

WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

A close-up photograph of a person's hand holding a large, vibrant green leaf. The left side of the leaf is replaced by a detailed green circuit board pattern, symbolizing the integration of nature and technology. The background is a blurred grey and white fabric.

CREATING A BETTER TOMORROW

Sustainability at
Würth Elektronik
Circuit Board Technology

THINKING

ABOUT

TOMORROW

TODAY

Management of Würth Elektronik
Circuit Board Technology, from left:
Andreas Gimmer, Thomas Beck, Daniel Klein



FOREWORD

Sustainability has become a central topic in many companies – including the Würth Group.

Ecological sustainability has also long been an integral part of many areas of the company at Würth Elektronik Circuit Board Technology and is actively practised by our employees.

We work together to continually reduce the environmental impact and resource consumption and to support social projects around the world.

We are committed to our employees and promote them in their workplace every day. Our environmental and energy management is part of the Integrated Management System (IMS). It has an immediate as well as lasting effect on procedures and processes in the company. When it comes to environmental measures, we deliberately go beyond the existing legal requirements. This means that all our PCB plants not only comply with the legal requirements, but often fall very significantly below the prescribed limits. We record our environmental indicators semi-automatically or update them regularly. They form the basis for continuous reduction measures in the consumption of energy, raw materials, materials, water and emissions of air pollution and noise. Our customers can therefore be sure that the environmental impact of the manufacture of our products is as low as possible according to the state of the art.

The concept of sustainability is integrated into the strategic framework of our company with its focus on holistic growth. Within this framework, new targets were defined for key issues:

- We want to become a climate-neutral company,
- drive the optimisation of our use of resources and
- continue to expand our positive contribution to social development.

In this brochure, we present our entry into holistic sustainability at Würth Elektronik Circuit Board Technology. It represents a snapshot and forms the basis for a sustainable future at Würth Elektronik Circuit Board Technology. Heavy investment over recent years has enabled us to achieve a significantly measurable improvement in our environmental impact. We continue our steady development towards holistic sustainable production.

Kind regards


Thomas Beck


Andreas Gimmer


Daniel Klein

AT A

WÜRTH ELEKTRONIK
CIRCUIT BOARD TECHNOLOGY

GLANCE

Made in Germany

Three production sites
in Germany



Niedernhall



Rot am See



Schopfheim





Expert

Over 50 years of experience in PCB production and more than 20 years in environmental and energy management

In partnership

More than 4,000 active customers benefit from maximum service and know-how transfer

Successful

€181 million turnover in 2021

Leading

Europe's largest printed circuit board manufacturer

International

Printed circuit boards delivered to all 5 continents of the world

Diverse

Specialist in the technologies:

- Multilayer
- RIGID.flex
- SLIM.flex
- Microvia HDI
- Embedding
- Wire bonding
- Thermal management
- Stretchable circuit boards

Family

More than 1,000 employees worldwide and part of the strong, owner-managed Würth Group



17 SUSTAINABLE DEVELOPMENT GOALS



In its actions, Würth Elektronik Circuit Board Technology supports the implementation of the 17 Sustainable Development Goals (SDGs), which were adopted by the 193 member states of the United Nations in September 2015 with the aim of actively promoting sustainable development.

The SDGs are derived from the global problem analyses, which express the overarching expectation of the global community with regard to justice, prosperity, health and quality of life. The Sustainable Development Goals contain interrelated set of tasks in need of change, so-called fields of action.

As a rule, fields of action in sustainability are multidimensional, since economic, ecological and societal problems are, on the one hand, problems in themselves and, on the other hand, problems in interaction with each other.

WHAT ARE SDGS?

The **UN Sustainable Development Goals**, or SDGs for short, contain 17 goals to be achieved by 2030 by all developing, emerging and industrialised countries. The SDGs have put the focus on transforming society and securing natural livelihoods for all countries. The aim is to make the world a fairer, healthier, more peaceful and more social place.

