Federal Ministry
for Economic Affairs
and Climate Action

Germany's innovative solutions for the energy transition in the Gulf region

bmwk.de

Imprint

Publisher
Federal Ministry for Economic Affairs
and Climate Action (BMWK)
Public Relations
11019 Berlin
www.bmwk.de

Status
November 2022
This publication is available for download only.

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Second edition
November 2022, first published October 2021

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Preface

The Gulf Cooperation Council (GCC) countries are committed to renewable energy and are continuing to focus on the diversification of their energy sectors. German companies are well positioned to serve these demanding markets with their innovative and leading technologies and services. This publication showcases some of those technologies and presents solutions German companies have to offer in the field of renewable energy.

Bilateral business relations require a dedicated, hands-on approach. This is especially true for the Arabian Peninsula and its traditional, value-driven business communities. Germany has a well-established and deeply rooted business network operating in most GCC countries – the AHKs.

The German Chambers Abroad (Auslandshandelskammern, AHKs) are key partners for German business activities in the respective host countries. As non-profit organizations, they are trusted brokers of bilateral business relations. AHKs are officially mandated and supported by the German Federal Ministry for Economic Affairs and Climate Action (BMWK), based on a decision of the German Parliament.

The AHK network has had many successes in the Gulf region. The foundation of the German Saudi Arabian Liaison for Economic Affairs (GESALO) dates back to 1978 and is also responsible for Bahrain and Yemen. With the head office in Riyadh, and German desks in Jeddah and Dammam, it constitutes the largest private bilateral business development organization in the Kingdom of Saudi Arabia.

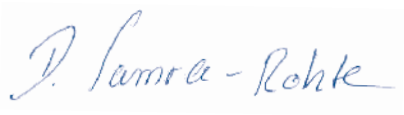
The German Emirati Joint Council for Industry and Commerce was founded in 2009, based on German representative offices in the United Arab Emirates (UAE) being established already in the late 1990s. With satellite offices in four other Gulf countries and operations in Pakistan, it covers a geographical area of great economic relevance for German companies.

The AHK offices are not only the first contact points for German companies from all sectors but also for local institutions and local companies. They talk and think business.

The renewable energy sector is pivotal to the many activities carried out by the AHKs.

Supported by the German Federal Ministry of Economic Affairs and Climate Action, and together with the German Chamber of Commerce and Industry (DIHK) and other leading industry associations, the AHKs have introduced a significant number of technology and service providers to the local GCC markets. Both AHKs support the energy dialogues and energy partnerships established between the BMWK and several GCC countries. The dialogues have significantly enhanced the relationship in the field of renewable energy, creating a valuable platform for regular exchanges, events, expert meetings, and delegations to and from the Gulf region.

This publication adds another milestone in this special relationship.



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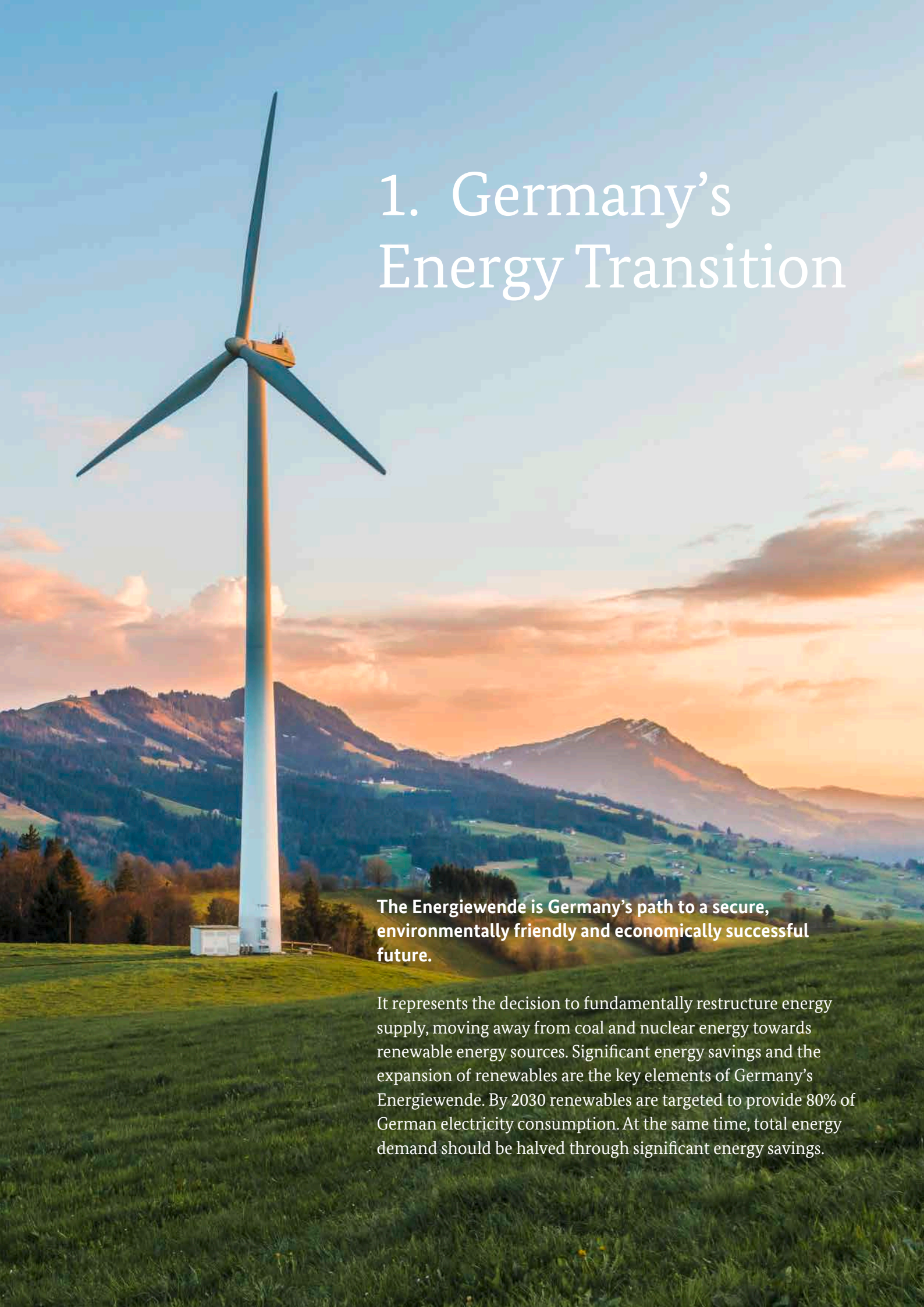


1. Germany's Energy Transition

The Energiewende is Germany's path to a secure, environmentally friendly and economically successful future.

It represents the decision to fundamentally restructure energy supply, moving away from coal and nuclear energy towards renewable energy sources. Significant energy savings and the expansion of renewables are the key elements of Germany's Energiewende. By 2030 renewables are targeted to provide 80% of German electricity consumption. At the same time, total energy demand should be halved through significant energy savings.

The energy transition is an essential contribution to reducing global warming to 1.5°C and a maximum of 2°C by the end of the century, in accordance with the Paris Agreement under the United Nations Framework Convention on Climate Change.

In 2019, the German government adopted a binding legislative framework for its climate policy. Germany's Federal Climate Change Act sets the target for reaching climate neutrality by 2045. Until 2050, Germany plans to become a carbon sink. In 2021 Germany had already reduced 38.7% of its greenhouse gas emissions compared to 1990.[1] Until 2030, the emissions are to be reduced by at least 65%. The Climate Change Act specifies the annual emission reductions for individual sectors until 2030. Those annual sector-specific targets are fundamental for the comprehensive monitoring system that ensures the attainment of Germany's climate targets.

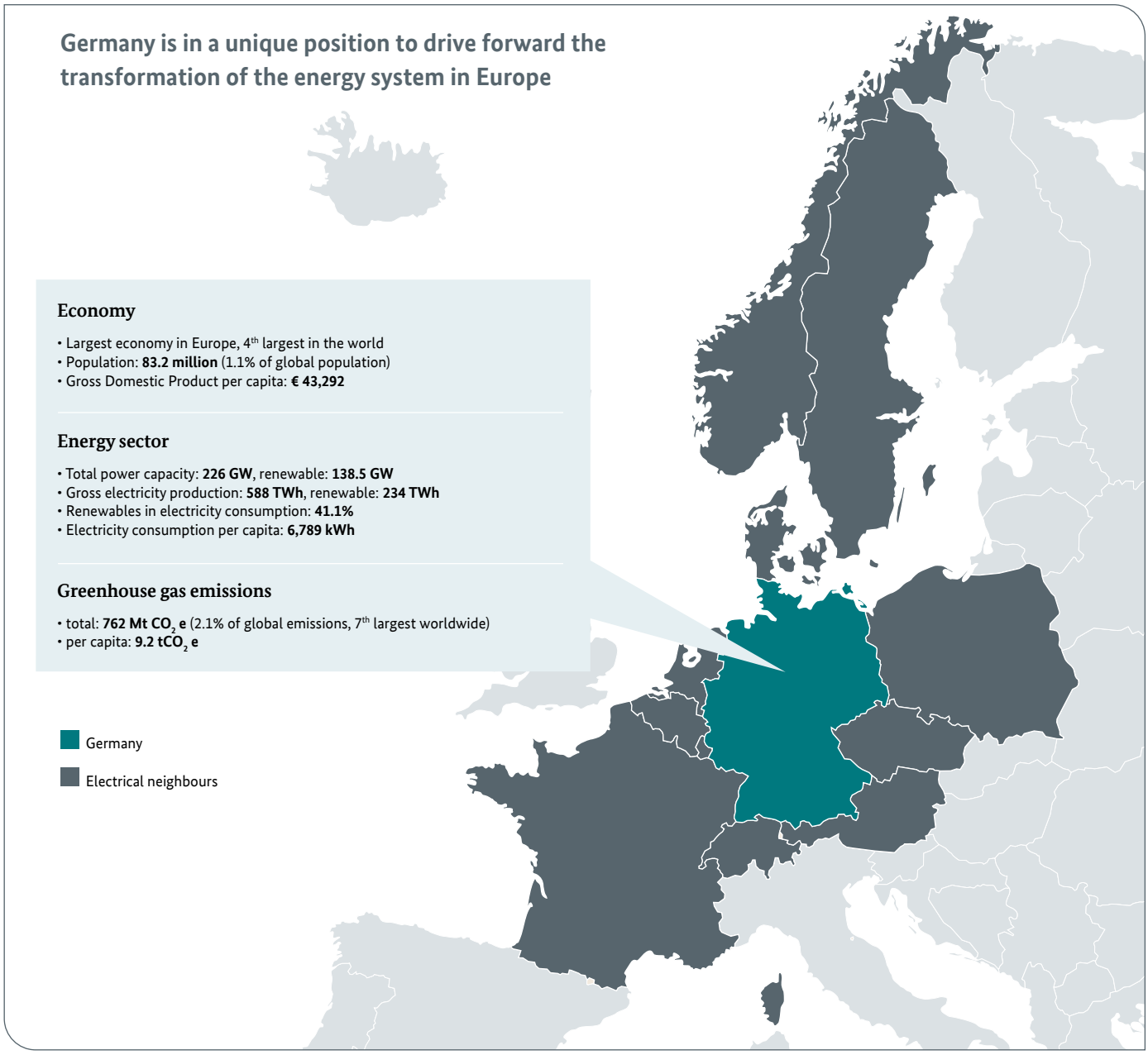
The energy transition contributes to the diversification of the German energy supply and reduces the dependency on imports of fossil energy carriers.

German engineering spirit and continuous policy development have positioned Germany as a pioneer and leader in the global energy transition. Green technology is driving sustainable development in Germany and around the world.

For Germany, as a global technology and industry hub, the importance of green technologies cannot be overstated. German companies – large industrial corporations as well as many small- and medium-sized companies (SMEs) and family-owned businesses – are leading in state-of-the-art sustainable energy and environmental technologies in the fields of renewable energy, green hydrogen, efficiency, recycling, waste management and water treatment.

The energy transition enjoys broad support within the German population and among political parties.

Support for the energy transition path continuously exceeds 90% among the German population.[2] This support is not only related to the environmental benefits of sustainable energy supply and efficiency, but also to the economic advantages and competitiveness stemming from innovative solutions in the energy transition. Renewable energy has become an important economic factor in Germany providing employment to 344,100 people in 2021.[3] Parallel to the ongoing expansion of domestic renewable energies, exports of German technology have become a second pillar for economic opportunities and securing employment across Germany. In 2019, German technology exports related to renewable energies amounted to about €10.6 billion.[4]



The German government has created a stable policy framework to make sure that the ambitious targets of the Energiewende will be reached.

A reliable and transparent long-term strategy with sector-specific targets underpins the energy transition. The oil crises of 1973 and 1979 were the lightning bolt for the Energiewende in Germany. Rising energy prices and concerns about the global climate led to a continued and growing public and political desire to use renewable energy sources. This desire is reflected in the three pillars of the Energiewende: energy efficiency, renewables and sector coupling, that is to say, the use of renewable energy in all end-use sectors.

1) Reducing energy demand is the primary pillar of the German energy strategy.

Energy efficiency measures in industry, buildings and the transport sector have successfully decoupled Germany's economic development from its energy consumption. The German experience proves that significant energy savings and constant economic growth are not contradictory. Energy efficiency has become a competitive advantage for Germany's domestic industry and business due to energy cost reductions and technological advantages.

The energy transition follows a transparent, long-term strategy with specific targets.

		2021	2030	2040	2045	2050
Climate	Greenhouse gas emission (vs. 1990)	**-38.7 %**	-65 %	-88%	GHG neutral	GHG sink
Renewable Energy	Gross electricity consumption	**41.1 %**	80 %			
	Gross final energy consumption	**19.7 %**	30 %	45 %		60 %
Energy Efficiency	Primary energy consumption (vs. 2008)	**-15.2 %**	-30 %			-50 %
	Final energy productivity (vs. 2008)	**1.4 % p.a** (2008–20)	+2.1 % p.a. (2008–2050)			
	Primary energy demand in buildings (vs. 2008)	**-23.6 %** (2019)				-80 %
	Final energy consumption in transport (vs. 2005)	**-11.4 %** (2020)				-40 %

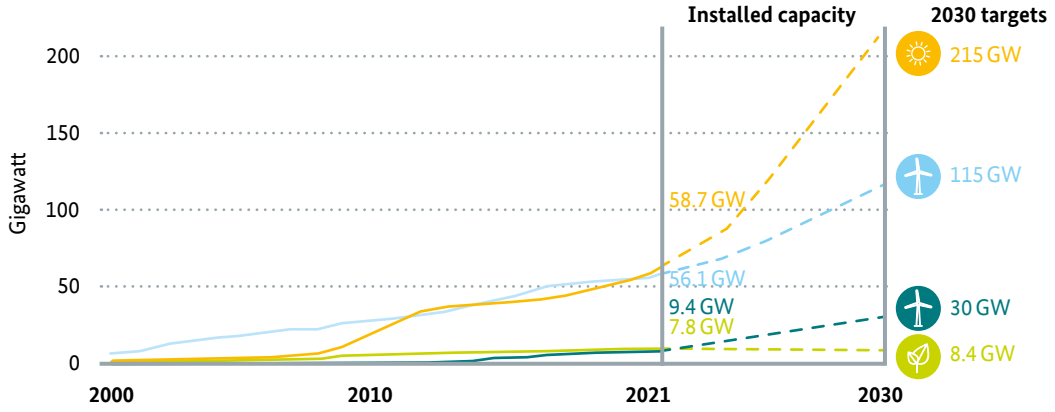
The German government set the goal to reduce primary energy consumption by 50% by the middle of the century.

Primary energy consumption has already decreased by more than 15% through sustainable investment support programs and policy measures. By 2030, a 30% reduction is targeted compared to 2008 levels. Energy productivity has already improved significantly in Germany but still, the potential for energy savings remains high, especially in the buildings sector.

2) The expansion of renewables is the second pillar of the German energy transition.

Continuous policy development has fostered the deployment of renewables in Germany. The first law supporting electricity production from renewables already entered into force in 1990 and quickly became a blueprint for regulation in many other countries. Today, the support level given to new renewable energy installations is determined through competitive auctions to further incentivize the market integration of renewables. Smaller installations are exempted from participation in the auctions and receive an administratively determined feed-in premium to enable households and other actors to take part in the energy transition and generate their own energy. Despite the mediocre natural conditions, renewables are becoming competitive with conventional energy sources, as can be seen from auction results.

