group Code of Conduct](#), [Supplier Code of Conduct](#).

The group is also committed to uphold the human rights of workers, and to treat them with dignity and respect as outlined in the Universal Declaration of Human Rights as well as in ADVA's Position on Slavery and Human Trafficking published in February 2018. The latter can be found in the [ADVA position on slavery and human trafficking](#) chapter in this report and online [here](#).

International labor standards are an essential component for ADVA to ensure equitable and sustainable growth for all employees.

The labor standards are:

- Freely chosen employment
- Child labor avoidance
- Working hours
- Wages and benefits
- Humane treatment
- Non-discrimination
- Freedom of association

The company recruits, hires, trains and promotes individuals on all job levels without regard to race, religion, ancestry, sexual orientation, marital status, national origin, age, gender and physical or mental disability.

Employee diversity

G102-4, G102-8

ADVA Optical Networking is continuously focused on balancing the male/female split in the overall ADVA workforce.

Our average employee age is between 30 and 50, and we employed people of approximately 50 nationalities across 36 company sites as of December 31, 2017. Being an international company the diversity of nationalities, age, gender and religion is crucial in helping us continually improve our work environment and be a great workplace with a unique culture based on strong core values. Our sophisticated human resource information system (HRIS) provides detailed reporting functionalities and helps us to ensure diversity going forward. We as a company are committed to equal opportunities and to hiring and employing people with disabilities.

Quotas ensure either a certain percentage of people with disabilities in our employment base or a penalty payment to the government. Moreover, we cooperate with Bundesvereinigung Lebenshilfe e.V. in Germany to integrate people with disabilities in supportive roles (see the chapter [Social engagement / volunteerism](#)).

On December 31, 2017, ADVA had 1,894 employees, including 27 apprentices (prior year: 1,764 including 21 apprentices).

On average, ADVA had 1,834 employees during 2017, up from 1,716 during 2016 (not considering apprentices). Furthermore, at year-end 2017 and 2016, there were 13 and 9 external temporary employees and 19 internal fixed-term employees each working for the company, respectively.

In 2017, the increase in employees largely related to the group's acquisition of MRV Communications Inc. headquartered in Chatsworth, CA, USA, with maintained offices in Chelmsford, MA, USA, and Yokneam, Israel.

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

Employees per country (year-end)		
	2017	2016
Germany*	499	497
Austria	3	3
Switzerland	46	49
Italy	12	10
Spain	2	3
France*	17	17
Poland	300	298
Finland	10	8
Sweden	4	3
United Kingdom	110	114
Netherlands	2	-
South Africa	5	6
USA	461	412
Brazil	2	4
Australia	5	-
China	131	138
Hong Kong	4	5
Japan	8	7
India	89	88
Singapore	17	14
United Arab Emirates	1	1
Israel	139	66
Total	1,867*	1,743*
*Without apprentices		

More facts and figures

G401-I, G405-I

The development, 2017 over 2016, of our gender ratio for all employees and in management can be derived from the next two tables.

ADVA global	2016	2017
Males total	78.0%	77.9%
Males in management	89.2%	88.5%
Females total	22.0%	22.1%
Females in management	10.8%	11.5%

Team leader	2016	2017
No male	59.8%	60.4%
No female	19.8%	19.8%
No total	79.6%	80.2%
Yes male	18.2%	17.5%
Yes female	2.2%	2.3%
Yes total	20.4%	19.8%

The age distribution for 2017 and 2016, per gender, is displayed in the following table.

Gender	Age group	2016	2017
Male	< 30 years	11.0%	9.8%
	30-50 years	62.2%	59.7%
	> 50 years	26.7%	30.6%
Male average		41.4 years	43.7 years
Female	< 30 years	11.9%	10.0%
	30-50 years	64.2%	62.0%
	> 50 years	24.0%	28.0%
Female average		42.7 years	42.3 years



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

In the next table, the changes between 2016 and 2017 are listed in terms of gender- and age-specific absolute numbers. This shows that overall, the employee number grew significantly. This is mostly due to the acquisition of MRV Communications Inc., as mentioned earlier. In 2017, this overlapped with a (voluntary) turnover rate of 5.6% and a total number of new hires of 141.

Gender	Age group	2016	2017
Male	< 30 years	152	144
	30-50 years	856	881
	> 50 years	368	451
Male total		1,376	1,476
Female	< 30 years	46	42
	30-50 years	249	259
	> 50 years	93	117
Female total		388	418
Employees total		1,764	1,894

The last table in this section shows the distribution of our employees across the different functions in the company.

Function	2016	2017
Finance / Admin / IT	155	165
Operations	214	217
QM	19	22
R&D	902	963
Sales / Marketing / Services	453	500
Apprentices	21	27
Employees total	1,764	1,894

Our focus on R&D can clearly be derived from this table.



Girls' Day

Mädchen-Zukunftstag

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

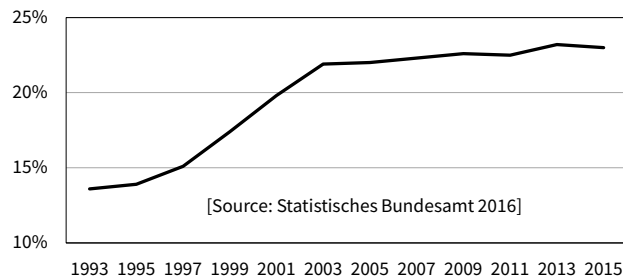
Glossary

Corporate information

Girls' Day 2017

G413-1

As a telecommunication systems provider, ADVA Optical Networking works in the field of electronic engineering. Historically, gender distribution has been quite asymmetric in this domain (see the following chart).



1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015

Women in engineering studies in Germany

The diagram displays the percentage of women in engineering in Germany – based on data from the Federal Statistical Office from 2016. The ratio of women in engineering is barely 25%. Consequently, it is very difficult to achieve gender parity in our technical departments. On the other hand, the company is committed to increasing the percentage of women working in our company.