The SDGs encompass all three dimensions of sustainability: **Social, economic and environmental**. In addition, the Sustainable Development Goals are preceded by five core messages as principles guiding action: people, planet, prosperity, peace and partnership.

SDGs AND WÜRTH ELEKTRONIK



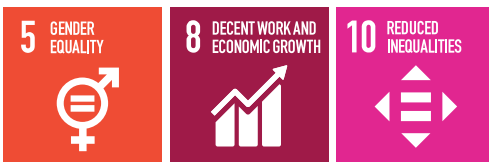
We would like to support the disadvantaged around the world as one part of our responsibility.

To achieve this goal, we provide development aid and ensure that our employees are fairly remunerated worldwide. In addition, we specifically allocate some of our apprenticeships in Germany to people with special needs and support them in their development.



We use special recycling processes to conserve resources. Various raw materials such as copper, gold or palladium are recovered from individual production processes, at best directly at the production site.

In addition, we use economical washing techniques and reuse the water within the production process. The wastewater is purified in compliance with strict requirements.



At Würth Elektronik Circuit Board Technology, we attach great importance to equal rights and equal opportunities. We therefore support our employees during pregnancy and parental leave, for example, and thus ensure a better work-life balance. In addition, we provide all our employees with support through a wide range of training and mentoring programmes.



We use photovoltaic systems to produce green electricity on unused open spaces on buildings and car parks at our plants in Niedernhall, Rot am See and Schopfheim. In addition, Würth Elektronik Circuit Board Technology pays particular attention to incorporating the optimal use of renewable energies into its work processes by means of an intelligent electricity mix.

WHAT DOES SUSTAINABILITY MEAN AT WÜRTH ELEKTRONIK CIRCUIT BOARD TECHNOLOGY?

**Technical progress in harmony with nature
and fair dealings with each other.**

The economic aspect

Our products and services are an important component in many pioneering electrotechnical products.

Our printed circuit boards enable us to contribute to making end products more sustainable while taking economic and ecological criteria into account. This is made possible, for example, through the increased longevity of our products, or through increased efficiency and "clean" production.

The ecological aspect

Protecting nature is one of our core values in the area of sustainability. Würth Elektronik has been producing environmental reports since 1999. This results in a respectful, transparent and considerate approach to natural resources.

The social aspect

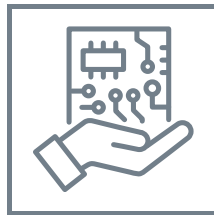
People are close to our hearts, because every individual counts and can contribute to sustainable development. We achieve our sustainability goals faster and more efficiently together and in teamwork. The issue of compliance plays an important role for us. For us, compliance means not only adherence to all applicable rules, laws and corporate guidelines, but also a corresponding inner attitude on the part of our employees, which is an essential building block for the sustainable corporate success of the Würth Group. Würth Elektronik Circuit Board Technology promotes social projects at the regional and international level.

Based on this understanding, we have defined our fields of action for sustainability at Würth Elektronik Circuit Board Technology, which are discussed in more detail below.



OUR FIELDS OF ACTION AND GOALS

We have chosen three fields of action to achieve our goals, which are relevant for sustainable corporate development: Product & Service, Resources & Environment, People & Society. We use these to define our milestones and record our successes.



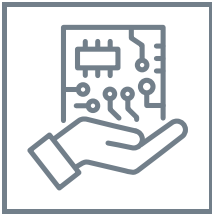
> Product & Service



> Resources & Environment



> People & Society



GOALS OF THE >>PRODUCT & SERVICE<< FIELD OF ACTION

Electronics have a decisive influence on sustainability in the age of digitalisation. Printed circuit boards, services and solutions from Würth Elektronik are used in many promising products.