Technology-specific capacity expansion targets make deployment of renewables plannable



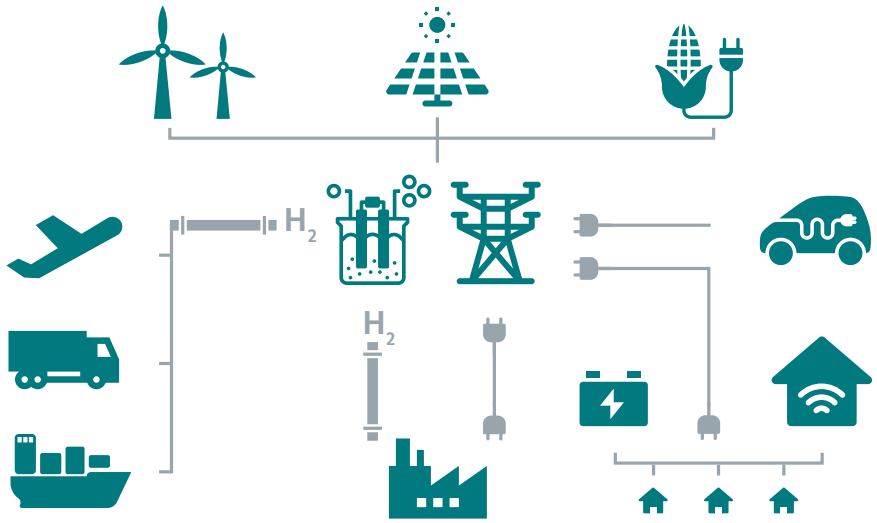
Renewable energy has already become the most important source of electricity in Germany.

In 2021, the total installed renewable energy capacity amounted to 132 GW, accounting for 41.1% of Germany's electricity consumption. Until 2030, the German government aims at a renewable energy share of 80% in electricity consumption. With the completion of the coal phase-out, the goal is to generate nearly all of Germany's electricity from renewable sources by 2035. To achieve that, onshore wind is targeted to increase to an average of 10 GW per year to reach a cumulative capacity of 115 GW by the end of 2030. Offshore wind is targeted to reach 30 GW, and solar is set to more than triple to 215 GW by 2030.

3) Sector coupling is the third pillar of the German Energiewende.

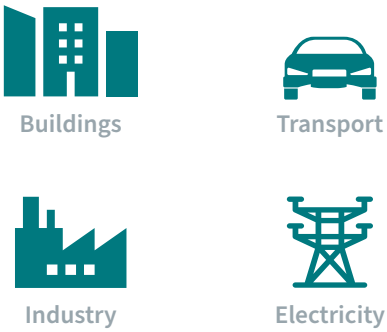
The decarbonisation of the energy system leads to an increased need to also decarbonise end-use sectors through the direct and indirect use of renewables. In order to decarbonise the economy, the industry and transport sectors as well as district heating and cooling for buildings need to be electrified via renewable electricity. As electricity production from renewables in Germany rises quickly, generation, grids, consumption and storage need to be combined in a smart way to provide for the increasing demand for flexibility and the decarbonisation of various sectors.

Sector coupling implies the interconnection of energy production with energy consuming sectors



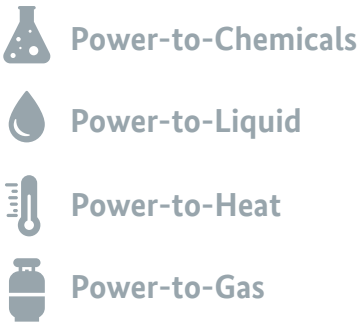
The German government supports sector coupling through a variety of measures.

The direct use of renewable electricity, for example, in battery electric vehicles, is one of the elements of the Energiewende. To speed up the market launch of electric mobility, Germany is offering financial incentives for the purchase of electric vehicles in the form of subsidies and tax rebates. The stock of electric vehicles and the number of public charging points are rapidly increasing. The extensive funding programme SINTEG showcased the use of digitisation for energy systems with 100% renewables in real-life laboratories across model regions in Germany.



Power-to-X technologies can supply several sectors with energy carriers and feedstocks based on renewable energy.

In some sectors, solutions other than direct electrification are needed for technical or economic reasons. Germany's National Hydrogen Strategy emphasises the need for green hydrogen and supports the development of international hydrogen markets. The strategy envisages a mix of investment support, relief on operating costs, carbon pricing and other beneficial regulatory conditions. Extensive funding of €7 billion is provided to scale up hydrogen production and end-use technologies, with €2 billion being earmarked for international projects to support hydrogen production plants in potential trade partner countries.



The Energiewende is part of an integrated European energy and climate strategy.

Due to the size of its economy and population and its central location, Germany is in a special position to drive the transformation of the energy system in Europe. Several regulatory frameworks exist at the level of the European Union (EU) such as the Energy Efficiency Directive, the Ecodesign and Energy Labelling Directive, the Energy Performance of Buildings Directive and the EU Heating & Cooling Strategy. These are being transposed into national law by each Member State. The German energy efficiency and renewable energy policy are aligned with the European policy framework.

Germany's security of electricity supply remains one of the highest worldwide.

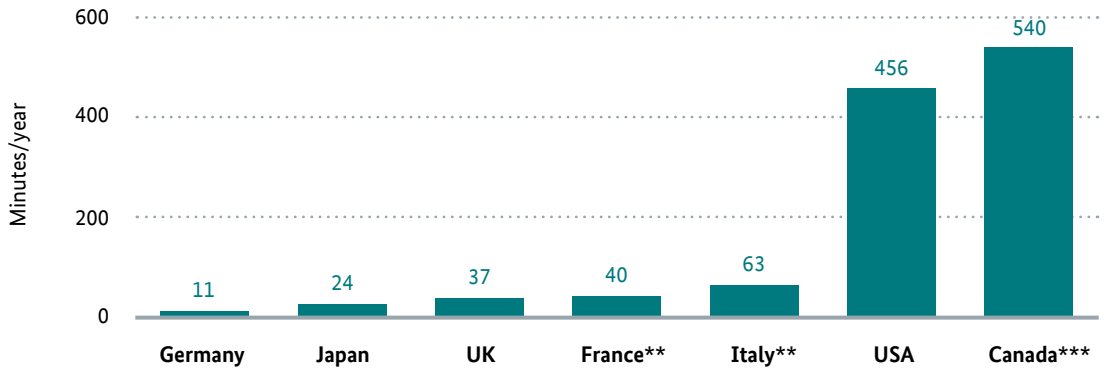
During the ongoing energy transition, Germany maintains its high security of supply standards. While German system operators have already handled hourly renewables shares of 100%[5] in the electricity supply, the total duration of electricity outages in Germany was as low as 11 minutes per customer in 2020,[6] the best performance among the countries of the G7. Germany's ever-improving System Average Interruption Duration Index (SAIDI) proves that energy systems with high shares of renewables are reliable. Throughout the transformation of the energy system, Germany has even been a net electricity exporter since 2003. In 2020, it was the second-largest electricity exporter in the world.[7]

Flexibility options are key to making the energy system renewables-ready.

With rising shares of variable renewable energy in the system fluctuations in energy supply increase. Different flexibility options can help balance demand and supply. The German power market supports healthy competition between flexibility options like demand response, battery storage, sector coupling and Power-to-X. A well designed power market is a primary condition for the safe and efficient integration of renewables as interconnections to neighbouring countries. Grid expansion is an essential flexibility option, especially in the long term.

The security of Germany's electricity supply remains one of the highest worldwide

Annual average duration of electricity outages based on SAIDI* in 2020 for G7 countries



* SAIDI = System Average Interruption Duration Index ** 2021 value *** 2018 value

The energy transition creates a positive impact at various levels of the economy.

Infrastructure investments strengthen the domestic economy and enable innovative and highly competitive businesses in growth sectors. The implementation of climate-friendly and energy efficient technologies is part of electricity grid modernization, investments in heating and cooling networks, buildings, electric mobility and much more. The German government has earmarked over €200 billion for investments in climate protection by 2026 - both nationally and internationally.[8] The investments create jobs, support economic development and incentivize innovation in the energy industry, alongside the value chain of providing energy in various cross-sectors.

Innovation, research and development are spurred by the energy transition.

In Germany, real-world laboratory projects have been launched on a broad variety of topics such as sustainable development, urban development, renewable energy supply and much more. The energy transition is driving innovation in Germany. The German government spent more than €1.3 billion on R&D in the energy sector in 2021.[9] The scope of the practical implementation and economic advantages of new products is decisive and beyond the number of new patents that are filed in Germany every year.

The energy transition is a driver for employment and supports future-proof structural change in the economy.

There has been a slow but perceptible shift in Germany from employment in traditional and conventional energy businesses to renewable energies. Jobs in the renewable energy sector tend to be created broadly, thus contributing to a smooth structural change by creating employment also in remote areas and in the German coal regions, not only in economically developed areas. Employment in renewable energies has exceeded 300,000 individuals and is an important economic factor in the German energy transition. Investments in energy-saving building refurbishment contributed to the employment of more than 541,000 people, particularly in the construction business.[10] The integration of digital technologies into the energy system has the potential to create even more new occupational profiles and jobs in the energy sector.

Small- and medium-sized businesses are the driving force behind the energy transition and are providing innovation and employment in the energy sector.

Energy saving measures and the deployment of renewable energy installations all over the country are brought forward primarily by small- and medium-sized companies through their products and services. More than 99% of all businesses in Germany are small- and medium-sized.[11] The know-how and innovative strength of German medium-sized companies and industries is a huge asset and has played a pioneering role in managing the switch to sustainable technologies. Half of the hidden champions worldwide are small- and medium-sized businesses from Germany.[12]

Several German companies have already committed to striving for climate neutrality.

Decarbonisation is increasingly seen by companies as an opportunity to develop and adapt innovative climate-friendly technologies. German companies are striving to be global frontrunners in the transition to a climate-neutral economy and aim to become major exporters of climate-friendly technologies. Germany has already become a global leader in environmental technologies relating to renewable energy, recycling, waste management and water treatment. Green technologies are projected to account for 19% of the German GDP by 2025, which represents an annual growth of almost 7% in this industry.[13]

The uptake of innovative technologies for the industrial transformation in Germany will be supported through Carbon Contracts for Difference (CCfDs).

Climate-friendly production processes often still have higher investment and operating costs than emission-intensive conventional production. By covering the abatement costs of climate-friendly technologies, CCfDs can enable the competitiveness of low-carbon technologies. In the long term CCfDs can therefore support the market entry of climate-friendly technologies and prepare the development of green lead markets.

Overview of selected German companies and their climate goals

Thyssenkrupp AG
- Climate neutral by 2050
- Production of 50,000 tonnes of climate neutral steel by 2022

Deutsche Post AG
- Carbon neutral by 2050

Energie Baden-Württemberg AG
- Climate-neutral by 2035

Siemens AG
- Carbon neutral by 2030

Volkswagen AG
- Carbon neutral by 2050
- End sales of combustion engines in Europe by 2035

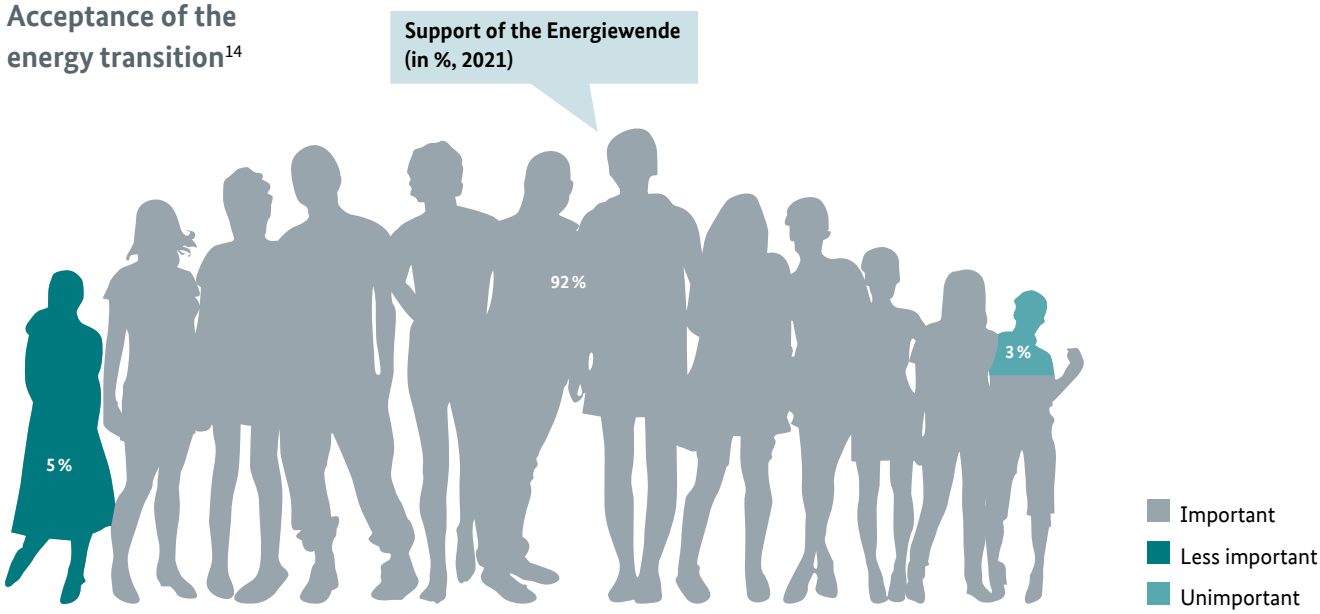
Deutsche Bahn AG
- Climate neutral by 2040
- By 2038, traction current will be up to 100 percent green electricity

Robert Bosch GmbH
- Climate neutral since 2020

The energy transition involves all levels of government, the business community and society in general.

To ensure ownership and transparency of the German Energiewende, the Federal Ministry for Economic Affairs and Climate Action coordinates a close and ongoing dialogue between relevant stakeholders. The Ministry constantly exchanges information with representatives from the German federal states, business and industry, society and science and research. Regular consultations allow citizens and the private sector to comment on governmental strategies and actively participate in the decision-making process. Recent consultations were conducted on the German grid expansion plan, the national blockchain strategy, reactive power procurement and the design of the German electricity market.

Acceptance of the energy transition[14]



2. Shared opportunities: German-Gulf cooperation

The German-Gulf climate and energy cooperation is taking on an increasingly important role.

Due to the diversification of energy imports and Germany's ambition to achieve climate neutrality, the MENA-region, in particular the Gulf states, represents an important partner for short-term oil and gas imports. In the medium to long term, the Gulf region will be a crucial supplier of renewable energy and hydrogen for Germany.

The Gulf region and its outstanding natural conditions for renewables offer vast potential for local value and job creation.

Renewable energies are increasingly competitive with other sources of electricity, especially in the Gulf region. The opportunities for solar and, where conditions allow for it, wind, are not only reflected in lower prices but also economic potential, amongst others, creating sustainable job opportunities. The UAE, Saudi Arabia, Oman, Qatar and other countries in the region have developed strategies to transform their energy systems towards a growing share of renewables to capture these opportunities. Highly competitive prices for renewable energy production and the political commitment that manifests itself in ambitious diversification programs are key drivers for the emerging energy transition in the Gulf countries.

The UAE has set ambitious targets for expanding renewables, scaling up hydrogen trade and decarbonising the economy.

As the first country in the Arab world, the UAE announced a net-zero emission target by 2050 underpinned with planned investments of about €150 billion. By 2030, greenhouse gas emissions will be reduced by 31% compared to business-as-usual. The UAE will host the 28th UN Climate Change Conference (COP 28) in Dubai in 2023. With a 7% share of renewables in electricity production, UAE has the highest share of renewables in electricity generation capacity among the Arabian Peninsula countries, (2.6 GW out of about 34 GW), with solar energy being the most important source. By 2050, the UAE intends to reach a non-carbon energy share of 50% (44% renewables and 6% nuclear).[15] The energy efficiency target aims at a 40% increase in consumption efficiency of individuals and corporates by 2050 compared to business-as-usual. Due to low renewable power generation costs, the UAE has outstanding potential for green hydrogen production. The Emirates target a 25% market share for 'low-carbon' (green and blue) hydrogen in key export markets by 2030.[16] In October 2022, the first test shipment of ammonia derived from hydrogen from the UAE arrived in Germany at the Port of Hamburg. This shipment marks an important step in the intended establishment of a comprehensive hydrogen value chain between Germany and the UAE.

In 2021, the Kingdom of Saudi Arabia announced its net-zero target by 2060 and has set ambitious goals for the expansion of renewable energy.

By 2030, 58.7 GW of renewable energy capacity is planned with an interim target of 27.3 GW by 2024.[17] Since 2017, renewable energy projects, especially solar energy, with a total volume of about 7.1 GW have been awarded at extremely low prices. A national hydrogen strategy is currently being developed and ambitious targets for hydrogen production have been set. The goal is to produce 4 million tons (66 TWh) of 'clean' hydrogen by 2030 (blue and green hydrogen).[18] Green hydrogen and ammonia production is already being ramped up next to the planned new metropolitan region of NEOM in north-western Saudi Arabia. Thyssenkrupp and SPG Steiner are two German companies involved in the construction in the green ammonia site in NEOM.

In the Sultanate of Oman, political momentum for renewables manifests itself in the country's hydrogen targets.