One of the ways this can be achieved is by engaging with girls at schools regarding technical and engineering studies. Just as we have in previous years, we did this in 2017.

On April 27, 2017, some 100,000 girls attended the Girls' Day in Germany. ADVA participated in the initiative, giving firsthand insight into the world of electronics.

At ADVA, the Girls' Day started with a short introduction to the company, including a walkthrough. Then, a small electronics hardware project was built, the result of which could be taken home.

In the R&D labs, our participants were introduced to the topics of laser safety and electrostatic discharge. Next, various typical optoelectronic components and some related measurement equipment were explained. The girls then used their new knowledge, measuring output and received power of optical transceivers. The day ended with a visit to our systems verifications testing labs.





Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

Global Sustainability Challenge update

The Global Sustainability Challenge is the group’s internal complement to the Global Idea Bank, dedicated exclusively to ideas related to the different aspects of sustainability. The challenge was implemented in 2016. It is an instrument of the company for involving our employees into the topic of sustainability.

ADVA is interested in, and relies on, employees’ ideas and suggestions for improvement. These ideas help to improve our business and enable the company to become greener and more sustainable. In many areas, it is our employees who know best where improvements can be made. This is why we created the challenge.

In 2017, a number of ideas have been generated and submitted (see the table on the right-hand side). The different ideas are evaluated by the members of the sustainability committee (see the chapter [Sustainability-related organization](#)). As indicated in the table, idea may be accepted, rejected, or in the status of implementation.

Category and idea status	Number of ideas
Car sharing	5
Completed (mostly rejected)	4
In progress	1
Energy savings (IT equipment)	8
Completed	8
Fairtrade products	3
Completed (mostly rejected)	3
Paper savings	5
Completed (mostly rejected)	3
Deferred	1
In progress	1
Reduction of electricity	10
Completed (mostly rejected)	10
Reduction of water	2
Completed (mostly rejected)	2
Renewable energy	5
Completed	5
Waste reduction / reusable packaging	7
Completed (mostly rejected)	4
Deferred	1
In progress	1
Open	1
Total	45

Overview of submitted ideas in 2017



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

Health & safety

G401-2, G403-1, G403-2, G403-3, G404-1

Being a high-tech company, more than 90% of our workforce fulfill office-related jobs. The risk of accidents at work is minimal. Different statutory rules across the globe challenge the company to have coherent reporting in place. This helps to ensure that employees facing specific risks at work receive dedicated training on a regular basis. The attendance is mandatory and is documented in personal files.

We support a flexible, diverse and casual work environment, which stimulates change and motivates our highly efficient people. We have designed our work and life program around our people because we know that they will spend the majority of their life at work.

The program consists of several benefits. These include (but are not limited to):

- First-aid training, incl. certification
- Vision care
- Fitness-center discount program

It is the management layer's responsibility to implement and indemnify the set working conditions on a day-to-day basis. Regular management training on labor law is provided to secure the knowledge and further educate our team and line managers.

In addition, all eligible employees have to attend trainings on:

- Labor safety and labor security (e.g., first aider)
- Laser safety
- ESD (Electrostatic Discharge)
- Special chemical training

The program comprises several categories, including, among others, health benefits, time-off offerings, and training & development and company events (group offsites, team-building activities). Our employees have access to the company doctor and several inoculation offerings.



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

Description	Region		
	Europe	Americas	APAC
A . The level at which each formal joint management-worker health and safety committee typically operates within the organization.	A . Site level (all major sites, small branch offices may not have such committees, in accordance with local legal requirements)	A . Site Level B . 100%	A . Site Level (Emergency Response Committee in Shenzhen)
B . Percentage of workers whose work, or workplace, is controlled by the organization, that are represented by formal joint management-worker health and safety committees.	B . 90%		B . 100%
A . Types of injury, injury rate (IR), occupational disease rate (ODR), lost day rate (LDR), absentee rate (AR), and work-related fatalities, for all employees, with a breakdown by region and gender.	A . For UK: 2 cuts, 1 slip/fall, 0 lost days, 0 fatalities. For Germany: 4 falls, 4 car (way-to-work) accidents, 1 spine-related and 1 eye-related injury, 7 males, 3 females, 121 lost days total, 0 fatalities. For rest of Europe: 0 occurrences.	A . 1 fall, 90 lost days, 0 fatalities B . -	A . 0 occurrences in 2017
B . Types of injury, injury rate (IR), and work-related fatalities, for all workers (excluding employees) whose work, or workplace, is controlled by the organization, with a breakdown by region and gender.		C . OSHA reporting	
C . The system of rules applied in recording and reporting accident statistics.	B . - C . Accidents are reported to first aider and then logged in the Accident Book		
Workers with high incidence or high risk of diseases related to their occupation	None	None	None



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

Further benefits

G401-2

Next to health & safety benefits (see preceding chapter), the company offers a range of further benefits to its employees. These include (but are again not limited to):

- Stock-options program
- Retirement provision
- Tuition reimbursement
- Food/snacks/beverages
- Various possibilities for time off. These include family medical leave, parental/maternity leave, jury-duty leave, bereavement leave, military leave and more
- Team-building activities and group off-sites
- Summer picnic
- Various sports activities
- Various trainings (see next chapter)
- For USA: life insurance, disability and invalidity coverage

These benefits are available at all group sites, not just at significant locations. Part of these benefits are available to temporary and part-time employees as well.

Training and development

G404-2

Career development

ADVA Optical Networking has a career development program designed especially for our employees.

Career development is an organized planning method used to match our needs with the career goals of our employees. Formulating a career development plan helps us do our jobs more efficiently and it benefits both ADVA and our employees.

Career development involves employees managing their careers either within or between organizations. It also includes learning new skills and making improvements to help in their careers. At ADVA, we know that this is an ongoing, lifelong process and we strive to help our people achieve more in their careers.