Specifically, we are looking at the ingredients of our products, adapting our manufacturing processes in terms of sustainability and optimising the transport of goods and commodities. Together with our customers and suppliers, we develop sustainable, resource- and energy-saving solutions over the entire lifecycle with innovations, quality, long-term availability and intensive customer support.

> Sustainability through quality

Our goal is to lay the foundation for sustainability with the help of convincing quality and transparent data. Environmentally friendly packaging and shipping systems round this off.

> Sustainability through panel optimisation

We create optimised printed circuit board panels for our production with expert employees to achieve resource-saving production. We actively reduce the waste of raw materials and energy this way.

> Sustainability through miniaturisation

Our standards and design support enable the widespread use of high-tech in miniaturised systems with improved performance, reduced volume and weight.

This is what we are already doing in terms of **quality:**

- Continuous improvement to reduce scrap rates
- The constant evaluation and further development of the raw, auxiliary and operating materials we use enable PCB production at the highest level
- Process optimisations through internal CIP control loops and adaptation of market and customer feedback
- Material compliance: RoHS, REACH & halogen free – we are constantly looking into the substitution of hazardous and restricted substances
- Environmentally friendly packaging ensures quality by avoiding damage during transport

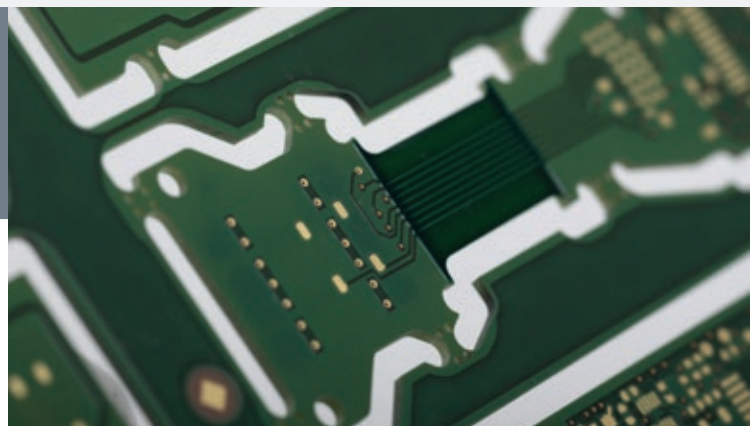
This is what we are already doing in terms of **optimisation of panels:**

- The optimization of production panels ensures the lowest possible use of resources during manufacturing
- Pooling for PCBs in the online shop (different customer orders are manufactured together on one production panel)
- Project greenPCB: Use of residual areas for low-cost and sustainable pooling
- Personal consultations with our clients to optimise their individual panels

This is what we are already doing in terms of **miniaturisation:**

- Diverse range of technologies for customised miniaturisation solutions
- Standardisation of many processes and production steps as well as digital standards as a basis for quality and efficiency
- Technology enablers (e.g. technology partnerships) and cooperation with universities and colleges (promoting our developers and customers of tomorrow)
- Design support for advanced applications for successful and reliable customer products
- Pre-simulations avoid failures and unnecessary consumption of resources
- Transparent data exchange between the customer and Würth Elektronik

A lighthouse project from the Product & Service field of action can be found on page 16.





GOALS OF THE >>RESOURCE & ENVIRONMENT<< FIELD OF ACTION

The responsible use of resources has been a guiding principle at Würth Elektronik Circuit Board Technology for over 15 years and continuously leads to improvement measures via our environmental/energy teams. This includes, for example, consistent recycling in our plants, integration of green IT, reduction of pollutants, use of our roof surfaces for photovoltaics, digitalisation to increase energy efficiency and saving on packaging material.

In our production processes, we use heat recovery, free cooling, and also reuse water multiple times to achieve environmentally friendly results in terms of sustainable production. Environmental and climate protection are part of the corporate strategy, documented by management systems and certifications according to ISO 14001 and ISO 50001.