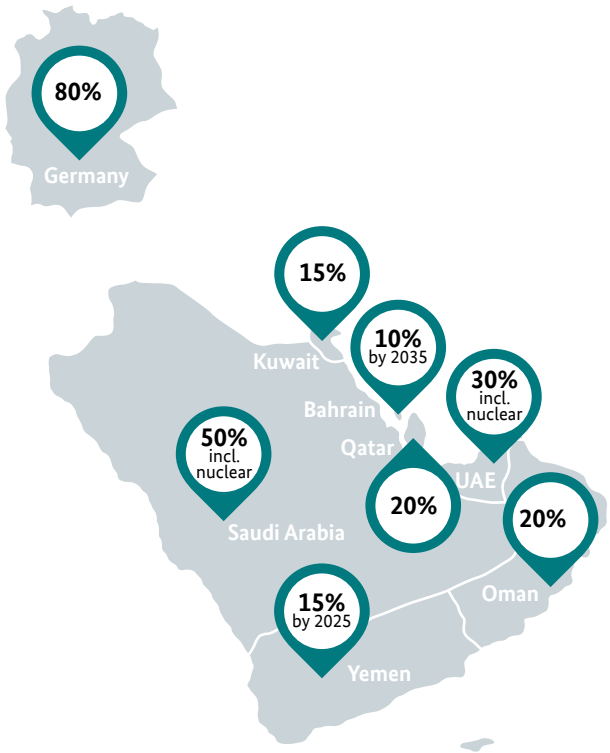
Oman's Vision 2040[19], targets a 20% share of renewable energy in electricity consumption by 2030 while the hydrogen strategy currently under development targets another 10 GW of wind and solar capacity for green hydrogen production.[20] German companies including Uniper, Linde, Siemens Energy and Hydrogen Rise are involved in green hydrogen projects planned in Oman.

The State of Qatar is taking large first steps for its national energy transition.

Its first large-scale 800 MW solar power plant is expected be finalised by November 2022. The next 875 MW project is already being developed and expected to be operational by 2024. Qatar aims to cover 20% of its power mix with renewable energies by 2030. It is also branching out to the field of hydrogen and its derivates with the announcement of a world-scale blue ammonia project involving the German company ThyssenKrupp.

Other countries in the Gulf region have also set renewable energy targets. Kuwait's targets a renewable energy share of 15% by 2030.[21] Bahrain defined a renewable energy target of 5% by 2025 and 10% by 2035 and is aiming for net-zero emissions by 2060.[22]

2030 Renewable energy targets[23]



Robert Habeck, German Federal Minister for Economic Affiars and Climate Action and Sultan Al Jaber, Minister of Industry and Advanced Technology of the United Arab Emirates in the Hamburg City Hall after receiving the first shipment of hydrogen based ammonia from the UAE.

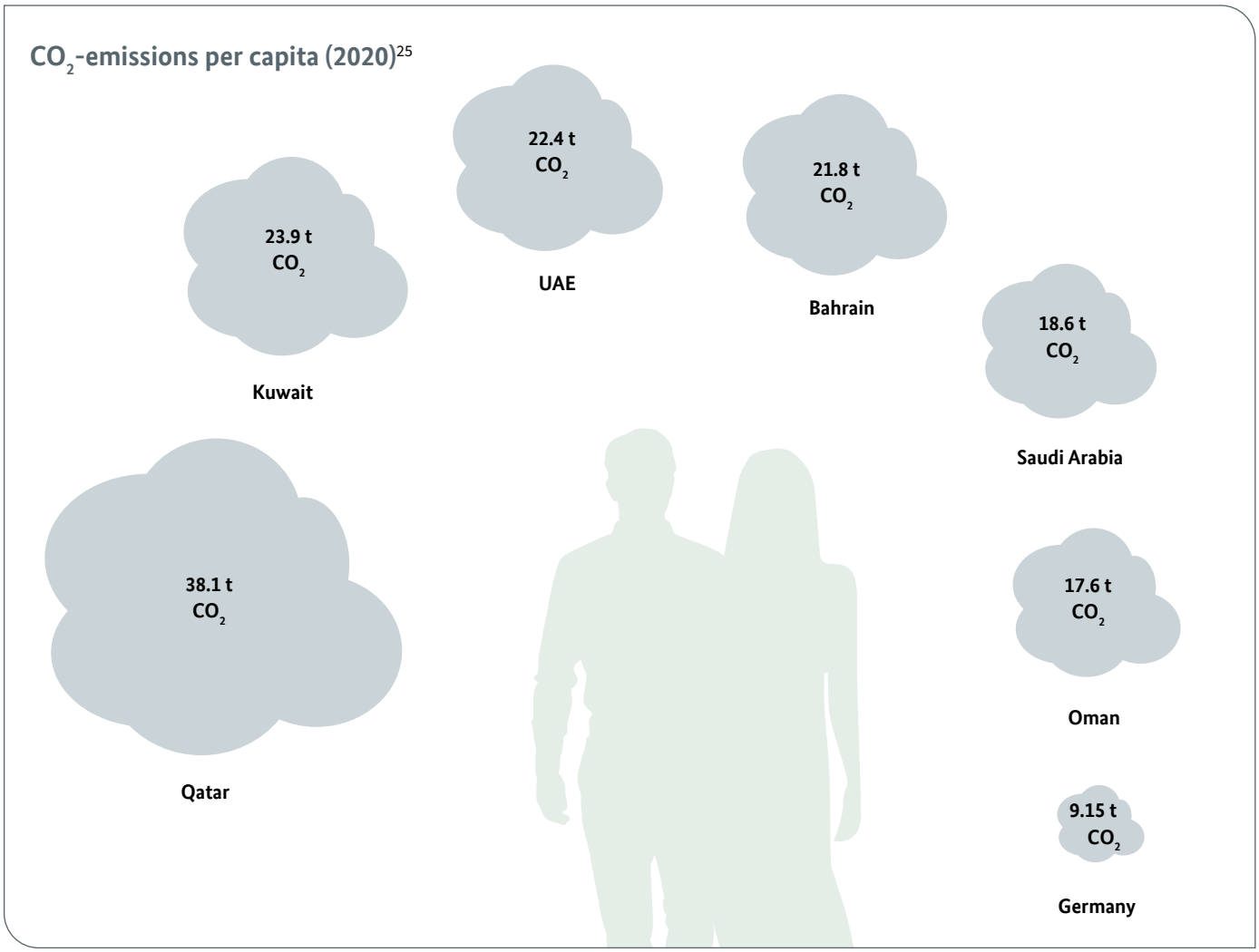
© Handelskammer Hamburg

Renewable energy projects at utility scale are being realized with record-low energy prices across the entire Gulf region.

The world's largest solar power plant Noor Abu Dhabi with a generation capacity of 1.2 GW has been commissioned in the UAE in 2019. The Mohammed bin Rashid Al Maktoum Solar Park in Dubai with a planned capacity of 5 GW is set to become the world's largest solar farm by 2030. Renewable energy projects in the Gulf region are breaking records in solar tenders. In April 2020, the National Renewable Energy Programme solar energy tender in the Kingdom of Saudi Arabia set the latest new world record with $0.0104/kWh.[24] In comparison, the cheapest conventional energy sources in Europe start with energy production costs at around $0.04/kWh – $0.05/kWh.

The Gulf countries have entered the path to diversify their economies and energy supply to tackle the new challenges.

With global concerns over climate change and carbon emissions, sustainability factors and a successful transition will render the Gulf region more resistant to future economic and environmental challenges. Still, a long transformation path lies ahead as the six GCC countries rank among the highest CO_2 per capita emitters worldwide.



The global energy transition is well under way and creates new sustainable economic structures and great chances for local value creation.

Global renewable energy employment reached 12 million in 2020. Solar energy was the largest renewable energy employer with about 3.9 million jobs worldwide. Germany remains the European country with the highest employment figures in the renewable energy sector.[26] The Gulf region is just beginning to obtain the economic benefits of the energy transition and the scale-up of renewable energies and hydrogen.

The transformation of the energy transition enables local employment and is a chance to empower women in the energy sector.

Educating on a vast array of skills and harnessing talent in all its forms fosters innovation and strengthens the economy. Promoting the participation of women in the local workforce can be an important accelerator for the energy transition and for economic and societal development. Renewable energy employs about 32% women, compared to 22% in the energy sector overall.[27]

Women Energize Women Conference 2022

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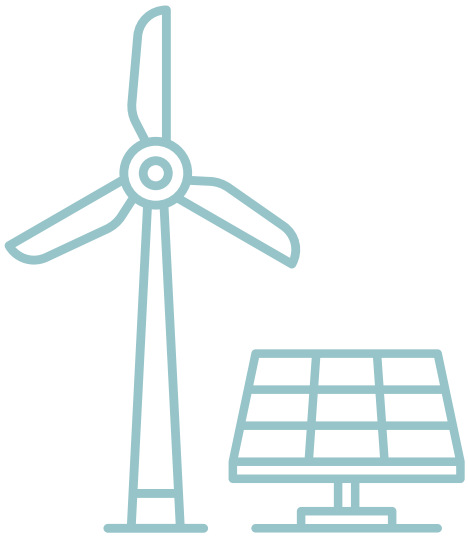
WOMEN ENERGIZE WOMEN

"Women Energize Women" is a communication campaign for the global empowerment of women in the energy sector by the Federal Ministry for Economic Affairs and Climate Action (BMWK). It is implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and German Renewable Energy Federation (BEE) within the framework of BMWK's Bilateral Energy Partnerships. "Women Energize Women" can count on strong cooperation partners such as the Global Women's Network for the Energy Transition (GWNET), the German Energy Agency (dena), and has collaborated with the Berlin Energy Transition Dialogue (BETD) and The smarter E Europe. The goal of "Women Energize Women" is to inform, mobilize, inspire and connect women around the world who work for the energy transition.



International cooperation and trade will be essential for global decarbonisation.

Germany is eager to intensify its collaboration to support its international partners in their efforts to transform their economies towards renewable energies and sustainability. Renewable energy and energy efficiency will shape the economic landscape in the upcoming decades. The innovative technologies and solutions developed by German companies and tested in the context of the German Energiewende can be of use in the Gulf region's transition. They offer new opportunities for new business relations and strategic partnerships.

Global Women's Network for the Energy Transition Workshop

GWNET
Global Women's Network for the Energy Transition

The Global Women's Network for the Energy Transition (GWNET) aims to advance the global energy transition by empowering women in energy through interdisciplinary networking, advocacy, training, coaching and mentoring. GWNET seeks to address the current gender imbalances in the energy sector and to promote gender-sensitive action around the energy transition in all parts of the world. GWNET advances the role of women in the energy transition through various mentoring programmes. Furthermore, GWNET in partnership with other key actors such as IRENA focusses on producing data to document the status of women in energy as a basis for policy action in this field. GWNET also collaborates with regional and national Women in Energy networks from all around the world and organises networking events back toback with major energy events. GWNET's Women in Energy Expert Platform allows women working in energy to showcase their experience in the field and facilitates networking with their peers.

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Germany engages in numerous multilateral initiatives to promote the energy transition worldwide.

With climate change and the energy transition as global challenges, multilateral cooperation is important for exchanging best practices. Germany strongly supports multilateral initiatives in the area of clean energy and is proud to host the technology and innovation centre of International Renewable Energy Agency (IRENA), which is headquartered in Abu Dhabi – connecting the Gulf region and Germany in this important domain. Other institutions and formats such as the IEA, REN21, G7 and the G20 are also used by Germany to promote a sustainable energy agenda. In the framework of these initiatives, cooperation between Germany and its partners in the Gulf region can make substantial contributions in multilateral cooperation formats to the ongoing global transformation of energy systems.

© BMWK, Buzmann

Visit of Robert Habeck, German Federal Minister for Economic Affiars and Climate Action in the UAE in March 2022

"It is (...) more important than ever to press ahead even harder with the global energy transition. Germany has committed to do this in the context of the Paris climate agreement."

Robert Habeck, German Federal Minister for Economic Affairs and Climate Action

Opening Ceremony at the MENA Europe Future Energy Dialogue 2022

© MEFED

MEFED 2022
MENA Europe Future Energy Dialogue

The first MENA Europe Future Energy Dialogue (MEFED) took place at the Dead Sea in Jordan in 2022. The energy forum, jointly organized by the German and the Jordanian government, was attended by more than 1000 participants including numerous ministers and heads of international as well regional organizations. At the MEFED, countries and international energy organizations from the Middle East and North Africa (MENA) region and Europe, agreed to strive for the implementation of the first ever regional climate target for the MENA region and to jointly commit to substantially reduce greenhouse gas emissions.

IRENA
International Renewable Energy Agency

www.irena.org
IRENA Headquarters,
Masdar City,
P.O. Box 236, Abu Dhabi,
United Arab Emirates
+971 (0)2 417 9000
info@irena.org

The International Renewable Energy Agency (IRENA) is the lead intergovernmental agency for the global energy transformation that supports countries in their transition to a sustainable energy future, and serves as the principal platform for international cooperation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. With 161 Members (160 States and the European Union) and 22 additional countries in the accession process and actively engaged, IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity.

KFW IPEX-Bank

www.kfw-ipex-bank.de
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Within KfW Group, KfW IPEX-Bank is responsible for project and export finance. It supports German and European companies operating in key industrial sectors in global markets by structuring medium and long-term financing for their exports, funding infrastructure investments, securing a raw materials supply and by financing environmental and climate protection projects worldwide. The new PtX Platform of the BMWK and KfW supports hydrogen partnerships and supports Germany's technological development. As a specialist bank, KfW IPEX-Bank has extensive industry, structuring and country expertise, it takes on leading roles in financing consortia and actively involves other banks, institutional investors and insurance firms. KfW IPEX-Bank operates as a legally independent group subsidiary and is represented in the most important economic and financial centres across the globe.

The representative office in Abu Dhabi supports the activities of KfW IPEX-Bank in the GCC countries. The representative office maintains contact with the customers and financial institutions in the region and analyses the local markets in order to identify new business opportunities for the bank and its customers.

Energy Partnerships and Energy Dialogues are the German federal government's central instrument in bilateral energy cooperation.

In the context of the Energy Partnerships with UAE and Qatar and its Energy Dialogues with Saudi Arabia, and Oman, Germany continuously exchanges views on energy policy and economic issues with its partners. Sharing technological expertise and knowledge for the system integration of new energy sources and increasing energy efficiency will be important to make the global energy transition a success. Germany is committed to intensifying its energy cooperation with its partners and supports new and reliable business and trade relations.

Germany is seeking international partnerships on future hydrogen from renewable sources.

Despite all efforts to build renewable energy capacity, Germany will remain an energy importer due to its high population density, strong industrial energy demand and average solar irradiation. Energy scenarios show that Germany will require significant amounts of synthetic fuels, especially green hydrogen, to decarbonise sectors like heavy transport or heavy industry. The German government is therefore actively engaging with partner countries that have renewable energy potentials to export renewable electricity and green hydrogen.

H2Global Stiftung

H2Global is a competition-based mechanism to promote a timely and effective PtX market ramp-up on an industrial scale. The H2Global mechanism is implemented by the non-profit H2Global Foundation based in Hamburg. The purpose of the Foundation is to promote the protection of the environment and the climate. The founders are well-known German and European companies from the private sector. In addition to the H2Global funding instrument, a variety of other measures are implemented to promote the production and use of green hydrogen and other climate-neutral energy sources nationally and internationally. The central vehicle within the Foundation for implementing the H2Global funding mechanism is an intermediary, the Hintco GmbH. It will conclude long-term purchase contracts on the supply side and short-term sales contracts on the demand side. Based on a mechanism in analogy to the Contracts for Difference (CfD) approach, the difference between supply prices and demand prices will be compensated by grants from the German government.

www.h2-global.org
Trostbrücke 1
20457 Hamburg, Germany
+49 40 40 60306 460
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Green synthetic fuels such as hydrogen bear the potential for new trade and business relations.

For countries on the Arabian Peninsula, these fuels present an opportunity with many potential applications in industry, transport and the electricity system. Additionally, the Arabian Peninsula has attractive conditions and can build on existing infrastructure to produce synthetic fuels, putting it in a good position to become a global renewable fuel supplier.

A reliable regulatory framework is essential to provide stable investment conditions for the private sector during the energy transition.

The German and EU energy and climate strategies with their long- and medium-term targets create a predictable economic environment that allows industries and businesses to participate with their own innovative solutions in this transformation. The EU dedicated 30% of its €2 trillion long-term budget (2021-2027) to fight climate change. The EU and Germany achieved their ambitious climate action goals for the year 2020 and are working hard to bring the energy transition to success for achieving climate-neutrality.

H2.B HYDROGEN CENTER BAVARIA

www.h2.bayern/en
Hydrogen Center
Bavaria (H2.B)
Zentrum Wasserstoff.Bayern
(H2.B)
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The Hydrogen Center Bavaria (H2.B) is the strategy and coordination agency for hydrogen of the Free State of Bavaria and acts at the interface between industry, science and politics. As Bavaria's key institution for national and international matchmaking and cooperation in the field of hydrogen, the center provides information, consulting and networking support. Its numerous activities promote national and international cooperation and contribute to a faster ramp-up of the hydrogen economy in Bavaria.