Together with the employee's manager, they can set goals and objectives for their own personal career growth and plan their own career development.

Expertise development module (EDM)

The group wants to identify and develop employees with the potential to develop into "top experts" in their field. ADVA Optical Networking has designed the expertise development module (EDM) for this purpose.

The referral program

ADVA Optical Networking's Referral Program is in place to recognize and compensate our employees for referring candidates to work at the company.

Spot award program

Spot awards can be granted by each Vorstand member "on the spot" throughout the year to recognize employees for outstanding contributions or efforts. Either a team member or manager can nominate employees.

Anniversary award program

ADVA Optical Networking acknowledges and celebrates all employees' employment anniversaries and has a program in place to do so. The global anniversary award program has been in place since May 1, 2010 so that we can recognize employees who reach their landmark anniversary years at the company. The program is designed to celebrate and acknowledge each employees anniversary as they reach a milestone year.



ADVA University

G404-2

ADVA Optical Networking is committed to sponsoring a state of the art education, development and training program that also includes an e-learning program. The ADVA University portal is structured to be a single point of reference for all training needs. We are committed to offering comprehensive on-the-job training, as well as specific continuing education opportunities in order to advance our employees' personal and professional development. These needs are identified, documented and reviewed semi-annually within an electronic performance appraisal and competency management system.

Through ADVA's general development program, courses on various topics that are regularly requested are offered, including language classes, standard office software know-how and the improvement of communication, presentation, conflict-management and project management skills. On the basis of individual development plans, which are agreed annually and regularly reviewed with the managers, ADVA offers specific training courses tailored to meet individual needs. This also includes technical training, which are mostly conducted internally by ADVA's own technical experts.

Previously, ADVA launched a global in-house management training program, the MTP. This customized initiative includes 16 active modules and is targeted at all leaders who have people-management responsibilities. The company offers a set of different courses according to experience and knowledge levels, which helps managers understand how to maximize both individual and team performance.

In July 2017, the group introduced the new and improved ADVA University. This was based on employees' feedback and led to several changes which include:

- Four new trainings added to the MTP on coaching, mentoring, writing a business case and project management essentials
- Improved course content and increased number of technical and product courses
- Trainings are available online and in webinar format
- Streamlined and integrated registration process
- Remote access to trainings
- Automated and integrated tracking, reporting, feedback and direct link to performance management and appraisal

This will be complemented by a new hire orientation process, which formalizes global, regional and functional new-hire orientation trainings.

E-learning on the learning management system (LMS)
ADVA has an excellent e-learning program that includes technical training for our employees. With the e-learning online tool, our employees have 24-hour access and can complete the trainings at their own pace.

Course offerings in 2017
In 2017, new technical/product trainings were offered via the ADVA University as well as new-hire functional trainings and shorter soft-skills training, including:

- Language
- Professional & communication skills
- Customer service
- Leadership and management
- Safety
- Social media and marketing
- Sales and negotiation
- Interpersonal skills
- Teamwork
- Time and project management
- MS Office, MS Project
- Desktop publishing
- Finance and accounting

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information





Social engagement / volunteerism

G413-1

Our employees regularly join our volunteer teams. Our volunteer programs help others and also allow our volunteers to develop their own skills, make contacts or simply have fun.

Volunteering takes on many forms. Our volunteers serve on an “as-needed” basis, such as in response to natural disaster, marathons or runs for the cure of illnesses, and the needs of our communities.

An overview on the numbers and types of events of our volunteer programs is given in the following table. A total of 2,311 employees participated the 91 events.

Events per region		
57 in Europe	24 in Americas	10 in APAC
Type of events		
30 donations and collections	14 runs and walks	47 sponsorships and awareness

Distribution and type of events in 2017



LebenshilfeWerk

Our common path with Lebenshilfe (Lebenshilfe Meiningen e.V. and LebenshilfeWerk Meiningen gGmbH) occupies a special position. The goal of Lebenshilfe is the comprehensive participation of people with disabilities and their families in the life of our society. Lebenshilfe supports people with disabilities and their relatives to lead a normal life from childhood to old age.

We can look back on a long-term cooperation:

- Until 2008, employees of Lebenshilfe workshop worked on ADVA jobs
- In April 2008, the first framework agreement with LebenshilfeWerk Meiningen gGmbH (LHW) was established:
 - External workplaces and internships for employees of the LHW
 - Support by the integration specialist of LHW and our employees
 - Start with three permanent external work placements and internships in logistics
 - Since 2008, a total of 25 LHW employees worked in internships or on external workplaces
 - Full integration into the world of work of ADVA
 - Support for ADVA and appreciation for the colleagues of Lebenshilfe
- ADVA donations in favor of the LHW association

In May 2017, ADVA was awarded the Lebenshilfe Meiningen Milestone Award for our commitment to employing people with disabilities.



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



 Operational
super segment



Environmental management

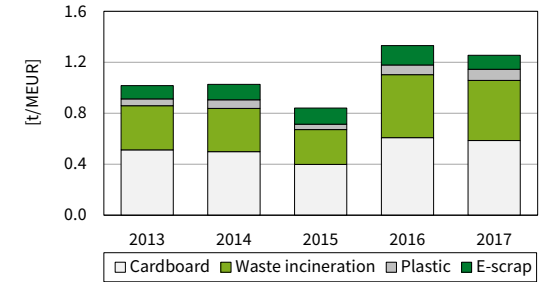
G306-2

In Q4/2017, ADVA Optical Networking was recertified according to TL 9000 / ISO 9001, ISO 14001 and ISO 50001. As part of ISO 14001, and next to the Environmental Management System (EMS) aspects, the group's capabilities regarding lifecycle assessment (LCA) were assessed for the first time.