> Sustainability through efficiency

For us, efficiency means the sensible and economical use of energy and resources and integration into a circular economy, as far as possible.

> Sustainability through management

Our management systems help to identify the expectations and needs of interested parties, as well as opportunities and risks. They anchor the requirements of environment, energy, occupational safety and quality in all processes.

> Sustainability through process optimisation

By optimally designing our processes, we avoid waste, rework and scrap in order to conserve our resources in the best possible way.

This is what we are already doing in terms of **efficiency:**

- Free cooling to reduce energy consumption
- Green IT through more energy-efficient data centres and workplaces
- LED lighting and motion detector
- Energy monitoring systems enable transparency and thus conscious control
- Monitoring systems: e.g. water, electricity, gas, compressed air and heat: Conscious consumption and sensible use of resources
- Photovoltaic systems for energy generation. Our on-site combined heat and power plant also serves to generate heat and electricity
- Recovery of raw materials from individual production processes
- Exhaust air purification through VOC biofilters
- Use of low-pollutant and partially recyclable materials
- Wastewater treatment and reuse
- Continuous packaging material improvements and state-of-the-art technologies enable waste reduction

This is what we are already doing in terms of **management:**

- ISO certifications at our production sites (including ISO 14001, ISO 50001, ISO 9001)
- Sustainability is an integral part of the corporate strategy
- Disposal management and use of recycled materials
- Occupational health and safety, a central component in our business processes
- Integration of sustainability aspects in in-house working groups

This is what we are already doing in terms of **process optimisation:**

- Heat recovery in our production processes
- Less plastic in our packaging and new packaging concepts in cooperation with our customers
- Digitisation – advanced technology and systems enable efficient and resource-saving economic activity
- Paper reduction through digitisation (digital order entry and archiving, digital invoice dispatch, etc.)
- Digital events such as our webinars and Digital Days enable resource-saving knowledge transfer
- Low waste and efficient use of raw materials through optimised processes
- Recycling in our production processes



A lighthouse project from the field of action Resource & Environment can be found on page 17.



GOALS OF THE >>PEOPLE & SOCIETY<< ACTION FIELD

The Würth Group has left its mark on the region around its headquarters and beyond with its social and cultural commitment. Würth Elektronik is also committed to its social responsibility – worldwide. This aspect of sustainability is reflected in a corporate culture of education, promotion and diversity.

Initiatives on diversity, including gender equality and equal opportunities, start within the company to solve social challenges. Fair dealings with each other focus on the well-being and advancement of our employees, in line with the motto “it's about people”. And not only that: We focus on fair business practices and long-term relationships in our dealings with our customers, partners and suppliers.

> Sustainability through fairness

Fair dealings with each other are the cornerstone of our diverse corporate culture.

> Sustainability through awareness

We raise awareness among our fellow human beings through visible actions and thus encourage them to think and act.

> Sustainability through engagement

Sustainability is a matter close to the heart for us, every single person can contribute their individual part here, because only together can we achieve great things.

This is what we are already doing in terms of **fairness:**

- Commitment to corporate social responsibility in line with the RBA (Responsible Business Alliance) along our value chain
- Social commitment, for example by supporting workshops for the disabled in the region or by supporting the Special Olympics
- Signing the Diversity Charter in 2015
- Equality is very important to us

This is what we are already doing in terms of **awareness:**

- JobRad bike leasing – a sustainable way to get to work
- Raising awareness and staff training
- Fully electric cars for our apprentices at our production sites