Furthermore, H2.B coordinates the Hydrogen Alliance Bavaria which is a networking and information platform. The Alliance brings together about 300 key hydrogen players from industry and science in Bavaria.

3. Cooperation with partner countries

International cooperation has always been a central cornerstone of Germany's climate and energy policy. The countries of the on the Arabian Peninsula, which have also entered paths to a transformation of their energy systems, are important partners in the shared ambition to reduce emissions, increase the share of renewable energy and to promote energy efficiency. Currently, the bilateral energy cooperation with the countries of the Arabian Peninsula comprises the following focus topics:

- Supporting the market uptake of hydrogen and renewables
- Collaboration on climate action policy and regulation
- Designing and creating electricity market elements
- Expanding and operating electricity grids
- Supporting energy efficiency in various sectors, at increasing renewable energy penetration

Essential to cooperation in these areas is the support of bilateral trade, business relations and shared opportunities in the private sector.

This brochure introduces the German energy transition to stakeholders in the Gulf region and showcases innovative solutions providers from all areas of the energy sector.

The publication has been prepared on behalf of the German Federal Ministry for Economic Affairs and Climate Action in the context of bilateral energy cooperation with the countries of the Arabian Peninsula. The energy cooperation is implemented by Guidehouse, and by the AHKs in the region.

Berlin Energy Transition Dialogue (BETD)

Contacts

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About Germany's energy and climate cooperation

Germany cooperates with its partner countries on various energy and climate policy issues relating to the energy transition.

The Energy and Climate Partnerships as well as the Energy Dialogues with 30 partner countries are key to the external energy and climate policy of the Federal Ministry for Economic Affairs and Climate Action. They form a global, continually growing and valuable network linking Germany with countries that are striving to decarbonise their economies.

In an Energy Partnership, Germany works directly with a partner country on various energy policy issues relating to the energy transition.

Each of the partnerships is based on a binding memorandum of understanding signed at a high political level. Cooperation at a practical level occurs within a formalized structure of dedicated groups. The political orientation of the cooperation is determined in joint steering group meetings. The specific project work takes place in bilateral working groups that meet on a regular basis and have significant involvement from the business community. An Energy Dialogue has the same goals but is not based on a declaration of intent. The main topics and concrete activities are agreed upon by the respective partners.

Germany works closely with the UAE in an Energy Partnership agreed in 2017 and has Energy Dialogues with Saudi Arabia and Oman. In May 2022, Germany and Qatar signed a joint declaration to establish the Qatari-German Energy Partnership.

For the implementation of the German-Arab energy cooperation, the Federal Ministry for Economic Affairs and Climate Action is supported by the German Chambers of Commerce and Industry in the UAE, Saudi Arabia, Qatar and Oman, and the consultancy Guidehouse. Formats for collaboration include bilateral study tours and delegation visits, expert presentations at conferences, bilateral expert and industry workshops and contact offices for stakeholders and bodies.

Visit of Mariam Almheiri, Ministry of Environment and Water, United Arab Emirates in Berlin

4. Innovative solution providers

Ghorfa Arab-German Chamber of Commerce and Industry e.V.

The Ghorfa represents all Arab chambers of industry and commerce in Germany. For decades, it has been successfully promoting economic relations between Germany and Arab countries. With its top-class network, it is the first point of contact for the Arab-German business community and an integral part of the global network of Arab Chambers. As such, it operates under the auspices of the Union of Arab Chambers. Ghorfa works closely with the Arab Chambers of Commerce and Industry, Arab ministries and embassies as well as with relevant business associations. In Germany, it cooperates with government institutions and industry associations.

www.ghorfa.de
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10178 Berlin, Germany
ghorfa@ghorfa.de

German Near And Middle East Association e.V. (NUMOV)

NUMOV/German Near And Middle East Association was founded 88 years ago. It is Germany's oldest and largest NGO for economic support between Germany and the Near and Middle East. This region offers companies exceptional opportunities for success. NUMOV has supported German companies in establishing and expanding business. The German Orient Institute is also part of NUMOV. Delegation trips to the region as well as delegations visiting Germany give German businesses a chance for successful partnerships with companies from the region.

www.numov.de
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numov@numov.de

Euro-Mediterranean-Arab Association e.V. (EMA)

The EMA is a regional association for the German economy. It is committed to creating sustainable cooperation between Germany and the countries of the Mediterranean, Middle East and Arab Gulf regions, with a special focus on SMEs and start-ups. For this, the EMA connects decision-makers and multipliers from companies and associations, diplomacy and politics, as well as science and society. With this unique network and its cross-sector expertise the EMA offers regional and country-specific forums such as the German-Arab Environment & Energy Forum and releases market studies such as on renewable energy in the Arab Gulf countries.

www.ema-germany.org
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North Africa Middle East Initiative (NMI)

As representative of German business in Germany and in the MENA region, the North Africa Middle East Initiative of German Business (NMI) strengthens the development and expansion of bilateral business relations. It shapes the substantive discussion on potentials and challenges in the areas of trade and investment and communicates the economic policy interests of German companies in relation to the MENA region. Further, it supports trips by the German government with business delegations to the region and advocates the dismantling of trade and investment barriers in the region and in the EU.

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10 Association Profiles

DCSP
Deutscher Industrieverband
Concentrated Solar Power

German Association for Concentrated Solar Power (DCSP)

Concentrated solar power (CSP) plants produce green electricity with the energy of the sun. A decisive advantage of CSP is the storage capability of its energy: CSP plants supply electricity 24/7 at competitive prices. CSP storage capacities make the energy systems more stable, allowing increased use of wind and PV by reducing curtailment. Concentrated solar thermal plants can produce green heat at sufficiently high temperatures for the process steam for the industry – including for the production of green hydrogen.

Since 2013, the German Association for Concentrated Solar Power (DCSP) has been committed to the generation and use of electricity, heat and fuels from concentrated solar technologies. Its members cover the entire CSP value chain. This ranges from project development and planning, engineering services, component supply and system integration to the ownership and operation of solar thermal power plants and research facilities. The aim of the association is to bundle the strengths and interests of German market participants and to increase international market opportunities.

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EUROSOLAR
The European Association for Renewable Energy

European Association for Renewable Energy (EUROSOLAR e. V.)

The European Association for Renewable Energy (EUROSOLAR e. V.) was founded in 1988 by Dr. Hermann Scheer (1944-2010) and is dedicated to the cause of completely substituting for nuclear and fossil energy through renewable energy. EUROSOLAR regards solar energy supply as essential to preserve the natural resources and a prerequisite for a sustainable economy. EUROSOLAR brings together expertise from the fields of politics, economy, science and culture. It develops and encourages political and economic action plans and concepts for the introduction of renewable energy from the local to the international level. This registered non-profit organization conducts its work independently of political parties, institutions, commercial enterprises and interest groups. As a membership-based organization, EUROSOLAR is financed from membership fees and donations only. In 13 European countries EUROSOLAR-sections are working for a successful energy transition in their country.

www.eurosolar.de/en
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German Biogas Association e.V. (GBA)

The German Biogas Association (GBA) unites operators, manufacturers and planners of biogas plants, representatives from science and research and all those interested in the industry. Since its establishment in 1992, the association, (more than 4,700 members) has become the most influential independent organisation in the field of biogas worldwide. It campaigns for the increased use of biogas and biomethane technology through political lobbying at EU, national and state levels.

The Association encourages the exchange of information and knowledge, for instance by collecting, evaluating and spreading knowledge of scientific findings and practical experience and by means of conferences, exhibitions and other events. It works closely with international organizations, e.g. amongst others the GIZ and UNIDO. Thus, GBA actively promotes and stimulates the exchange of international experience. It has excellent expertise and knowledge in all biogas-related topics and cooperates with almost all official German bodies as well as many international ones where standards for biogas plants are discussed, developed and defined.

www.biogas.org
+49 (0)8161 98 46 60
Angerbrunnenstraße 12, 85356 Freising, Germany
info@biogas.org

German Federation of Energy and Climate Protection Agencies e. V. (eaD)

The German Federation of Energy and Climate Protection Agencies is an organization to represent the joint interests of the regional and local Energy and Climate Protection Agencies in Germany. Their members advise public authorities, companies and private households in renewables, energy-saving potentials and develop individual solutions and services in minimizing energy consumption. This also includes planning and implementation of installations and systems as well as training and transfer of knowledge and skills.

www.energieagenturen.de
+49 (0)30 29 33 30 66
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German Renewable Energy Federation (BEE)

Founded in 1991, the German Renewable Energy Federation (BEE) is the umbrella organization for the renewable energy sector in Germany. Its mission is to improve the regulatory and legal framework for renewables and to promote a shift to renewable energy in the electricity, heating & cooling and transport sectors. The BEE is the voice of 37 industry associations in the hydropower, wind energy, solar energy, bioenergy, geothermal power and ambient energy sectors, comprising more than 30,000 individual members and companies. The BEE's primary objective is to develop policy by providing input to relevant stakeholders. Its activities address a broad public, including politicians, business leaders, citizens and the media. The BEE's services include expert studies, thematic working groups, policy projects, conferences and workshops, expert hearings, networking possibilities and position papers.

www.bee-ev.de
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German Smart City Association e.V. (BVSC)

The German Smart City Association e.V. (BVSC) is the german holistic, interdisciplinary research platform for the intelligent city of the future called "smart city", which is characterized in particular by the merging of supply networks (energy, communication, mobility, transport, etc.) into one intelligent and highly networked infrastructure. The main focus of the BVSC is on the rational generation and distribution of resources, in particular the environmentally friendly, sustainable and regenerative generation, storage, distribution and use of energy, new mobility concepts, innovative health prevention and care, as well as living and working in an ageing society (demographic change). Aspects of data protection and security as well as the consideration of privacy and personal rights also play an important role. The involvement of all social groups - politics, research institutions, industry and above all the inhabitants of the smart city - in this research and development process is of crucial importance.

www.bundesverband-smart-city.org
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Alte Gärtnerei 2, 55128 Mainz, Germany
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German Solar Association e.V. (BSW-Solar)

The German Solar Association (BSW-Solar) sees itself as a "tugboat", a "pilot" and an "icebreaker" for an accelerated energy transition in Germany and beyond. By providing targeted policy advice, the association exerts a decisive influence on the creation and maintenance of suitable political framework conditions for the continuous growth of the solar energy market. In addition, the German Solar Association is committed to a positive industry and company image through regular media coverage as well as campaigns and provides numerous information services. BSW-Solar serves as a gateway to the German market and access point to German companies. Through a network of around 40 international partnerships with fellow associations, it is involved in a number of projects to develop the right framework for solar investments, financing and verified and time-tested business models.

www.solarwirtschaft.de
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EUREF-Campus 16, 10829 Berlin, Germany
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German Wind Energy Association (BWE)

In the process, Germany is a role model for many countries. Since its founding in 1996, the German Wind Energy Association (Bundesverband WindEnergie e.V. or BWE) has played a major role in that process. With some 20,000 members, it is one of the world's largest associations in the renewables sector. For years, the BWE has been increasingly successful in efficiently expanding wind power in Germany for the long term. Furthermore, our experts work in such international associations as the European Wind Energy Association (EWEA), the Global Wind Energy Council (GWEC) and the World Wind Energy Association (WWEA) in developing wind energy within Europe and worldwide. In this way, the German success story of feed-in tariffs have since been adopted in more than 45 countries. With its ambitious expansion targets, the wind power sector is the main driver behind the switch to renewables. The BWE and its members do their utmost to ensure that the success story of German wind power continues – and that the vision of "100 percent renewable power" becomes a reality in Germany soon.

www.wind-energie.de
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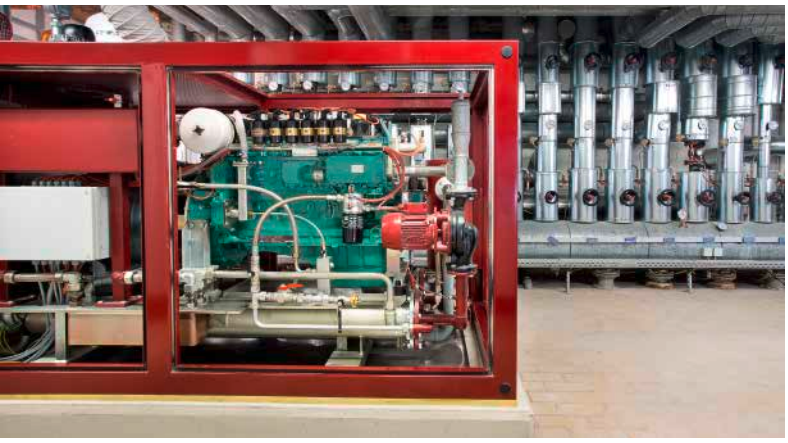

Mechanical Engineering Industry Association e.V. (VDMA)

The mechanical and plant engineering sector is Germany's largest employer with 1,34 million employees. VDMA represents around 3,400 companies, making it the largest industry association in Europe. The Power Systems Association within VDMA is the information and communication platform for the manufacturers of engine systems, thermal turbines and power plants, hydropower and wind turbines. VDMA "Power-to-X for Applications" is a cross-industry platform with over 170 members for exchange and cooperation in the P2X community. It involves stakeholders from the development of manufacturing processes through the production of hydrogen, synthetic fuels and raw materials using power-to-X technologies to the end customer. It promotes an holistic and technology-open approach to the transformation of energy systems. The VDMA Fuel Cell Working Group is the industrial network for all manufacturers of fuel cell systems and components in Germany. It offers 60 leading national and internationally active manufacturers and suppliers a platform for networking and joint representation of interests.

www.vdma.org
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TÜV Association

It's all about our safety. The TÜV Association represents the interests of its members in Berlin and Brussels vis a vis politics, authorities, economy and the public. It´s aim is to improve the technical and digital safety of vehicles, products, systems and services through independent assessments. Together with its members, the TÜV Association pursues the goal of maintaining the high level of technical safety in our society and creating trust for the digital world. To achieve this, the experts of the TÜV Association are involved in the further development of standards and regulations. Currently, the main focus is on strengthening digital security and meeting the growing demands for sustainability in our society.

www.tuev-verband.de/en
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75 Company Profiles

Energy Efficiency

Integration of Renewables

Hydrogen

Solar

Wind

Biomass

Climate

Linde

ludwig bölkow systemtechnik

Lufthansa

MAN Energy Solutions

STREICHER

meteocontrol

mtu A Rolls-Royce solution

MULTIFILM

NEA COMPRESSORS The H2 Experts

next

BERLIN PI

RENK

BOSCH

RWE

S:FLEX

SCHLETTER The Solar Mounting Group

SCHÜCO

SHARP Be Original.

SIEMENS energy

SMA

solarlite

solmove

SPG STEINER

sunfire

SYNLIFT industrial products

thyssenkrupp

thyssenkrupp nucera

TRACTEBEL ENGIE

TROX TECHNIK The art of handling air

Transsolar KlimaEngineering

TÜV SÜD

uniper

VIESMANN

WAGO

WENGER Engineering GmbH

Ammonit

Ammonit Measurement GmbH

Ammonit Measurement offers high quality measurement equipment for the wind and solar industry since 1989. The product portfolio includes data loggers, meteorological sensors, remote sensing devices as well as communication and power supply systems. With AmmonitOR, the company provides a web platform to monitor measurement campaigns in accordance with international guidelines. Ammonit's measurement systems are designed to calculate energy yield forecasts, monitor wind and solar power plants as well as analyze power curves of wind turbines. Consultants, operators and research institutes in over 100 countries rely on the offered expertise and high quality measurement systems.

MAIN PROJECTS/CLIENTS

- 6 wind measurement projects, Petroleum Development Oman (PDO), along with GCC partner Firnas Shuman; UAE
- 13 solar measurement systems, Eurosol Energy Solutions WLL; Qatar
- 3 solar and wind measurement systems, King Abdullah University of Science and Technology; KSA
- Solar and wind measurement systems, ACWA Power; Dubai, UAE

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APRICUM
THE CLEANTECH ADVISORY.

Apricum GmbH

Apricum is a globally active transaction advisory and strategy consulting firm focused exclusively on solar & wind, water, waste, energy storage, green mobility, green hydrogen, digital energy, geothermal, and bioenergy. Established in 2008, Apricum offers a complementary suite of growth-oriented consulting services for companies and investors worldwide. The international team at Apricum combines an impressive array of experts with backgrounds in cleantech, consulting, and finance. The team has completed over 350 cross-border transaction advisory and strategy consulting projects with the highest levels of client satisfaction. Apricum is headquartered in Berlin with offices in London, Paris and Dubai as well as representatives in the USA, UK, Turkey, Brazil, Saudi Arabia, India, China, South Korea, Japan, Indonesia, the Philippines, Thailand, and Vietnam.