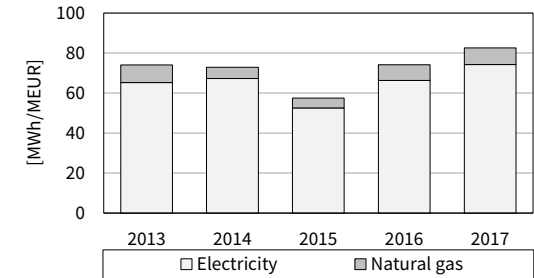
As a result, the standards ISO 14001 and ISO 50001 were recertified with one minor nonconformance each. The respective aspects have already been addressed with appropriate action plans.

Note that we had to correct the figures for 2016 due to some data inconsistencies that were identified when compiling the actual report. Previous data collection, for year 2015 and earlier, was not as comprehensive as it is today.

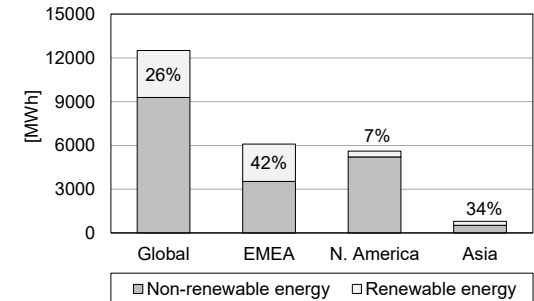
Apart from running office buildings and a car fleet, the group does not produce any dedicated air emissions or discharges to water. Therefore, the relevant performance under environmental compliance relates to waste generation and treatment. Waste production is shown in the first diagram on the right. Plastics, cardboard and e-waste (WEEE) all go into the respective recycling. Note that we normalized waste to value added (VA). This is the intensity metric suggested by the Science Based Targets initiative, as explained earlier



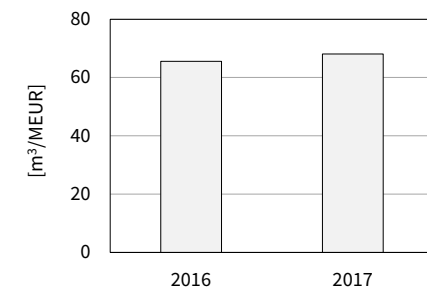
Waste production and treatment over the last 5 years



Energy consumption over the last 5 years



Mix of renewable vs. non-renewable energy used in 2017



Water consumption over the last 2 years

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

Resource efficiency

G302-1, G302-4

Energy and water consumption are the two relevant parameters that fall under resource efficiency. Especially with regard to electricity, the group is committed to reduction via its ISO 50001 efforts and the SBTi participation, despite company growth.

The diagrams on the right present the developments of energy consumption (Scope 1, natural gas, plus Scope 2, purchased electricity) over the last five years, and the mix of renewable vs. non-renewable energy for 2017, as per our electricity providers and data from regional grids. This is followed by a diagram showing the water usage over the recent years. The consumption parameters are normalized against the group's yearly VA.



Carbon emissions (Scope 1-3)

G305-1, G305-2, G305-3, G305-4, G305-5, G302-2

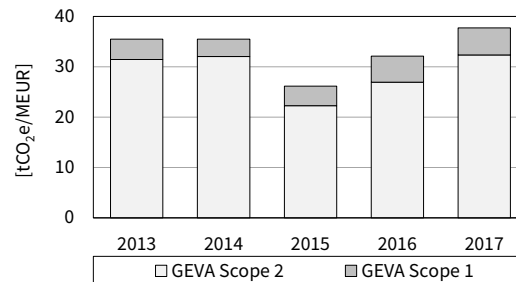
Over the past five years, ADVA Optical Networking has steadily improved its tracking and reporting capabilities with regard to its Global Warming Potential (GWP) contributions. For 2017, we again complemented our GWP reporting by GHG Protocol categories within Scope 3 that were not yet reported before, namely capital goods, purchased goods, and transmission and distribution losses. Consequently, all relevant GHG categories are considered.

Emission factors used for Scope 2 and Scope 3 categories are provided in the table below. For purchased electricity, the numbers are mainly based on data we got from our electricity suppliers, subregion grid factors published by the US EPA's Emission & Generation Resource Integrated Database, the UK Department of Environment, Food and Rural Affairs, and the ecoinvent database. The transportation emission factors were taken from the ecoinvent 3.3 database.

Emission factors 2017 [kgCO ₂ e/kWh]		
EMEA	N. America	Asia
0.406	0.434	0.673
Emission factors 2017 [kgCO ₂ e/(t·km)]		
Sea freight	Ground transportation	Air freight
0.0116	0.514	1.09

Employees commuting is based on average data. There is certain overlap with the Scope 1, owned-transport (car fleet) emissions, which cannot be fully solved yet. Regarding total GWP, this leads to a negligible error.

The Scope 1 and Scope 2 intensity (GEVA) emissions are shown in the diagram below.



GEVA development over the last 5 years

The total GHG inventory of ADVA Optical Networking, including Scope 1, Scope 2 and Scope 3 emissions for 2017, is summarized in the following table.