This is what we are already doing in terms of **commitment:**

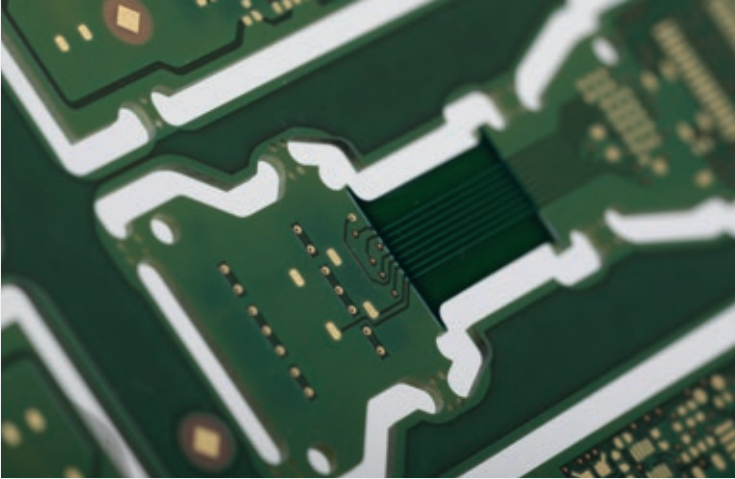
- Company health management, sports and compensation programme WEtality
- Company canteen with healthy alternatives for our employees
- It's about people – our corporate culture
- Works of art from the Würth collection accompany employees in their everyday working lives
- Educational commitments (e.g. cooperation with students from electronics courses)
- Social business project, international model for the sustainable safeguarding of livelihoods
- Hohenlohe Model membership – being regionally sustainable together
- Internal suggestion scheme, involvement of employees and awards for implemented suggestions
- Employee coaching in challenging situations through personal conversations

A lighthouse project from the field of action People & Society can be found on page 17.





LIGHTHOUSE PROJECT FOR THE >>PRODUCT & SERVICE<< FIELD OF ACTION



High-tech safety module: Flexible solder mask in a car key

Inkjet printing production project

Solder mask fulfils different functions on a printed circuit board for electronic circuits. The usually green coating serves, among other things, to protect the copper conductor tracks from corrosion, to protect them from mechanical damage and to prevent the surfaces on the PCB that are coated with it from wetting during soldering. In addition, solder mask improves electrical properties such as dielectric strength. To apply the coating, Würth Elektronik Circuit Board Technology has up to now used full-surface conventional processes such as curtain coating, screen printing or spraying.

Since the beginning of 2017, the **"s.mask"** project has been trialling the use of a special ink and inkjet printer to precisely place solder mask only on certain areas of the printed circuit board. In addition to savings of up to 70% for the coating, large amounts of resources are also saved by eliminating processes such as pre-cleaning, pre-drying, exposure or development. This reduces the use of chemicals, especially in the development process, and reduces hazardous waste due to excess application of coating or filters that are covered by coating. It also reduces water, wastewater and energy consumption. In addition to the resource savings, the new technology shortens the production time of a panel by up to 30% compared to the previous process.

The implementation process of "s.mask" is currently still in a development stage. The results of the project so far confirm the potential behind the idea and ensure a high priority for Würth Elektronik Circuit Board Technology.

The findings from the project have also led to a similar approach being used to develop the application of flexible solder mask to rigid-flex PCBs using an inkjet process, which has recently been introduced in series production. This has led to savings in resources while improving the quality of the product.



Daniel Klein and Franz Untersteller (former Minister of the Environment Baden-Württemberg) at the award ceremony of the State of Baden-Württemberg





**LIGHTHOUSE PROJECT FOR
THE >>RESOURCE & ENVIRONMENT<<
FIELD OF ACTION**

Etchant recycling and copper recovery in an alkaline etching line

PCB production is extremely complex. The PCB production passes through 72 to over 130 individual process steps depending on the design. More than half of these are chemical wet processes, such as cleaning, etching and electroplating.

Specifically, three processes are combined in the alkaline etching line. The first process step in the etching line is the removal of the plating resist. In the subsequent second process step, the actual alkaline etching process, the copper areas not covered with tin are removed. The third step in tin stripping is to remove the tin layer applied as an etching protection.