MAIN PROJECTS/CLIENTS

- NOMADD Desert Solar Solutions – strategic investment by CEPCO in NOMADD; KSA
- Greencells Group – a strategic investment of a 50 % equity stake by Zahid Group in Greencells; KSA
- Al-Babtain – strategy and joint venture with the Haizea Wind Group and Metalogalva; KSA
- JGC consortium – financial advisory in the bid for the 300 MW Sakaka Solar PV IPP tender; KSA

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AREVA H_2Gen
We make it happen

AREVA H_2Gen GmbH

AREVA H_2Gen is a technology supplier for Proton Exchange Membrane (PEM) electrolysis systems, who develops, produces, and distributes PEM electrolysis plants. With the PEM electrolysis system green hydrogen can be produced, which is used in industrial applications, markets of mobility or to store renewable energies. The applications are sold in the fields of electricity and gas management, neighborhood concepts, sector coupling, hydrogen mobility and filling stations. The CE certified systems range from a hydrogen production of 5 Nm^3/h up to 2.000 Nm^3/h. The systems are characterised by high dynamics and an overload capacity of up to 100 %. The young company draws on the knowledge of more than 30 years of research and development in PEM technology, which is unique in Europe.

MAIN PROJECTS/CLIENTS

- Lighthouse project supported by the German Federal Ministry for Economic Affairs and Energy, Frequency Containment Reserve for stabilizing the grid; Germany
- Store energy in remote areas facing grid export limitation, using energy from wave, tidal and wind; UK
- Hydrogen refueling station for utility vehicles; France
- Hydrogen refueling station for passenger vehicles, coupled with PV; Germany

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Aspens
WASSERSTOFF IST UNSER ANTRIEB
HYDROGEN DRIVES US

Aspens GmbH

Solution provider for comprehensive hydrogen technologies. Thanks to our efficient and durable electrolysis and fuel cell systems, you can now drive decarbonisation! Complete system from a single source: We offer complete systems tailored to your needs from a single source. Just flip the switch. We take care of planning, permitting and commissioning. Longer durability and variable deployment options: Our robust fuel cell stacks based on metallic bipolar plates in compact module form can be used and scaled in a variety of ways: from portable power supplies to combined heat and power plants. Efficient sector coupling of economy and ecology: With our intelligent control, you get more out of the energy carrier electricity or hydrogen. We combine the generation of hydrogen or electricity with the intelligent use of waste heat and oxygen, which is inevitably produced during electrolysis. Independence through regional energy resources and value creation: Aspens' motive is to produce and consume CO_2-free hydrogen and green energy locally.

MAIN PROJECTS/CLIENTS

- Dewatering operation in Hessen 1,25 MW
- Dewatering operation in Brandenburg 25 kW
- Dewatering operation in Hanover 2 MW
- Energy Farm in Saxony-Anhalt 10 MW

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AVL List GmbH

AVL List is with more than 11,500 employees the world's largest independent company for the development, simulation and testing of all types of powertrain systems. The AVL solutions for the Energy Transition are: concise description of global emission reduction strategies and global energy roadmaps, analysis of market trends, energy provision and portfolio strategies, identification of possible scenarios and impact on the industry and identification of technologies supporting the energy transition. AVL provides a complete and objective picture of all existing and potential global energy and fuel scenarios. AVL creates confidence by defining the right future technology roadmap and offers market specific and independent recommendations for qualified and balanced solution packages at the intersection of energy and Mobility.

MAIN PROJECTS/CLIENTS

- Hydrogen in mobility, strategy consulting; UK
- Sustainable energy, co-electrolysis and methanation; Austria
- Synthetic fuel production, efficient production technologies; Europe
- Hydrogen in mobility, public bus fleet planning; Austria

www.avl.com
+49 (0)2191 950 0
Dreherstraße 3-5, 42899 Remscheid, Germany
info@avl-schrick.com

BASF FZE

BASF creates chemistry for a sustainable future while combining economic success with environmental protection and social responsibility. More than 117,000 employees in the BASF Group work on contributing to the success of customers in nearly all sectors and almost every country in the world. The portfolio is organised into six segments: Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care, and Agricultural Solutions. BASF has been producing sodium nitrate in Ludwigshafen for over 90 years. Along with its use in the solar industry, it is primarily used in the processing of glass and foods. BASF supplies its salt to all solar tower power plants around the world: clear proof of BASF's outstanding product quality.

MAIN PROJECTS/CLIENTS

- Noor 1, the world's largest solar project; a total of 950 megawatts is to be generated as of the end of 2022. BASF is the sole supplier of high-quality sodium nitrate for the solar tower power plant – a total of roughly 100,000 tons of the inorganic salt produced in Ludwigshafen will be shipped to the Gulf over the coming three years; UAE, from 2019-ongoing.

www.basf.com
+971 (0)4 8072 222
BASF FZE, JAFZA One, Tower B, 15th floor,
Dubai, United Arab Emirates
info@basf.com

Bischof + Klein SE & Co. KG

Bischof + Klein's (B+K) product range encompasses the entire range of flexible packaging – from traditional industrial packaging and consumer packaging to special films for technical applications Industrial packaging from B+K is used worldwide. Today, B+K is one of Europe's leading full-service suppliers of flexible plastic and plastic laminate packaging and technical films. B+K has developed a high technical backsheet for PV Module. Backsheets contribute to the efficiency of PV modules by reflecting sunlight. This contribution must not decrease or alter over time, e.g. due to weathering. B+K BackFlex PP demonstrates excellent reflection and no yellowing even after harsh accelerated weathering tests.

MAIN PROJECTS/CLIENTS

- Sabic is a big supplier of raw materials of B+K BackFlex photovoltaic foil and at the same time customer of B+K industrial packaging; KSA
- Joint Venture with Alrajhi International Group; KSA
- Gulf Acrylic Industries; Oman
- Tata Solar; India

www.bk-international.com
+49 (0)5481 92 08 74
Rahestraße 47, 49525 Lengerich, Germany
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© Blackforest Group

☆ Start-up

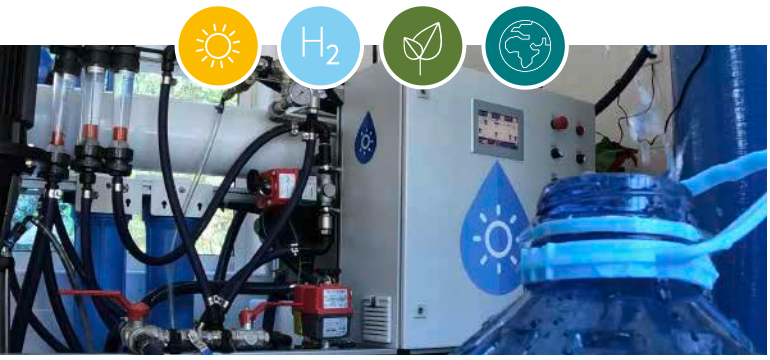
BlackForest Solutions GmbH

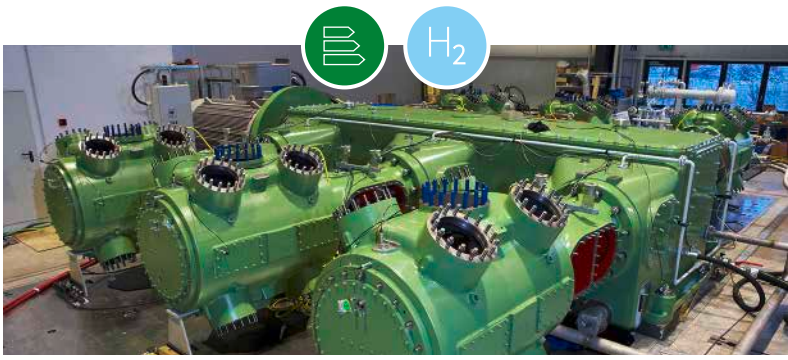
BlackForest Solutions GmbH (BFS) is a waste management company founded in 2016, part of the RainbowForest Solutions Group (www.rainbowforest.org) - an international environmental service group which aims to tackle environmental and social injustice with its entities and purpose driven teams. Besides technical consultancy in waste field for authorities, investors and development corporations, BFS additionally conducts international movements of hazardous waste into the European Union. As of June 2022, BFS has successfully completed almost 200 projects in > 64 countries.

MAIN PROJECTS/CLIENTS

- Development of the Kuwaiti National Waste Strategy Plan 2040 for non-hazardous and hazardous waste from the municipal, industrial & commercial sectors
- Technical assistance to the National Centre for Waste Management in Saudi Arabia
- Integrated municipal solid waste management facility – Solid waste-to-energy in Saudi Arabia
- Financial, legal, and technical assessment of hazardous waste treatment facilities in The Kingdom of Saudi Arabia for all special types of waste.

blackforest-solutions.com
+49 (0)30 896311 80
Kopenhagener Straße 60-68, Haus A 13407 Berlin, Germany
info@bfgroup.org





Boreal Light GmbH

Boreal Light GmbH is a Berlin based company specialised on renewable energy solution for water treatment facilities. The company designs and manufactures affordable solar water desalination systems for off-grid communities around the globe. Systems manufactured by Boreal Light are capable of delivering high quality hygiene drinking, irrigation, fish farm and sanitation water from any kind of high saline and polluted water resources. Powered fully by solar, simplicity of the design and affordability of the cost of the systems manufactured by Boreal Light are the three great competences the company is proud of. Machines manufactured by Boreal Light GmbH range from 1000l/h to 40,000l/h capable of treating direct seawater, brackish water, waste water of any kind, and yet fully powered by solar and just solar!

MAIN PROJECTS/CLIENTS

- + 300 of installed solar water desalination systems in 14 countries around the world
- Delivering hygiene drinking water on a daily basis to over one and a half million people in East Africa.
- Delivering hygiene drinking water to 33 hospitals across Kenya, and Tanzania.

www.winture.de
+49 (0)30 983976 72
Schichauweg 52, 12307, Berlin, Germany
info@boreallight.com

Borsig ZM Compression GmbH

Borsig offers customised, innovative and high-quality solutions for reciprocating compressors for process gases (acc. API 618, horizontal and vertical design with up to 6 axes; discharge pressure: 1,000 bara, capacity/flow: 115,000 m^3/h, power: 21,000 kW); centrifugal for process gases: multi-stage integrally geared centrifugal compressors (acc. API 617 & 672; discharge pressure: 150 bara, capacity/flow: 300,000 m^3/h, power: 25,000 kW); compressor control Borsig BlueLine (combines control system, machine protection and emergency shutdown for reciprocating and centrifugal compressors) and compressor services: installation, commissioning, spare parts, maintenance, overhauling, revamp and training. Borsig compressors are used in the power sector, oil and gas industries, chemical and petrochemical industries, refineries, and steel plants.

MAIN PROJECTS/CLIENTS

- Saudi Aramco; Saudi Arabia
- Takreer; UAE
- Enppi; Egypt
- Suez Oil Processing Company; Egypt

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Seiferitzer Allee 26, 08393 Meerane, Germany
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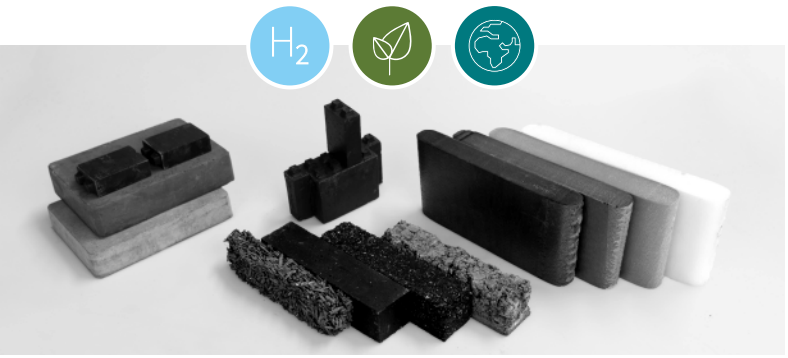

© carbonauten GmbH

carbonauten
the minus CO2 factory

☆ Start-up

carbonauten GmbH

Following the motto "Fuck CO_2" carbonauten 2022 is launching the "minus CO_2 factory 001" to reduce climate gases and to obtain raw materials for sustainable products. The CO_2 sink is created by carbonising biomass residues into biocarbons at decentralised, modular facilities - anywhere in the world. One ton of carbon permanently stores up to 3.3 metric tons of CO_2. In addition to technical biocarbon - as a CO_2-negative raw material - the carbonauten system supplies 24/7 base-load renewable energy to power the company's own production facilities, as well as to supply local companies and communities.
In specialised business units, carbonauten ensures that sustainability becomes practicable. For various industries, they produce high-quality, plastic compounds, building materials and agricultural soil additives - and at low prices.

MAIN PROJECTS/CLIENTS

- minus CO_2 factory 001: The first industrial carbonisation plant is about to start its production in 2022
- Series of field trials verifies the effect of carbonauten bio stimulants under different soil and climatic conditions
- Development of CO_2 storing construction materials

www.carbonauten.com
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michael.sernatinger@carbonauten.com

DEGER

DEGER Energie GmbH & Co. KG

Deger is the leading manufacturer with the world's largest product portfolio for single and dualaxis solar tracking systems. Their market position is based on the unique, patented Maximum Light Detection (MLD) technology. The MLD-sensor constantly aligns the connected solar modules to the point that provides the greatest energy and achieves a 42,9 % greater yield on average than fixed systems. With more than 100,000 projects implemented in more than 75 countries since 1999, Deger is the world's market and technology leader for solar tracking systems.

MAIN PROJECTS/CLIENTS

- 5000NT dual axis solar tracking systems were used in a 2,8 MWp project; Escalon, Spain
- D100 dual axis solar tracking systems were used in a 1 MWp project; Kimberley, Canada
- S100-DR single axis solar tracking systems were used in a 1,14 MWp project; Adıyaman, Turkey
- S60H single axis solar tracking systems were used İn a 13,2 kWp project; Suurberg, South Africa

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info@degerenergie.com

DIN Deutsches Institut für Normung e.V.

DIN, the German Institute for Standardization, is the independent platform for standardization in Germany and worldwide. DIN plays a major role in identifying future areas for standardization and brings together the experience of 36.000 experts from industry, scientific institutions, public authorities and civil society. By helping to build a green and sustainable economy, DIN makes an important contribution towards solving current challenges. One major field is the development of standards in the field of hydrogen technologies, which DIN pursues on national, European and international level. DIN is part of the long-standing partnership between CEN/CENELEC and the Gulf Cooperation Council Standardization Organization (GSO), which aims to build a strong, mutually beneficial collaboration regarding standards and standardization.

MAIN PROJECTS/CLIENTS

- DIN is member of the European Clean Hydrogen Alliance and takes active part in the WG Standardization of the Alliance
- Standardization roadmap energy storage
- DIN SPEC 91434:2021-05 Agri-photovoltaic systems - Requirements for primary agricultural use

www.din.de
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Am DIN-Platz, Burggrafenstraße 6, 10787 Berlin
info@din.de

Dornier Group GmbH

We live in a world full of change, in which the demands on the infrastructure of tomorrow are becoming ever more comprehensive, networked and complex. Dornier Group finds solutions to these challenges even before they manifest themselves and provides guidance in decision-making processes. Dornier is a global one-stop shop for all consulting engineering services with a focus on the infrastructure sector. Over 2,000 interdisciplinary experts develop new solutions every day – Dornier is global, efficient and goal-oriented. It has a local presence, is familiar with local conditions around the world, and has offices in 11 countries. Dornier has extensive expertise in different engineering services, which it manages in five business units: Power and Heat, Nuclear Services, Renewables, Mobility and Water.

MAIN PROJECTS/CLIENTS

- Feasibility Study on Aquifer Storage & Recovery, Dubai
- Development and Maintenance of an Urban Transport Forecast Model for Riyadh, Saudi-Arabia
- Strategic Water Storage and Recovery Project, Abu Dhabi
- Raise Efficiency of Collection and Transport of Waste, Saudi-Arabia

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econ INDUSTRIES

econ industries services GmbH

econ industries offers solutions for the treatment of industrial hazardous wastes and contaminated soil, based on 20 years' experience and more than 30 industrial waste recycling plants. econ's aim is to avoid the elimination of waste through incineration and landfilling by achieving a resource conserving material recycling instead. Thermal desorption technology is used in the plants, in which harmful substances (e.g. hydrocarbons, mercury) are separated under heat and vacuum in a fully encapsulated system. Particularly when it comes to energy efficiency, low carbon emissions and resource recovery rates, this method is far superior to other thermal desorption techniques and is accepted as state of the art by approval authorities world-wide. Tailor-made research, development, consulting, engineering, delivery and commissioning are econ's core competencies.

MAIN PROJECTS/CLIENTS

- World's largest drill cuttings treatment center for the recycling of synthetic drilling fluid; Azerbaijan
- Recycling of oily wastes including low and high-viscous sludges and contaminated soils; Australia
- Remediation of mercury containing crude oil based sludge; Brunei
- On-site naturally occurring radioactive material waste (NORM) treatment for safe final disposal; Germany

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egi Elia Grid International | Elia Group

Elia Grid

Elia Grid International (EGI) is a global consultancy company that specialised in complex power system challenges. Our multidisciplinary team of experts offers strategic, technical, and regulatory advice in all fields related to large power system integration, as well as a range of specialist solutions. We are an international company with offices in Abu Dhabi, Alberta, Bangkok, Berlin, Brussels, and Riyadh, and we have been successfully delivering projects in over 20 countries worldwide. EGI is part of Elia Group, one of Europe's top five transmission system operators and a key player in the European energy market and interconnected electricity system. Elia Group is also an industry-renowned specialist in building interconnectors and integrating renewable energy generation.