2017	Source/category	Consumption	GWP [tCO ₂ e]
Scope 1	Natural gas	1,367 MWh	252
	Owned transport	4,739,349 km	635
	Total Scope 1		887
Scope 2	Purchased electricity	12,505 MWh	5,446
	Total Scope 2		5,446
Scope 3	Capital goods		4,380
	Purchased goods		
	Production-related		52,090
	Non-production-related (other than paper)		360
	Purchased paper	9.7 t	7.7
	Transmission and distribution losses	677 MWh	285
	Transportation and distribution (inbound)	13,587,976 t·km	6,980
	Waste disposal		
	Cardboard	97 t	2.1
	Plastic	15 t	0.3
	Waste incineration	79 t	1.7
	E-scrap	18 t	0.4
	Business travel		
	By air	24,873,819 (p)km	3,142
	By car	546,285 km	91
	By train	151,746 (p)km	1.0
	Employee commuting		3,250
Transportation and distribution (outbound)	3,711,826 t·km	3,722	
Use of sold products	850 GWh	325,538	
End-of-life treatment of sold products		1,618	
Total Scope 3			401,469
Total all Scopes			407,802

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



 Commercial
super segment



End-to-end delivery

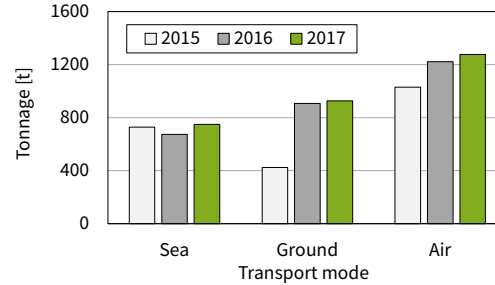
G305-3

The end-to-end-delivery chapter contains relevant environmental aspects. The most important of these are transport and packaging.

Transport mode

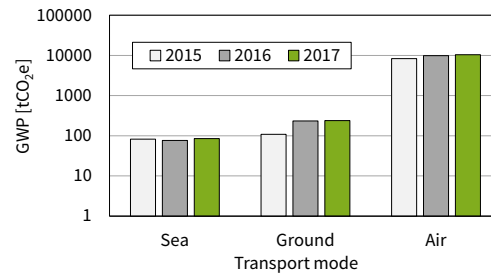
Transport (inbound and outbound) is a main contributor to the end-to-end logistics segment. In 2017, the group continued its efforts to reduce its transport-related environmental impact, i.e., reduce where possible air freight. These attempts are sometimes limited by large customers' requirements for short delivery times.

The freight-split development over the last three years is displayed in the following diagram.



Development of transport modes over time

The GWP resulting from transport is shown in the diagram below. Note the logarithmic scale.



Transport-related GWP

New transport mode: railway

All goods transported for the group are constantly checked for alternative transport methods, be it sea freight, trucks or railway. We are still investigating the newly established railway connections between China and Europe. Currently, it seems this could be a good compromise between sea freight and air freight regarding CO₂ emissions, transport delay and cost.

Packaging optimization

The other area of consistent improvements in logistics relates to packaging. Optimizing our packaging addresses GHG reductions and avoidance of certain materials. This refers to foam and plastics, although these cannot be fully avoided for packaging fiber-optic components.

Our packaging has been optimized regarding its form factor in order to fit standard pallets size most efficiently. Then, the amount of renewable materials (cardboard) has been increased, thus replacing most foam and plastics. Finally, we introduced re-usable packaging for the majority of our products. Since after several use cycles, the packaging may not look brand-new anymore, it carries an explanation for its look:



ADVA re-usable packaging

The most recent example, established in 2017, comprises the reuse of CFP (pluggable optical transceiver modules) packaging. In total 15,000 packaging units are reused per year, thus substantially saving emissions, waste and cost.

- Introduction
- Holistic approach to sustainability
- Ethics and compliance
- Organizational super segment
- Operational super segment
- Commercial super segment
- Glossary
- Corporate information



Circular economy

G417-1

Circular economy (CE) is necessary to reduce the amount of raw material, energy and waste that is associated with (the production of) any products and services. The main savings are projected to result from extended lifetime (incl. second life where applicable), full or partial parts reuse and finally optimized recycling. The latter must avoid downcycling by recovering close to 100% of all precious materials in best-achievable quality and purity. This obviously needs to be supported by respective eco-design aspects.

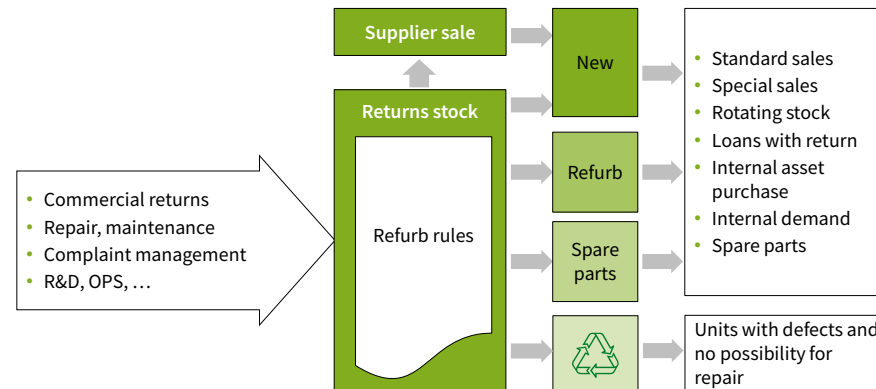
In the recent years, we implemented a number of smaller take-back, refurbishment and recycling processes especially in the UK, and a larger-scale refurbishment and recycling process on our main site in Meiningen, Germany, called Supplier Sale.

In the UK, we implemented, on a daily-business basis, several processes with two large customers. These include take-back, refurbishment and recycling. For both customers, logistics and reverse logistics are optimized through respective logistics providers that offer dense networks of suitable logistics hubs. The processes cover our own as well as third-party equipment. The take-back and refurbishment processes scale up to more than 1000 related product units per year.

In addition to these customer-specific processes, we implemented a refurbishment / parts reuse / recycling process for equipment sent back to our site in Meiningen. A process overview is shown in the figure below.

All equipment sent back is analyzed for potential parts reuse and refurbishment. This includes selling substantial amounts of components back to their suppliers. Systems or components without possibility for reuse are professionally recycled by a contract WEEE recycler located close to Meiningen, which also minimizes truck-roll mileage. Depending on the degree of reuse potential, the components are sold back (supplier sale, new) or get into respective stocks for new, refurbished or spare parts, as per the figure below.

Since all equipment sent back is analyzed for reuse, the process ensures that reuse is extended to the maximum and that WEEE scrap going to landfill is minimized.