With the help of etchant recycling through copper recovery using the MECER process, which is a combination of liquid-liquid extraction and electrolysis, **over 90% of the etchant and over 99% of the copper contained in the etching solution is recovered.** In addition, by using waste heat from the air compressors to heat the electrolytes, the required energy costs were halved.



ment of the State of
en-Württemberg.



**LIGHTHOUSE PROJECT FOR
THE >>HUMAN & SOCIETY<<
FIELD OF ACTION**



WE Mill

Würth Elektronik Circuit Board Technology sees itself as a good corporate citizen – this means that, within the scope of our possibilities, we take responsibility where we are economically active and where help is needed.

Our aim in the WE Mill project is to enable women in rural India to secure their own livelihoods through a sustainable livelihood model.

We have been supporting a social business project in the district of Mysore, in the Indian state of Karnataka since 2019. The goal is to train rural women to become entrepreneurs. Extensive training empowers them to make products from traditional grains and offer them at the nearest markets. This sustainably secures their livelihoods.

Production focuses in particular on the old cultivated plant ragi. Due to its particularly rich nutrients and ingredients, ragi forms a valuable basis of the Indian diet.

Project participants report not only a newly increased recognition of rural women as a result of the creation of income opportunities, but also the development of a regional, non-city centred economy. At the same time they contribute to the maintenance and expansion of ragi cultivation.

The positive development and results provide insights that can be helpful with regard to further social projects.

NUMBER WORK

Energy					
Würth Elektronik GmbH & Co. KG		Emission factor 2019 CO ₂ e/kWh	Consumption 2019 kWh	CO ₂ emissions 2019 T CO ₂ e	Emission factor 2020 CO ₂ e/kWh
Scope 1 Direct green-house emissions	Company cars				
	Diesel	0.267	1,911,955.00	510.49	0.267
	Petrol	0.250			0.250
	Natural gas	0.182	14,180,171.00	2,580.79	0.182
	CO₂ emissions (Scope 1)			3,091.28	
Scope 2 Indirect green-house emissions	Power	0.28	36,832,682.00	10,276.32	0.22
	CO₂ emissions (Scope 2)			10,276.32	
Total energy consumption			52,924,808.00		
Total energy consumption per € operating turnover			0.34 kWh /€		
Total CO₂ emissions				16,458.88	

Logistics		2019	2020	2021
Packaging materials used in metric tonnes	of which aluminium	2	2.6	2
	of which paper/cardboard	13	12	13
	of which plastics	2	2	2
Orders in logistics	Shipments per year	65,935	58,091	63,215
	Shipping in tons	1,097	1,068	1,448

Resources		2019	2020	2021
Resources used in production	Basic material in m ²	389,589	342,672	360,764
	Metals in t	221	214	213
Water	Water consumption in m ³	160,007	145,366	166,181
	Waste water volume in m ³	160,007	145,366	166,181

Products		2019	2020	2021
Fabricated circuit boards	in m ²	4,700,996	4,069,664	4,357,289
Service level	Niedernhall in %	97	87	87
	Rot am See in %	96	96	90
	Schopfheim in %	92	90	72
	Asia Production in %	90	89	87

Consumption 2020 kWh	CO ₂ emissions 2020 T CO ₂ e	Emission factor 2021 CO ₂ e/kWh	Consumption 2021 kWh	CO ₂ emissions 2021 T CO ₂ e
1,342,767.00	358.52	0.267	27,570.44	7.36
		0.250	977,691.68	244.42
12,346,756.00	2,247.11	0.182	12,595.237.00	2,292.33
	2,605.63			2,544.12
35,925,746.00	7,795.89	0.17	34,839.139.00	5,887.81
	7,795.89			5,887.81
49,615,269.00			48,439.638.11	
0.33 kwh /€			0.27 kwh /€	
	13,007.14			10,976.05

Health	2019	2020	2021
Health rate	93%	96%	97%
Active breaks carried out	93	26	35
Absences due to accidents	108	50	63
Reportable accidents (to BG)	7	15	19
Trained first aiders	36	38	43
Employees trained in fire protection	12	17	19