MAIN PROJECTS/CLIENTS

- Assessment of the impact of the integration of 60 GW of solar and wind into the national grid; KSA
- Set up of a management control center allowing to forecast and coordinate with RES power producer, KACARE; KSA
- Support the operational readiness of the load dispatch center for the arrival of RES; KSA
- Support the review of the power purchase agreement, Saudi Power Procurement Company; KSA

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+971 (0)4 884 24 26
Free Zone Dubai, Business Park Dubai South (DWC), Building A5, Dubai, United Arab Emirates
info@eliagrid-int.com

EMPURON AG

EMPURON is a software company that develops innovative, technical solutions of the highest quality for renewable energy systems, smart grids and increasing energy efficiency. EMPURON's Energy Management Software application can be parameterised according to the different needs. It includes a powerful process data warehouse, forecasting and predictive analysis, storage optimization and much more. EMPURON's Energy Management Software is the right choice for energy efficiency tasks. In utilities, it is also used for supporting ancillary services. EMPURON software modules and hardware for energy management can be extensively and very easily adapted to various requirements. Customers receive a perfectly and precisely tailored function for optimum benefit – also as a cloud service.

MAIN PROJECTS/CLIENTS

- DEWA – process data warehouse, visualization and reporting; UAE
- SEC – services for Siemens Spectrum Power; KSA
- Münch-Energie – management and optimisation of hybrid power plant with renewables and battery storages; Germany
- Austrian Power Grid AG – primary and secondary control reserve monitoring; Austria

www.empuron.com
+49 (0)91 31 69 12 70
Am Weichselgarten 7, 91058 Erlangen, Germany
info@empuron.com

Enapter GmbH

Enapter designs and builds the AEM electrolyser, one of the most efficient green hydrogen generators. Enapter's electrolyser are standardised, scalable, and flexible. They run in over 30 countries across all sectors, striving to make electrolysers a commodity. Currently, the scale of production is to deliver low-cost devices that will produce hydrogen for industrial and commercial purposes, energy storage, transport, or fuel for heating. Enapter team also developed Enapter's software-defined Energy Management System. The EMS is a decentralised energy system controller. It configures, controls, and monitors energy systems, as well as individual hydrogen components. Enapter's approach is to build the EMS as an operating system for any energy system that offers core functionality, and can easily be built upon to accommodate individual needs via open collaboration tools.

MAIN PROJECTS/CLIENTS

- DNVGL, Power to Heat, The Netherlands,
- ZeroAvia, Hydrogen Aircrafts, United Kingdom
- [White label], Backup Energy Supply, Japan
- Southern Green Gas, Power-to-Gas, Renewable Methane, Australia

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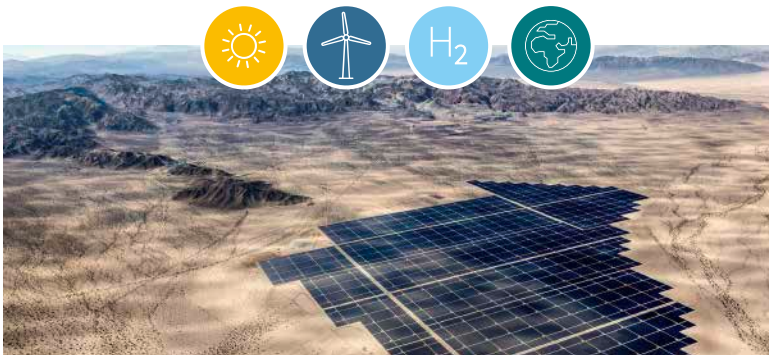

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Energy & Meteo Systems GmbH

Energy & Meteo Systems (EMS) is amongst the internationally leading providers of energy-meteorological predictions and virtual power plants. They predict approximately 50 % of the installed wind and 40% of the installed solar power worldwide and offer further essential forecasts for grid operators, traders and IPPs. With their Virtual Power Plant (VPP) services, they support power aggregators and power utilities in efficient market and grid integration of power assets. The VPP collects real-time measurement and market data, manages production schedules and information on failures, controlling the many small power generators so these can be implemented as a service beneficial to the grid. EMS services are used by grid operators, power traders and Independent Power Producers from Europe, North and South America, Asia, Africa, Middle East and Australia.

MAIN PROJECTS/CLIENTS

- Solar power forecasting for around 2000 MW in GCC, North Africa and Jordan
- Projects with ACWA Power a renewable energy power producer as their customer
- Projects with Sterling & Wilson a solar EPC contractor company as their customer
- Piloting the use of SKYCAM devices for tracking cloud movements to improve forecasting and better grid integration for a solar farm in UAE

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mail@energymeteo.de

Eternal Power GmbH

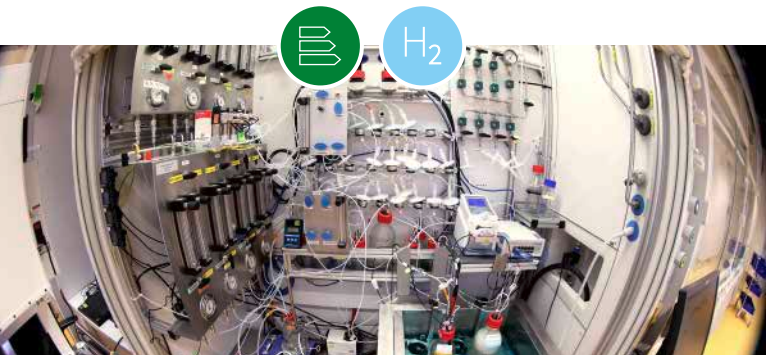
☆ Start-up

Eternal Power (EP) aspires to become a leading global integrated mass producer of green hydrogen (gH_2) and green hydrogen derivatives, and to address the main challenge of the green hydrogen sector: meeting a growing demand with supply at competitive prices. EP covers and integrates the whole value chain: development, and integration of production sites – encompassing utility-scale renewable energy generation, production of green hydrogen and green hydrogen derivatives – operations, sales, and logistics. EP has built a global pipeline of over 6GW green hydrogen production projects, with the goal to increase this tenfold by the end of the decade. The green hydrogen and derivatives produced will be sold and shipped globally to off-takers such as fertiliser producers, chemical manufacturers, mobility providers and energy companies.

MAIN PROJECTS/CLIENTS

- 2+GW green hydrogen project with local partner Khalid Al Hamed Group in the UAE
- 1+GW green hydrogen project in Turkey
- 2+GW green hydrogen project in Brazil
- 1+GW of green hydrogen projects in the EU

www.eternal-power.de
+49 (0)151 180 21 245
Haynstraße 33, 20249 Hamburg, Germany
contact@eternal-power.de



Evonik Industries AG

Evonik, one of the world's leaders in specialty chemicals, developed a new type of anion conducting membrane for the breakthrough of green hydrogen production by means of electrolysis. The new membranes consist of a resistant polymer with excellent performance indicators which is key to the effectiveness and efficiency of the electrolysis process used in the production of green hydrogen.
The advantages of electrolysis with anion-conducting membranes include lower investment costs, high current density, efficiency and high flexibility. Green hydrogen is of great relevance to the renewable energy industry in the Middle East where massive solar energy projects are being developed such as Noor in Abu Dhabi, the world's largest solar project.

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Fichtner GmbH & Co. KG

As a leading, independent engineering and consultancy active in energy and infrastructure sectors, Fichtner handles challenging projects in countries all over the world. Our highly qualified specialists provide engineering, consultancy, and financial advisory services for complex infrastructure projects, such as the planning of power plants, energy transmission, and distribution networks, drinking water supply, wastewater treatment systems, and waste management facilities. Fichtner offers wide-ranging technical, commercial, and economic expertise for the renewable energies sector. Fichtner handles projects for the whole range of technologies and supports its clients throughout all project phases, from feasibility study through to plant commissioning.

MAIN PROJECTS/CLIENTS

- Sweihan 1170MW Solar IPP and Al-Dhafra 1500MW Solar IPP, Technical Advisory services; Abu Dhabi, UAE
- Tendering of 500MW PV IPP Plant; Oman
- Techno-Commercial Advisory Services for a 2GW Hydrogen Project; Abu Dhabi, UAE
- Technical Assessment of the Impact of Introducing Renewable Energy to the National Grid; UAE

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Fraunhofer

Fraunhofer-Gesellschaft e.V.

The Fraunhofer-Gesellschaft based in Germany is the world's leading applied research organization. Prioritizing key future-relevant technologies and commercializing its findings in business and industry, it plays a major role in the innovation process. A trailblazer and trendsetter in innovative developments and research excellence, it is helping shape our society and our future. Founded in 1949, the Fraunhofer-Gesellschaft currently operates 76 institutes and research units throughout Germany. Over 30,000 employees, predominantly scientists and engineers, work with an annual research budget of €2.9 billion. Fraunhofer generates €2.5 billion of this from contract research.

MAIN PROJECTS/CLIENTS

- Capacity building, certification, technology development, MENA region
- HyPat: Global H_2 potential atlas
- Efficient PV modules: Anti-dust coating with anti-reflective properties, KSA
- eMISKWaste: Waste and Landfill Database and Management Strategy incl. Energy recovery, Kuwait

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goldbecksolar

GOLDBECK SOLAR GmbH

GOLDBECK SOLAR GmbH (GS) is an international company specialising in the turnkey construction of commercial and industrial rooftop and large-scale ground-mounted photovoltaic systems. Its range of services covers the entire value chain, from project development and financing to construction, technical operation, and asset management of the plants, as well as the integration of storage technologies and the direct sale of clean energy. Its holistic approach makes it the gateway to solar energy. Each partner can bring one or more aspects of the value chain and GS complements all the solutions and expertise needed to successfully realise a solar project. With more than 21 years of experience in solar power plant construction, the company has built more than 2.5 GW in 19 countries around the world and enjoys an excellent reputation in the market.

MAIN PROJECTS/CLIENTS

- The Solar Saran plant in Kazakhstan with 100 MWp
- Zwartowo in its first phase with 204 MWp and in the coming months will have a total of 300 MWp.
- Solar Plant Midden Groningen with 103 MWp the largest in the Netherlands.
- The Maasvlakte rooftop solar plant with 25 MWp the largest in Europe.

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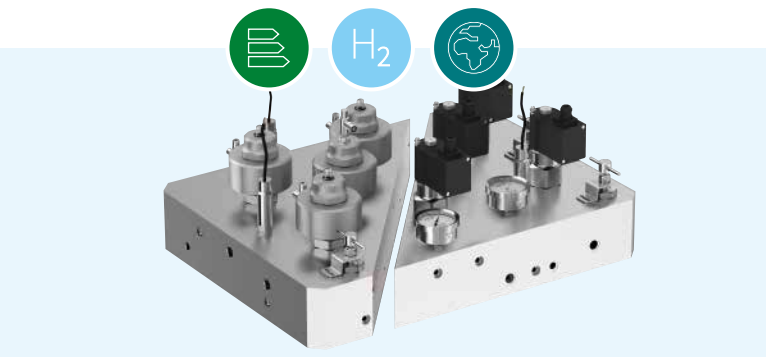

GSR Ventiltechnik GmbH & Co. KG

GSR Ventiltechnik (GSR), a subsidiary of INDUS Holding AG, was founded in northern Germany in 1971. With a staff of over 150 employees GSR develops, produces and distributes solenoid and pneumatic-actuated valves, made in Germany. They have the right solution for virtually every application. Over 1000 valve options can be selected from their extensive add-on system. The GSR team is there to assist you in choosing the correct valve and is happy to advise you. If GSR is unable to find it in their comprehensive product range, a custom valve according to your specifications will be developed. GSR is certified in accordance with DIN standards and has several licenses for a variety of requirements needed for valves and coils.

MAIN PROJECTS/CLIENTS

- Supply of valve blocks for hydrogen-dispenser, pressure rating 1050 bar; USA
- Supply of solenoid valves for high pressure CNG service, DN 25, pressure rating 450 bar; India
- Supply of valve blocks for system of distribution of hydrogen on a boat, pressure rating 500 bar; Netherlands

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Guidehouse LLP.

Guidehouse is a leading global consultancy with broad capabilities in management, technology and risk consulting. Working across the entire energy value chain, Guidehouse develops innovative solutions and strategies to support its clients in enabling the energy transition. With over 700 consultants, the global Energy, Sustainability, and Infrastructure segment is the largest in the industry. Guidehouse serves as trusted advisor to utilities and energy companies, large corporations, investors, NGOs and the public sector to help them thrive in the rapidly changing energy, resources, and infrastructure environment. Guidehouse helps customers to find effective solutions in the energy transition by connecting deep knowledge of technology, markets and policy to insights from working with governments, industry and the energy sector.

MAIN PROJECTS/CLIENTS

- Implementation of German Energy Partnership with UAE and Energy Dialogues with Saudi-Arabia and Oman
- ADDC Revenue Diversification and Beyond the Meter Services; UAE
- Demand Side Management Strategy for the Dubai Supreme Council of Energy; UAE
- ADDC Smart Grid Implementation Management; UAE

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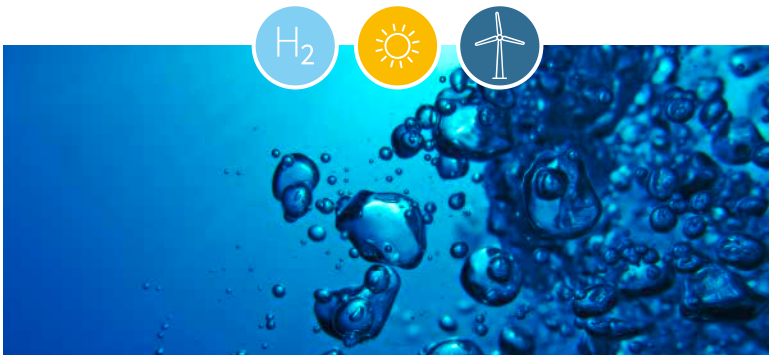

H_2 MOBILITY Deutschland GmbH & Co KG

H_2 MOBILITY Deutschland is creating the conditions for unlimited clean, quiet, and uncomplicated hydrogen mobility in the European GSA nations. The company is in charge of building and operating a network of public hydrogen filling stations that enables electric mobility for light- to medium-duty commercial H_2 vehicles (e.g. vans, buses, trucks, waste collection vehicles), as well as H_2 passenger cars, without range restrictions and with short refueling times. With the market ramp-up of the first commercial fuel-cell vehicles, existing hydrogen filling stations are quickly being expanded, and new, larger filling stations are being built where demand is expected to increase.

MAIN PROJECTS/CLIENTS

- The first interim goal is to operate 100 hydrogen stations in seven German metropolitan areas (Hamburg, Berlin, Rhine-Ruhr, Frankfurt, Nuremberg, Stuttgart, and Munich), and along the connecting arterial roads and motorways. This will be followed by another 300 as the vehicle numbers are ramped up.
- Hydrogen station in Erlangen, offering 350 bar and 700 bar. Besides offering two pressure levels, the station uses electrolytically produced hydrogen (H_2) and innovative Liquid Organic Hydrogen Carrier (LOHC) technology.

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Heraeus Deutschland GmbH & Co. KG

Heraeus is a globally leading technology group headquartered in Hanau, Germany. Founded in 1851, it is a family-owned portfolio company. Today, Heraeus combines businesses in the environmental, energy, electronics, health, mobility, and industrial applications sectors. The global business unit Heraeus Precious Metals is one of the world's leading suppliers of precious metal services and products. We combine all activities resulting from Heraeus' comprehensive expertise in the precious metals cycle – from trading to precious metal products and recycling. Based on Heraeus' profound expertise in precious metal catalysts, we are offering customised catalysts for polymer electrolyte membrane electrolysers and fuel cells as well as liquid organic hydrogen carrier (LOHC) and gas purification.

MAIN PROJECTS/CLIENTS

- Kopernikus Power-to-X, sector coupling – industrialization of green hydrogen as a starting point
- National Innovation programme 2 – direct catalyst coated membrane (CCM), industrialization of catalyst production and CCM manufacturing

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HEROSE

HEROSE GmbH Armaturen und Metalle

Herose provides safety around the world for the handling of technical gases, steams, and liquids. With more than 145 years' experience in the development, manufacture and sale of valves with a high level of innovation and modern production with certified quality management, their company is one of the world's leading manufacturers and suppliers for valves and safety valves for cryogenic technology, valves for small-scale liquefied natural gas and hydrogen applications, safety valves for general industrial applications and special valves for oil-immersed transformers.