Supplier-sale refurbishment and reuse process

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information



Eco design

G302-5, G417-1

Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

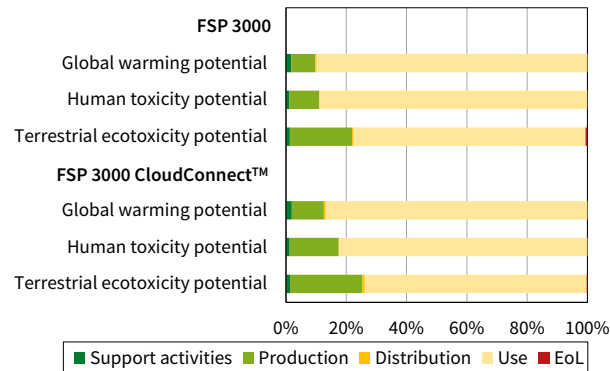
Corporate information

Portfolio lifecycle assessment

In the QuEST Forum sustainability model, product eco design is the segment with the highest weight. For ICT networks equipment, this weight is correct since the entire environmental impact of this equipment class is clearly dominated by use-phase GHG emissions. These emissions, in turn, can be improved by eco design which focuses at energy efficiency since lower energy consumption leads to lower environmental burdens.

The environmental impact of a product, or its footprint, is calculated by lifecycle analysis (LCA, e.g., according to ISO 14040/14044) that considers all phases of the entire product life. This ranges from extraction of raw materials via production and distribution to the use phase and finally the product end of life (i.e., reuse, recycling or landfill). Consequently, eco design must also consider the aspects of material usage/composition, size/weight, and design for reuse and recycling. Compared to energy efficiency, however, these may come in the second place.

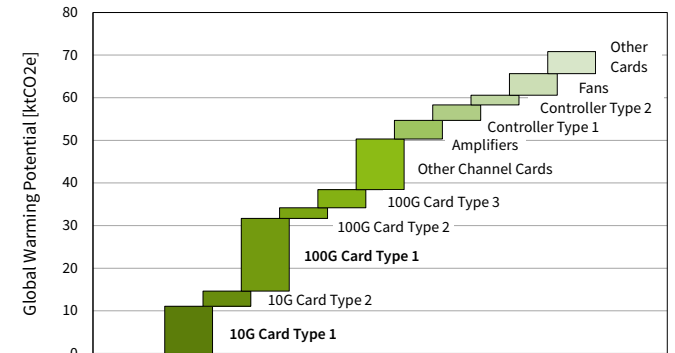
A WDM LCA example is provided in the diagram below. It shows the difference between the FSP 3000 and its successor, the FSP 3000 CloudConnect™, for three environmental impact parameters (global warming, human toxicity and terrestrial ecotoxicity potential). In both cases, a typical DCI configuration with identical capacity and seven years lifetime in the EU was used. The latter is relevant because of the region-dependent electricity mix that must be considered. Improvements regarding the dominating use-phase emissions can be derived because for the newer system, the relative contributions of the other lifecycle stages are larger.



WDM LCA example showing improvement between FSP 3000 and the newer FSP 3000 CloudConnect™

The use-phase dominance in LCA is common to WDM and Ethernet equipment. The reason in both cases is that these equipment classes typically have long lifetime (often approaching or exceeding 10 years) and are used in 24/7 always-on mode since deactivation would cause network outages. The dominance is related to the energy consumption of the products. It holds as long as the related energy consumption is not yet fully based on carbon-neutral renewables.

Product LCA started at ADVA Optical Networking several years ago. In 2017, the first analysis across the entire product portfolio was completed. This allows identifying heavy consumers and triggering related improvements, e.g., the development of successor modules. The portfolio analysis for Global Warming Potential (GWP, the most relevant environmental impact parameter for now) of our WDM products is shown below. Here, an averaged emission factor of 0.433 kgCO₂e/kWh has been used, representing the EU energy mix and taken from the ecoinvent 3.3 database.



WDM portfolio LCA, showing Global Warming Potential in absolute terms. The GWP contributions depend on per-module energy consumption and quantity of the respective modules sold in 2017



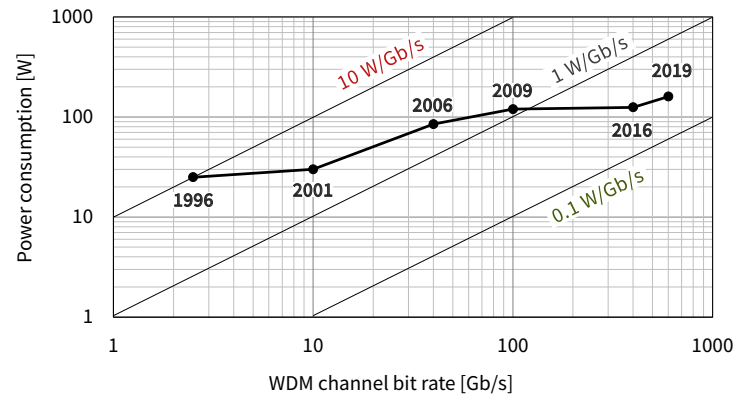
- Introduction
- Holistic approach to sustainability
- Ethics and compliance
- Organizational super segment
- Operational super segment
- Commercial super segment**
- Glossary
- Corporate information

Eco design and the SBTi

The LCA use-phase dominance to date is the main guideline for our WDM eco design focus. Since use-phase energy consumption clearly is the main environmental impact driver, we are constantly reducing the energy consumption to the best achievable extent. As a result, the energy efficiency of our WDM products (measured in watts per Gb/s) increased strongly over time. However, this is accompanied by the ICT trend of exponentially increasing bit rates. Since this bit-rate increase is faster than the energy-efficiency increase, WDM generations tend to consume increasing energy over time. This is despite the fact that all measures are taken to increase efficiency. In other words, to date, no technologies are known that would allow overcompensation of the bit-rate increase. This is a common trend in telecommunications today, it can be seen, e.g., for core IP routers as well.