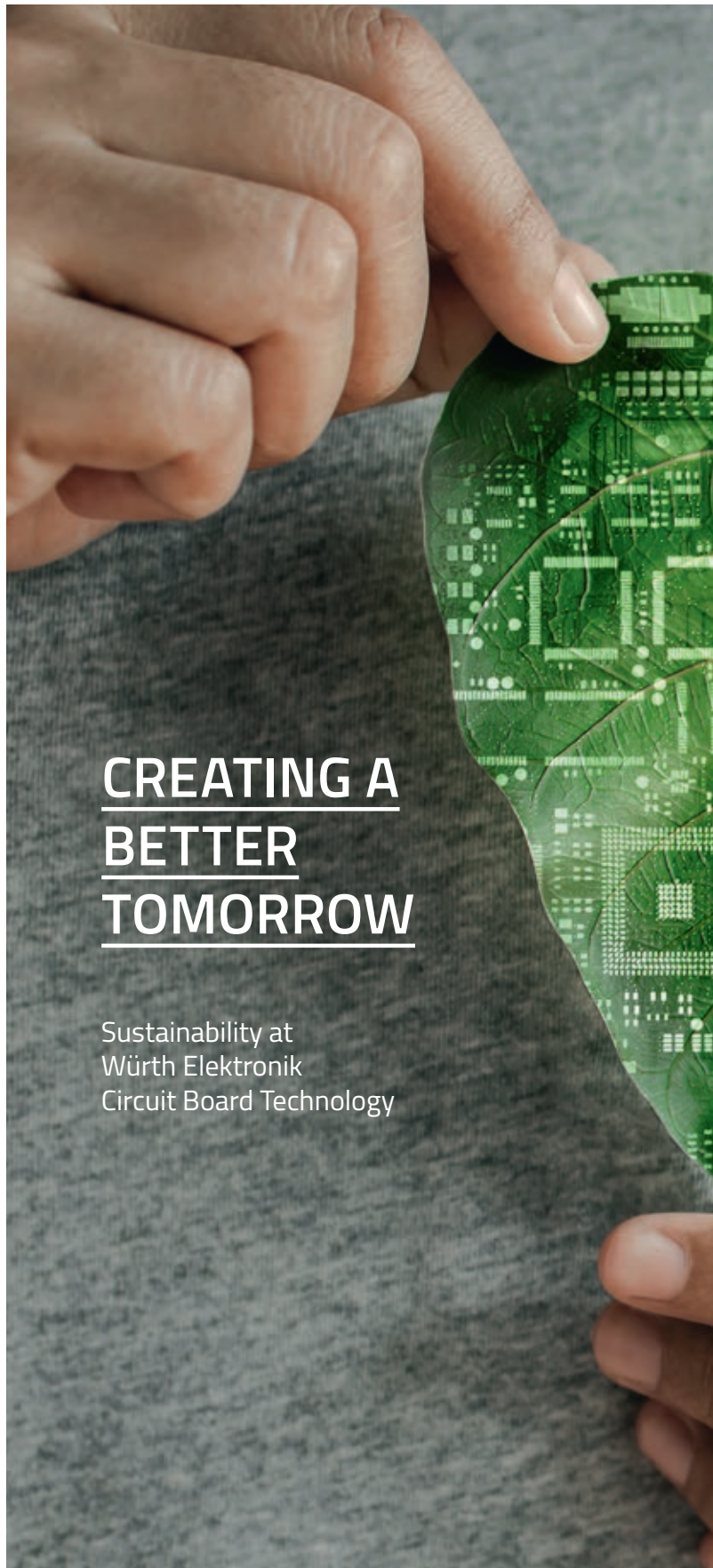
Efficiency	2019	2020	2021
Suggestions for improvement	210	135	258

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