MAIN PROJECTS/CLIENTS

- Hydrogen valves for the liquifying and shipping terminal, Kawasaki Heavy Industries; Australia
- Air Products – valve package for one of the largest air separation plants built; Jazan, KSA
- Valve package for one of the largest groups of LNG shaving stations built; Helfie, China
- LNG Vessel Fuelling – valve package for the fuelling of over 200 cruise and others shipping vessels

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Hydrogen is now.
H-TEC SYSTEMS

H-TEC SYSTEMS GmbH

H-TEC SYSTEMS is an international company in the field of renewable energy and hydrogen with offices in Braak and Augsburg in Germany. Since the company was founded in 1997, H-TEC SYSTEMS has been successfully developing innovative products for the production and supply of green hydrogen and is actively driving the energy revolution. Highly efficient electrolysers and stacks make H-TEC SYSTEMS one of the technology leaders in PEM electrolysis, which also contributes to making the customers value chain carbon neutral. Together with the investors GP JOULE and MAN Energy Solutions, the implementation and further development of innovative power to gas solutions are in progress.

MAIN PROJECTS/CLIENTS

- Hydrogen Refueling Station Westre – wind energy into green hydrogen; Germany
- eFarm – Germany's biggest green hydrogen mobility project; Germany
- H_2 Project Haurup – electrolyser with a nominal capacity of 1 MW; Germany

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Hydrogen Rise LLC

Hydrogen Rise Oman, a subsidiary of Germany based Hydrogen Rise AG is developing, building and operating green hydrogen projects in the GCC region. The company´s unique approach is centered around the development of complete green hydrogen value systems, including green hydrogen production, its transport, storage, distribution, integration into decarbonising industrial applications, export and certification. For this, Hydrogen Rise has built extensive expertise and networks of international hydrogen experts. Its current project at Jindal Shadeed in Oman will deliver green Direct Reduced Iron as feedstock for a green steel production which is receiving significant global interest and is supported by the German government through its National Hydrogen Strategy.

MAIN PROJECTS/CLIENTS

- Green DRI/Steel in Oman
- Green Cement and Green Methanol
- Decarbonisation of Refinery Processes

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Hydrogenious LOHC Technologies GmbH

Hydrogenious LOHC Technologies adds the missing link to high-performing hydrogen value chains globally. Based on its Liquid Organic Hydrogen Carrier (LOHC) technology with benzyl toluene as carrier medium, Hydrogenious LOHC enables superior, flexible hydrogen logistics, utilizing conventional liquid-fuel infrastructure. Hydrogenious' portfolio includes stationary and mobile LOHC-based applications: Hydrogenious LOHC Technologies offers (de-) hydrogenation turnkey plants, Operation and Maintenance. Hydrogenious LOHC Emirates is a joint venture with Emirates Specialised Contracting & Oilfield Services (ESCO) and based in the United Arab Emirates since the end of 2021. Hydrogenious LOHC Maritime, established in 2021 jointly with Østensjø Group in Norway, develops an emission-free onboard propulsion system for the global shipping industry.

MAIN PROJECTS/CLIENTS

- Joint study agreement with ADNOC, Uniper and JERA Americas to explore hydrogen transportation between the UAE and Germany using LOHC technology.
- Hydrogen refueling station with hydrogen LOHC underground tanks, hydrogen supplied via LOHC technology; Germany
- Industrial-scale H_2 storage plant based on LOHC technology; Germany
- IPCEI EU-funded projects – green hydrogen import to central Europe by LOHC technology; Europe

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automotive engineering iav

IAV GmbH

With more than 8,000 employees IAV is being active in the automotive industry, powertrain development, electromobility, renewable energies as well as product and technology-related life cycle assessments. IAV has 20 years of experience in the entire effects chain reaching from smart hydrogen production to the development and testing of fuel cells, fuel cell systems and integration of fuel cell powertrains. IAV also uses their experience in mechatronics and fluid mechanics to develop solutions in the water industry with respect to efficiency. IAV offers smart control solutions for variable-speed wind turbines that enhance energy production and reduce fatigue loads in design-critical components. We also offer virtual sensors that allow to estimate critical loads during operation, which are required for a lifetime assessment of the power plant.

MAIN PROJECTS/CLIENTS

- Development and realization of a scalable independent container-based electrolyser family
- Development and establishment of a platform for supporting the introduction of renewable fuels into the passenger car market
- Development of a control solution for variable-speed wind turbines
- Development of approaches for smart grid management and energy management

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ILF CONSULTING ENGINEERS

ILF Beratende Ingenieure GmbH

For more than 50 years, ILF Consulting Engineers helps its clients to successfully implement technically demanding energy infrastructure projects. ILF provides its clients with innovative and individualised solutions. Energy transition must be reliable, sustainable, and environmentally friendly. ILF supports these objectives with energy concepts and energy system planning, design of wind, solar and hybrid power plants, modifying power grids to increasing power supply from renewables, and integrating energy storage such as hydropower, batteries or hydrogen both on-grid and off-grid. ILF delivers masterplans and concepts, executes different phases of design, assists during permitting, construction and commissioning, and manages projects in the interface between owners, suppliers, and contractors in order to lead project implementation to success.

MAIN PROJECTS/CLIENTS

- Abu Dhabi Department of Energy – Policy & Regulatory Framework for Hydrogen
- NEOM Solar Power and Ammonia Export Project, KSA
- Sohar Industrial Estate 86 MW PV Plant, Oman
- Grid code analysis study for connection of large-scale solar PV plants, Bahrain

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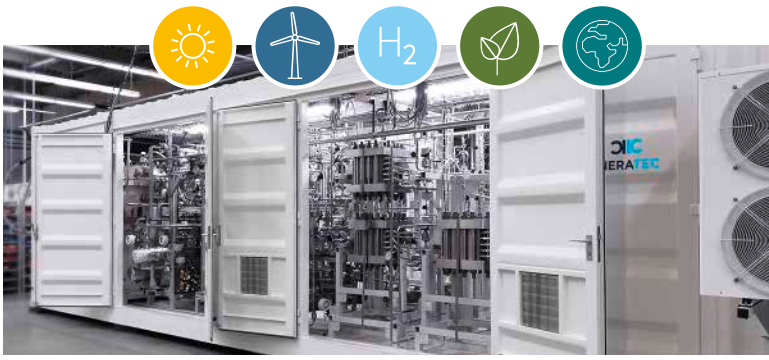

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Industrial Solar GmbH

Industrial Solar provides solar energy technologies, engineering and consultancy services, and turn-key solutions to industrial clients to help decarbonise their processes and reduce their reliance on fossil fuels. Industrial Solar offers a flagship technology in the Fresnel Collector, which is optimised for industrial applications and can deliver temperatures up to 400°C. Additionally, tailor-made Energy Concept Studies are offered to determine the clients' energy demand and optimise their green transition. The demand can be met by a wide range of solutions such as solar thermal collectors, power generation, waste heat recovery, solar cooling with absorption chillers, and heat pumps. Industrial Solar has a strong track record in the Middle East and North African region, with the first projects implemented in 2009.

MAIN PROJECTS/CLIENTS

- Solar steam generation & solar thermal cooling for Japan Tobacco International in Amman, Jordan
- Solar Steam Generation, RAM Pharma Amman, Jordan
- Solar Thermal Cooling, Mobile Telephone Networks, Johannesburg, South Africa
- Solar Air Heating, Pfizer, Freiburg, Germany

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Ineratec GmbH

☆ Start-up

INERATEC produces sustainable fuels (e-fuels) and chemical products manufactured in modular chemical plants using the power-to-X or gas-to-X process. Hydrogen produced from renewable electricity is converted with greenhouse gases such as CO_2 into e-kerosene, CO_2-neutral diesel, synthetic waxes, methanol, or SNG. The innovative plant modules provide high load flexibility as well as quick start-up and shut-down times. Therefore, they are perfectly suitable for fluctuating renewable energy applications, e.g. wind or solar. Additionally, with this plant concept a cost-efficient, modular numbering-up, and technology scale-up become possible, meaning that standardised modules are multiplied to reach higher capacities.

MAIN PROJECTS/CLIENTS

- Kopernikus P2X: conversion of electricity into chemical energy
- Energy Lab 2.0: Power-to-Jetfuel plant in Karlsruhe, Germany
- Industrial Power-to-Liquid pilot plant in Werlte, Germany
- INERATEC plans an industrial pioneer plant for the production of sustainable synthetic fuels in Germany starting in 2022.

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JONSOL
THE SILENT POWER OF SUNLIGHT

Jonsol GmbH

Jonsol is a PV panels manufacturer offering a wide range of polycrystalline and monocrystalline panels with different technologies and power classes. Custom made panels for specific projects with different shapes and colors are also provided. Jonsol offers storage systems, ranging from small off-grid systems for telecom towers to large backup for industrial solutions, as well as charging stations for smart mobility. Jonsol aims to provide best technology at optimal prices for its clients worldwide.

MAIN PROJECTS/CLIENTS

- Petromin Network of Gas Stations – equipping gas stations with solar energy and storage system to be grid independent
- Inwi Telecom – installing solar and storage in isolated sites of telecom towers to enlarge the telecom network in remote areas in the desert; Morocco
- American school of Tunis – installing rooftop PV modules to decrease the grid dependency and lower the energy bill; Tunisia
- 6.6 MW power plant, community project, Germany

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We connect people, mounting-systems and digital know-how.
Connecting Strength

K2 Systems GmbH

Since 2004, K2 Systems has been developing innovative mounting systems for photovoltaic (PV) rooftop installations around the world. The portfolio covers a broad range of roof coverings, from flat roofs to tile roofs, trapezoidal sheet metal, standing seam and corrugated roofs. K2 products are developed in Germany and tested according to strict performance criteria for long-lasting safety and key aspects like wind loads or watertightness. K2 helps increasing the efficiency of the overall PV installation process as products have been designed for fast and easy assembly. And the design software K2 Base plugs in seamlessly into major Inverter Design and yield calculation software. K2 engineers are readily available to help customer project planning, and also provide individually designed systems beyond standard solutions.

MAIN PROJECTS/CLIENTS

- Xylem with Enviromena Power Systems, UAE
- Barrakah with Enviromena Power Systems, UAE
- KOC (10 Petrol Stations) Roof Top, Kuwait
- Soft Group 2MW Industrial Roof Top – Morocco

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F. LAEISZ

F. Laeisz GmbH

F. Laeisz is a diversified, fully integrated, family-owned shipping company with approximately 60 owned or managed vessels in the group. F. Laeisz owns and manages 7 ammonia carriers with a capacity of approximately 200,000 cbm and has more than 30 years of experience in this field. Other types of vessels include container ships, car carriers and research vessels.

MAIN PROJECTS/CLIENTS

- The aim of F. Laeisz is to support the transport of hydrogen and its derivatives from the Gulf region to Germany and to help in the selection of the right port infrastructure in the Gulf region

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LED-LIGHT - Germany GmbH

LED Light Germany GmbH

The LED-LIGHT-Germany's high-performance LED-Technology is designed, developed, and made in Germany. LED Light is a system partner for energy-efficient lighting systems and renovation. With the highest possible quality and service processes, LED-LIGHT-Germany GmbH is a specialised manufacturer. The lightning and service offers are tailored to the respective customer needs and projects. LED Lights analyzes and develops the optimal solution for each project together with its customers. In Hotels LED Lights equips with all types of Lightings and antibacterial concepts for new buildings, especially for quick renovations of guestrooms. Led Light also provides hospitals with antibacterial light concepts and human-centric lightning as well as antibacterial light concepts for the food- and clean-room industry. LED Lights can be used for architecture, monuments, public areas, and landscape lighting. Since August 2022, a branch has been opened in Sharjah aiming to ensure excellent service and tailor-made support for its customer.

MAIN PROJECTS/CLIENTS

- Monument Lightning "House of Wisdom" Sharjah
- Titanic Deluxe Hotel "Französische Straße" Berlin
- Humboldt Carre Berlin / Event-Konferenzhouse
- "HIPP" largest Baby-Food Company in Europe / Produktionhall

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Linde Engineering

Linde is a global leader in the production, processing, storage and distribution of hydrogen. It has the largest liquid hydrogen capacity and distribution system in the world. The company also operates the world's first high-purity hydrogen storage cavern coupled with an unrivaled pipeline network to reliably supply its customers. Linde is at the forefront of the transition to clean hydrogen and has installed over 200 hydrogen fuelling stations and 80 hydrogen electrolysis plants worldwide. The company offers the latest electrolysis technology through its joint venture ITM Linde Electrolysis.

MAIN PROJECTS/CLIENTS

- Hydrogen liquefaction: Liquefaction plant with ongoing expansion project to double production capacity. Leuna, Germany
- Pre-combustion capture of CO_2: Capture of 600 tons per day of CO_2 and subsequent purification for further usage. Porvoo, Finland
- Hydrogen Refueling Station: next generation 100% renewable hydrogen refueling station for passenger cars. Fountain Valley, USA
- Upstream removal of CO_2 with pressure swing adsorption: 315 tons per day CO_2 are captured and purified for further usage. Leuna, Germany

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Ludwig-Bölkow-Systemtechnik GmbH

Ludwig-Bölkow-Systemtechnik (LBST) is an expert consultancy for sustainable energy and mobility. With expertise bridging technologies, markets and policy, LBST supports public and private international clients in strategy, feasibility, and market assessments. International blue-chip companies trust LBST's reliable judgment. The leading competence of LBST is based on four decades of continuous experience and on the interdisciplinary team of leading experts. Hydrogen-related activities include techno-economic analyses, modeling, feasibility studies of large-scale hydrogen generation and supply infrastructure as well as detailed work on the associated regulatory and market environment. With a deep understanding of developments and technologies and truly independent advice, LBST helps clients with sustainable decisions to secure their future.

MAIN PROJECTS/CLIENTS

- Study on introducing hydrogen into the energy sector, project developer; Oman
- Feasibility study for a 100 MW power-to-gas project, transmission system operators; Europe
- Impact of international climate action targets on worldwide hydrogen demand; GCC
- Hydrogen market study and demand outlook, oil producer; GCC

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Lufthansa

Lufthansa Group

Lufthansa Group aligns its emissions reduction with the Paris Climate Agreement and aims to be NetZero by 2050. As a starter, the company aim to reduce its net CO_2 emissions by 50% by 2030. Several projects are already in place for the company to succeed with the green transition. One of them being CleanTech Hub, a competence center for climate protection technologies that bundles airline expertise with impulses from the global start-up scene. Another large project is Compensaid, which for the first time ever, allows travelers around the world to offset their CO_2 emission by purchasing Sustainable Aviation Fuel (SAF). This has been a major success for the company. Furthermore, together with myclimate, the Lufthansa Group now offers a portfolio of climate protection projects to offset carbon emissions on a long-term basis.

MAIN PROJECTS/CLIENTS

- CleanTech Hub, competence center for climate protection technology supporting Masdar and our consortium partners in a pioneering project to generate carbon-neutral green hydrogen in Abu Dhabi.
- Compensaid, CO_2 neutrality and climate protection through Sustainable Aviation Fuel (SAF)
- Fleet renewal with Airbus A350, reduced fuel consumption and a noise footprint #MakeChangeFly Campaign

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MAN Energy Solutions

MAN Energy Solutions Middle East LLC

MAN Energy Solutions enables its customers to achieve sustainable value creation in the transition towards a carbonneutral future. Addressing tomorrow's challenges within the marine, energy and industrial sectors, they improve efficiency and performance at a systemic level. They provide a unique portfolio of technologies, such as liquefied natural gas, hybrid, energy storage, hydrogen and Power-to-X solutions. Energy storage is key to combine sustainability and availability, their molten salt energy storage technology takes solar power plants to base load operation. Green fuels from Power-to-X can continuously replace fossil fuels, tackling climate change and fostering oil and gas assets for upcoming markets at the same time. MAN Energy Solutions provides complete facilities for hydrogen, synthetic natural gas or energy storage on an EPC basis.

MAIN PROJECTS/CLIENTS

- World's largest power-to-methane plant; Werlte, Germany
- Steam turbine for a 100 MW CSP plant; Shams, UAE
- World's first ship operation on synthetic natural gas (SNG); Wes Amelie, Germany

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MAX STREICHER GmbH & Co. KG aA

STREICHER offers complete solutions within the energy sector. Pipeline and plant construction is one of STREICHERS' core competencies. As an EPC-contractor for natural oil and gas pipelines and plants as well as hydrogen pipelines and other products and media, STREICHER carries out all services from planning to construction to commissioning and maintenance. Further fields of activity are future-focused tailor-made construction equipment, drilling rigs for exploration of hydrogen, hydrocarbon and geothermal energy and electrical engineering. All fields of activity: Pipelines and Plants; Mechanical Engineering; Electrical Engineering; Civil and Structural Engineering; Raw and Construction Material

MAIN PROJECTS/CLIENTS

- Reconstruction of EUGAL Pipeline, Germany
- Baltic Pipe Project - Onshore Pipeline Jutland and EP II Terminal as well as 2 gas compressor Stations, Denmark/Poland
- Research and development H_2-20 Schopsdorf: Hydrogen Feed in Plant Schopsdorf, Germany
- H_2-Village Bitterfeld - pilot project Hypos: Engineering, construction and commissioning of a pressure regulating and metering station inclusive H_2-grid, Germany

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meteocontrol GmbH

From commercial to utility scale projects – meteocontrol is the leading provider of holistic and intelligent energy management solutions for PV and PV hybrid systems. With precise monitoring, direct remote control and feed in management, meteocontrol optimises the operation of PV plants to achieve optimal yields. Enabling customers to gain complete control over their asset and data, meteocontrol offers e.g. a professional remote monitoring platform for smart alarm handling based on machine learning and local SCADA solutions for on-site monitoring and control. With more than 40 years of expertise and in-house development, meteocontrol supports every phase of a project worldwide. Besides offices in Europe, Asia, America and Australia, experts for technical support, engineering and after sales are available at meteocontrol AMEA in Dubai on site.