The energy-consumption trend is shown in the following log-log-scale diagram for our WDM equipment. The figure shows energy consumption in dependence of the WDM channel-card bit rates, i.e., generation by generation. The x-axis also represents the time axis, as indicated. Our WDM equipment started at ~10 W/(Gb/s) more than 20 years ago. It is now approaching benchmark-setting efficiency of 0.2 W/(Gb/s).

The trend of bit-rate increase outpacing gains in energy efficiency sustained since the ramp-up of the Internet. It is ubiquitous in the global ICT networks segment and is not limited to specific equipment classes.



Development of WDM channel-card power consumption over time

For the Science Based Targets initiative, this means that no absolute Scope 3 GHG use-phase emissions reductions can be achieved or realistically promised for ICT network equipment. Instead, an intensity metric should be applied that accounts for the exponential ICT bit-rate growth. Then, the goal of ICT-equipment eco design must be to undercut the predicted ICT-emissions growth trend. This is our SBTi Scope 3 target. It limits future ICT emissions growth, rather than reducing total emissions.

ICT emissions forecasts can be taken from GeSI studies, [GeSI SMAR-Ter 2020](#). A respective diagram has already been shown in the [ICT and its environmental impact](#) chapter at the beginning of this report. Here, it must be noted that the forecasted ICT emissions increase is significantly smaller than the ICT bit-rate increase, which is forecasted, e.g., in the Cisco Virtual Network Index (VNI, see [vni-wp.html](#)). This also means that significant energy-efficiency increase is assumed between the two forecasts already. For the SBTi, it means that our target efficiency increase is above the one considered for the GeSI forecasts.

It must also be noted that ICT enables GHG abatement outside the ICT sector which is substantially higher than the ICT energy consumption itself. Hence, ICT – including the energy-consumption-critical network segment – can be regarded as one of the few enablers of decreasing global GHG emissions. According to latest GeSI studies, the ICT-enabled GHG abatement is almost 10x the total ICT GHG footprint.



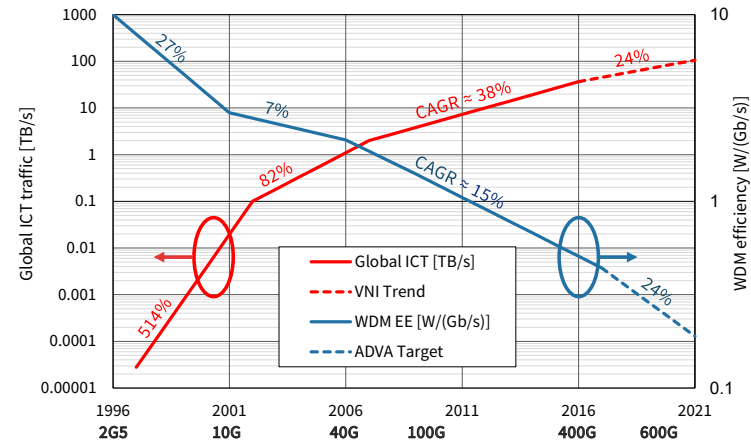
In Q4/2017, we also won an award for WDM Best Energy Efficiency at the Layer 123 Congress in The Hague, Netherlands



The comparison of the developments of global ICT traffic or ICT bit rates on the one hand and energy efficiency of our WDM gear on the other, reveals further insight in the practicability of our SBTi Scope-3 target.

If the respective data are displayed together, the following log-scale diagram results. Again, the global ICT traffic numbers have been taken from the Cisco VNI. The WDM efficiency numbers result from data from past and present generations of our WDM systems.

The diagram shows that at no point in the past, WDM energy efficiency increase was able to cope with ICT traffic increase. Total energy consumption of WDM systems grew accordingly. For the nearer future, this can change for the first time: WDM efficiency increase is in the same range as is the ICT traffic increase. On the WDM side, this will be enabled by a comprehensive combination of best available technologies – best system concept, best related functionality, and best components. This again is our SBTi Scope-3 target.



Development of global ICT traffic and WDM energy efficiency over time, and projection into the future

- Introduction
- Holistic approach to sustainability
- Ethics and compliance
- Organizational super segment
- Operational super segment
- Commercial super segment**
- Glossary
- Corporate information

Product design guide update

In 2015, we started dedicated product eco-design considerations aiming at:

- Energy efficiency
- Raw-material intake
- Recyclability

Internally, the respective framework document (the one that contains detailed design rules) is entitled Design for Environment (DfE). In 2016, it was implemented into our product process landscape and used for the first time. In 2017, a second round of even deeper implementation into our product-related processes took place. The DfE now has a framework similar to (product) Design for Manufacturing or Design for Cost. It consists of the framework document, a matrix where to apply which of the design rules, and tracking mechanisms for collecting feedback. It is applicable to all the group's product lines.

The DfE guide splits into two parts, one focused at energy efficiency, the other looking at different aspects that lead to design for circular economy. The CE part splits into several chapters:

- Principles for lifetime and life extension
- Parts reuse
- Design for recycling
- Material efficiency
- Principles for PCBs and ICs
- Principles for plastic parts
- Safe design (RoHS)
- Communication design (labelling, etc.)

Furthermore, a basic design guidance for logistics (packaging, transportation) is included as well.

As a process document, the design guide is subject to yearly review and, where necessary, change or completion.



- Introduction
- Holistic approach to sustainability
- Ethics and compliance
- Organizational super segment
- Operational super segment
- Commercial super segment

Glossary

Corporate information

Glossary

E

EICC (Electronic Industry Citizenship Coalition)

The EICC is a nonprofit coalition of electronics companies committed to supporting the rights and wellbeing of workers and communities worldwide affected by the global electronics supply chain. EICC members commit and are held accountable to a common code of conduct.

F

FSP (Fiber Service Platform)

The Fiber Service Platform is ADVA Optical Networking's comprehensive product portfolio that provides carriers and enterprises with innovative connectivity solutions for access, metro and long-haul networks.

G

GeSI (Global e-Sustainability Initiative)

In collaboration with major ICT companies, GeSI is a leading source of impartial information, resources and best practices for achieving integrated social and environmental sustainability through ICT.

GEVA (GHG Emissions per unit of Value Added)

GEVA are one way of defining intensity metrics for emissions, i.e., metrics that account for company growth. It is the intensity metric accepted by the SBTi. Find out more online: [sciencedirect.com/science/article/pii/S0301421512003461](https://www.sciencedirect.com/science/article/pii/S0301421512003461).

GHG (Greenhouse Gas)

GHG are gases that are responsible for the effect of global warming. The most relevant GHG are water vapor, carbon dioxide, methane, nitrous oxide, ozone and several chloro- and hydrofluorocarbons.

GHGP (Greenhouse Gas Protocol)

Through the GHGP, World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) work with businesses to develop standards and tools that help companies measure, manage, report and reduce their carbon emissions. More: [ghg-protocol.org](https://www.ghg-protocol.org).

GRI (Global Reporting Initiative)

GRI is an international independent organization that helps businesses, governments and other organizations understand and communicate the impact of business on critical sustainability issues such as climate change, human rights, corruption and many others.

I

ICT Ecology Guideline Council

The Japanese ICT Ecology Guideline Council is composed of five telecommunications industry organizations. Its object is to take further industry-wide measures to prevent global warming by creating, disseminating and promoting the Ecology Guideline for the ICT Industry (which define relevant TEER).

IPCC (Intergovernmental Panel on Climate Change)

The IPCC is the international body for assessing the science related to climate change. The IPCC was set up in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Program (UNEP) to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.

ISO 14001

A standard developed and published by the International Organization for Standardization (ISO). It defines an environmental management system (EMS) for the manufacturing and service industries.

ISO 14040 / ISO 14044

Two standards developed and published by the ISO. ISO 14044 replaces the former standards ISO 14041 to 14043. The standards fall into the area of environmental management, they define lifecycle assessments.

ISO 22301

This International Standard specifies requirements for setting up and managing an effective Business Continuity Management System (BCMS).

ISO 50001

An ISO standard that support organizations and companies in setting up a systematic energy management system (EnMS).

Q

QuEST Forum

A global association of companies dedicated to impacting the quality and sustainability of products and services in the ICT industry. QuEST Forum is the producer of the telecommunications quality standard TL 9000. For further information, please see [questforum.org/](https://www.questforum.org/).



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

R

RECh (Registration, Evaluation, Authorization and Restriction of Chemicals)

A regulation issued by the European Union addressing the production and use of chemical substances and the potential impact of these substances on human health and the environment.

RoHS (Restriction of Hazardous Substances)

A directive issued by the European Union regarding the restriction of specific hazardous substances used for production and processing of electronic devices and components.

S

SBTi (Science Based Targets initiative)

The SBTi is a partnership between the Carbon Disclosure Project, UN Global Compact, the World Resources Institute and the World Wide Fund for Nature. It aims at helping companies determining how much they must cut emissions to support the restriction of global warming to within 2°C compared to pre-industrial temperatures. Find out more under sciencebasedtargets.org/.

T

TEER (Telecommunications Energy Efficiency Rating)

TEER is a guideline to measure/calculate the energy efficiency of telecommunications equipment at a given functionality (e.g., WDM transport capacity). Relevant standards and guidelines are the Ecology Guideline for the ICT Industry, Version 8, 2018 (available online under tca.or.jp/information/pdf/ecoguideline/guideline_eng_8.pdf), the ANSI ATIS-0600015 series or ECEC1.2.

TL 9000

In 1998, QuEST Forum developed the TL 9000 quality management system (QMS) to meet the supply-chain and operational-quality requirements of the global ICT industry. TL 9000 is built on ISO 9001.

W

WDM (Wavelength Division Multiplexing)

WDM is a standardized technology used for maximizing the fibers' transport capacity. It uses different laser wavelengths per fiber, each carrying individual information.

WEEE (Waste Electrical and Electronic Equipment)

A directive issued by the European Union regarding the return and recycling of electrical and electronic equipment waste.



Introduction

Holistic approach to sustainability

Ethics and compliance

Organizational super segment

Operational super segment

Commercial super segment

Glossary

Corporate information

Corporate information

G102-3

Corporate headquarters

ADVA Optical Networking SE
Campus Martinsried
Fraunhoferstraße 9a
82152 Martinsried/Munich
Germany

t +49 89 890 665 0

Registered head office

Märzenquelle 1-3
98617 Meiningen-Dreißigacker
Germany

t +49 3693 450 0

Americas office

ADVA Optical Networking North America, Inc.
5755 Peachtree Industrial Boulevard
Norcross, Georgia 30092
USA

t +1 678 728 8600

Asia-Pacific office

ADVA Optical Networking (Shenzhen) Ltd.
18/F, Maoye Times Square
Haide 2nd Road
Nanshan District
Shenzhen 518054 China

t +86 755 8621 7400

ADVA Optical Networking on the web

More information about ADVA Optical Networking, including solutions, technologies and products, can be found on the company's website at www.advaoptical.com.

The PDF file of this sustainability report, the associated GRI index file as well the previous GRI reports are located on the ADVA Optical Networking website and can be downloaded at www.advaoptical.com/en/about-us/sustainability.

Auditor

Quality Austria
Trainings, Zertifizierungs und Begutachtungs GmbH

Headquarters
Zelinkagasse 10/3, 1010 Wien, Austria

Customer Service Center
Am Winterhafen 1, 4020 Linz, Austria