MAIN PROJECTS/CLIENTS

- Dubai rooftop projects (Ibn Battuta Mall, Dubai International Academic City, Dubai Production City): monitoring system, plant management software
- Oman C&I project: monitoring system, plant management software
- Egypt utility scale project: local SCADA system, project management, commissioning

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MTU Middle East FZE

The Power Systems Business Unit of Rolls-Royce is focused on creating sustainable, climate-neutral solutions for drive, propulsion, and power generation. We are making a significant contribution to the energy transition with environmentally-friendly technologies from our MTU product and solution brand. As leaders in standby power for safety-critical plants and in integrated drive and propulsion systems for ships and heavy-duty land vehicles, our customers know they can depend on us, and have been doing so for over 110 years.

MAIN PROJECTS/CLIENTS

- Stationary and mobile backup power for Barakah Nuclear Power Plant, Emirates Nuclear Energy Corporation; UAE
- Mobile Power Stations, Dubai Electricity and Water Authority; Dubai, UAE
- Emergency power station for new Kuwait International Airport Terminal 2; Kuwait
- Emergency backup power plant King Khalid International Airport; Riyadh, KSA

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Multifilm Sonnen- und Blendschutz GmbH

Multifilm Sonnen- und Blendschutz has been producing highly efficient sun and glare protection systems for more than 25 years with many international references. Their focus is on the improvement of energy consumption and the ergonomics of buildings and offices. The high-quality sun protection systems offer optimal heat and glare protection, pleasant indoor climate and a substantial reduction of the energy consumption of buildings. The systems are robust and maintenance-free and offer economically sustainable solutions for advanced facility management and a calculable a return on investment. The high-performance films and technical fabrics combine effective heat and optimal glare protection while still providing views to the outside world and natural daylight to support the wellbeing of employees.

MAIN PROJECTS/CLIENTS

- Daimler VAN Technology Center; Germany
- Center for Virtual Engineering (ZVE); Germany
- Universities in Seoul, Peking, Stockholm, Bergen
- Airport Towers in Dubai, Abu Dhabi, Oman, London Heathrow, Frankfurt, Zurich, Oslo, Dublin

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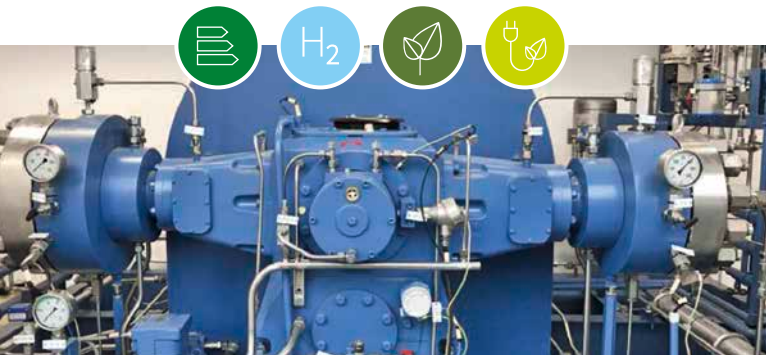

NEUMAN & ESSER GmbH & Co. KG

NEUMAN & ESSER GROUP (NEA) is a leading manufacturer of piston, diaphragm compressors and compressor systems for process gases, technical gases and natural gas from 5 kW to 30 MW driving power. With the acquisition of HOFER and its hydraulically driven piston compressors and diaphragm compressors, NEA entered the market segments Power-to-X and mobility with hydrogen refueling stations. Since ever NEA compressors play a key role when it comes to transport, store and feed the natural gas grid. The recent takeover of Arcanum Energy Systems as consultant of biogas plants along its value chain is a perfect fit to NEA's biomethane compressor range. NEA, the experts in hydrogen compression, are stakeholder of the start-up Alternative Energy Driven Solutions as well, which develops mobility concepts based on CO_2 neutral charging and supply infrastructure.

MAIN PROJECTS/CLIENTS

- 25 HOFER TKH compressors and diaphragm compressors for vehicle refueling stations; Korea
- Two diaphragm compressors to refill trailers for HRS of taxi fleet; France
- Green H_2 produced by electrolyzers will be used to refuel trains; Europe
- Six TKH compressors for HRS and two compressors to refuel trucks; California

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Next Kraftwerke GmbH

Next Kraftwerke operates one of the largest Virtual PowerPlants (VPP) in Europe and is, as a certified power trader (e. g. on EPEX and EEX), one of the leading traders of electricity from renewable energies. Via its control system, the VPP networks over 14,000 electricity producing, consuming, and storing plants. These include biogas, natural gas cogeneration, hydroelectric, wind and solar power plants, but also consumers, e.g. water pumps, industrial processes, and batteries. The networked generation capacity of the VPP is currently over 10,000 MW. With NEMOCS, Next Kraftwerke also offers a software-as-a-service solution that enables third parties to implement their own VPP and monitor, forecast and steer decentralised assets.

MAIN PROJECTS/CLIENTS

- Power-to-gas monitored and steered by VPP control system, Greenpeace Energy; Germany
- Trading of FCR provided by a pool of home storage units, pre-aggregated by sonnen; Germany
- Electric Vehicles: Project to provide control reserve through the batteries, Jedlix; Netherlands
- Software-as-a-service in UK, Slovakia, Japan and South Korea

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PI Photovoltaik-Institut Berlin AG

PI Berlin is the leading technical consultancy for complex PV projects. PI's service portfolio includes project development, risk management and quality assurance for PV power plants and components. The strength of PI results from the combination of expertise in the areas of factory production, laboratory testing, and PV power plant performance. The ability to carry out quality assurance from the factory to the field and to consider the interactions among the different areas creates a high degree of security and transparency for our customers. Internationally, PI is represented by subsidiaries in Germany, the US, Spain and China.

MAIN PROJECTS/CLIENTS

- Cleaning robots accelerated testing for large PV Solar Power Project with an international consortium; Dubai, UAE
- Technical Consultancy on Water Photovoltaic Plants (PV) for Pumping Stations; Jordan
- Factory Audit in China for a module manufacturer for a project based; Dubai, UAE
- 3rd Party inspection of PV modules for a rooftop project; Dubai, UAE

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RENK AG

RENK, headquartered in Germany with more than 2,500 employees, is the world's leading specialist for pioneering drivetrain solutions in industrial applications, energy production and beyond. Our innovative products and solutions set standards when it comes to quality, precision, and reliability. RECOVAR-E is a superimposed variable-speed drive used for compressors and pumps. The gear is an electromechanical drive system, being a hybrid of a converter and a mechanical drive. etaX is an evacuated high-speed gear for power generation and O&G applications. RENK also offers components for the wind sector.

MAIN PROJECTS/CLIENTS

- RENK has relationships with leading engineering companies and end-users across the GCC's oil & gas industry. Across the GCC there is a shift towards more efficient equipment and RENK's products are therefore used to replace conventional gears and increase production efficiency

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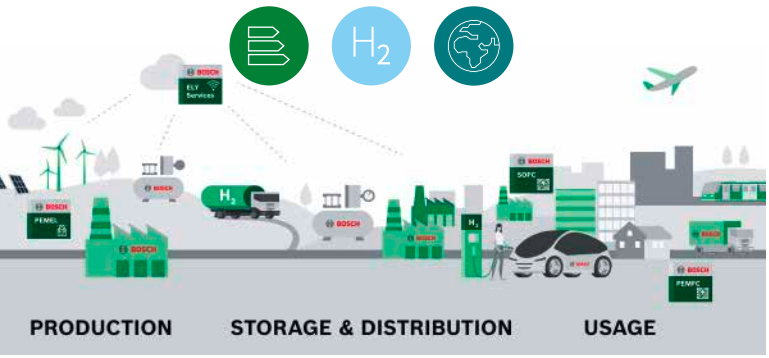

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BOSCH

Robert Bosch GmbH

The Bosch Group is a leading global supplier of technology and services. The company generated sales of 78.8 billion € and employs nearly 401,300 associates (2021). Bosch defines sustainability as securing the company's long-term success while protecting the natural environment for future generations. Hydrogen is a cornerstone of our strategy. In consequence, we are bringing in our values and strengths along the entire value chain of a sustainable ecosystem. In doing so, we develop, manufacture, and sell core products of electrolysis and stationary and mobile fuel cell applications. Utilizing our expertise of more than 100 years in industrialization and automation in combination with our digital service portfolio, we are convinced to drive the ramp-up of a green hydrogen ecosystem.

MAIN PROJECTS/CLIENTS

- Electrolysis: Test facilities on Bosch sites, installation of a multiple-GW stack manufacturing line
- Stationary applications: Pilot plants at Bosch locations in Germany. Further pilot systems in real operation at the central bus station (ZOB) in Bamberg and at a core site of PASM (Deutsche Telekom) in Berlin.
- Mobile applications: Vehicle fleets on the streets in China and the USA powered by Bosch fuel cell powertrains.

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RWE

RWE AG

RWE is leading the way to a green energy world. With an extensive investment and growth strategy, the company will expand its powerful, green generation capacity to 50 gigawatts internationally by 2030. RWE is investing more than €50 billion gross for this purpose in this decade. The portfolio is based on offshore and onshore wind, solar, hydrogen, batteries, biomass and gas. RWE Supply & Trading provides energy solutions for large customers. RWE has locations in the attractive markets of Europe, North America and the Asia-Pacific region. The company is responsibly phasing out nuclear energy and coal. RWE employs around 19,000 people worldwide and has a clear target: to get to net zero by 2040. The Science Based Targets initiative has confirmed that these emission reduction targets are in line with the Paris Agreement. Very much in the spirit of the company's purpose: Our energy for a sustainable life.

MAIN PROJECTS/CLIENTS

- RWE has reached agreements with two companies from Abu Dhabi: With Abu Dhabi National Oil Company (ADNOC) on LNG supplies and with Masdar, Abu Dhabi's flagship renewable energy company, on cooperation in offshore wind.
- Furthermore, RWE and ADNOC signed a Memorandum of Understanding on collaboration in low and green hydrogen.

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S:FLEX GmbH

S:flex is an international manufacturer of mounting systems for PV installations and a long established brand in the solar industry. Their founders look back to more than 20 years of experience in sales, planning and implementing solar power systems in Europe and the US. When developing the products, S:flex focuses on being able to satisfy customer requirements for easy and quick deployment with high compatibility for a variety of system applications. This results in a high-quality product portfolio based on a modular principle with prefabricated components. S:flex's offer is complemented by services and support for the local customer on site provided by the headquarters and its branch offices in Germany as well as its international subsidiaries from planning and developing project-specific solutions to fast and reliable deliveries.

MAIN PROJECTS/CLIENTS

- Dubai World Trade Center – 2 MWp photovoltaic rooftop system; Dubai, UAE
- ARAMEX – 7 MWp photovoltaic rooftop system; Dubai, UAE
- Sabhan Mall – 3,8 MWp photovoltaic rooftop system; Sabhan, Kuwait
- Jabal Allaith Island – 30 kWp ground mount photovoltaic system; KSA

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Schletter Solar GmbH

The Schletter Group is one of the world's leading manufacturers of solar mounting systems. Schletter develops and manufactures mounting solutions made of aluminum and steel for solar farms, flat roofs and pitched roofs. For 50 years, the name Schletter has stood for first class quality in metal processing – from its beginning as a family-owned enterprise to its present position as a global group of companies. With around 600 employees, production facilities in Germany and China as well as a global network of distribution and service companies Schletter today is one of the leading manufactures of solar mounting systems with plants and systems installed on all continents – from Germany to Saudi Arabia, from Cape Town to Sydney.

MAIN PROJECTS/CLIENTS

- 12 MW Almafraq, Client GSI; Jordan
- 55 MW Traker Project, Client M+W; Egypt
- 150 MW Ground mounting; Philippines
- 96 MW, Client Siemens; South Africa

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SCHÜCO

Schüco International KG

Schüco International KG is based in Bielefeld and develops and sells system solutions for windows, doors and facades in more than 80 countries. With more than 5,400 employees worldwide, the company strives to be the industry leader in terms of technology and service today and in the future. In addition to innovative products for residential and commercial buildings, the building envelope specialist offers consultation and digital solutions for all phases of a building projects from the initial idea through to design, fabrication and installation. More than 12,000 fabricators, developers, architects and investors around the world are working together with Schüco.

MAIN PROJECTS/CLIENTS

- Atlantis the Palm Hotel; Dubai, UAE
- Dubai Mall; Dubai, UAE
- King Abdullah Financial District; Riyadh, KSA
- Riyadh Metro Stations; Riyadh, KSA

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SHARP
Be Original.

Sharp Electronics GmbH

Having been in the solar market for 60 years, longer than any other company in the industry, Sharp's experience in the PV business is unrivalled. As a pioneer in the PV market, Sharp has been a driving force behind the use of PV technologies for decades and has delivered more than 50 million PV modules worldwide. With new solar applications in high-tech sectors of the industry including aviation and e-mobility, Sharp continues to demonstrate its aptitude for innovation. For residential, industrial and free-field installations, Sharp offers various sises of poly- and monocrystalline half-cut cell high-performance solar panels. Sharp's solar business is part of a corporation with a broad range of products and a strong financial backbone, as confirmed by Bloomberg's Tier 1 listing.

MAIN PROJECTS/CLIENTS

- Sharp NSN Energy Solution JSC, procurement and construction business; Vietnam
- Yokohama Rubber nr.1 tire factory installation, solar power system on the rooftop of a production plant; Philippines
- Prius concept car, Sharp and Toyota collaboration for solar powered car; Japan
- Turnkey power plant for Utilitas Energy Group, largest Sharp PV installation in the Baltic states; Estonia

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Siemens Energy LLC

Siemens Energy is one of the world's leading energy technology companies. The company works with its customers and partners on energy systems for the future, thus supporting the transition to a more sustainable world. With its portfolio of products, solutions and services, Siemens Energy covers almost the entire energy value chain – from power generation and transmission to storage. The portfolio includes conventional and renewable energy technology, such as gas and steam turbines, hybrid power plants operated with hydrogen, and power generators and transformers.

MAIN PROJECTS/CLIENTS

- State-of-the-art power block for Emirates Global Aluminium (EGA), UAE
- Green Hydrogen Project: clean fuel from solar power with DEWA, UAE
- Siemens Energy Dammam Hub: A regional manufacturing and servicing hub, Saudi Arabia
- Egypt Megaproject delivering power to over 40 Million Egyptians, Egypt

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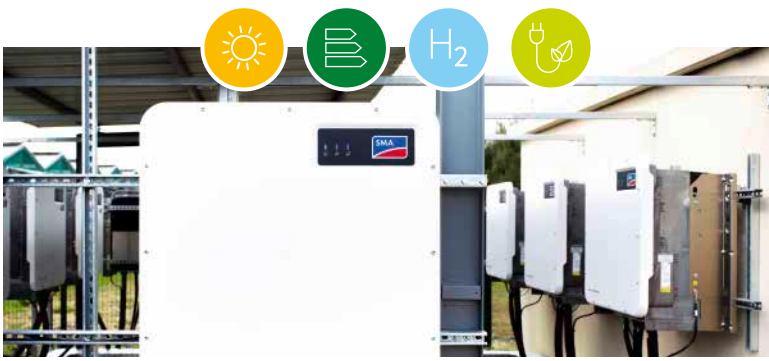

SMA Middle East Limited

As a leading global specialist in photovoltaic and storage system technology, the SMA Group is setting the standards today for the decentralized and renewable energy supply of tomorrow. SMA's portfolio contains a wide range of efficient PV and battery inverters, holistic system solutions for PV and battery-storage systems of all power classes, intelligent energy management systems and charging solutions for electric vehicles and power-to-gas applications. Digital energy services as well as extensive services up to and including operation and maintenance services for PV power plants round off SMA's range. SMA inverters with a total output of more than 115 gigawatts have been installed in more than 190 countries worldwide. SMA's multi-award-winning technology is protected by more than 1,700 patents and utility models.

MAIN PROJECTS/CLIENTS

- Masdar City Power Plant, UAE (UAE)
- Mohammad Bin Rashid Al Maktoum Solar Park (UAE)
- Shams Ma'an (Jordan)
- Spinneys Hypermarket (Lebanon)

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Solarlite CSP Technology GmbH

Solarlite CSP Technology is a German manufacturer and EPC of parabolic trough systems which are able to produce heat for power plants and industrial applications up to a temperature of 550° C. Solarlite offers state of the art direct steam generation and thermic fluid systems. The project portfolio varies from process heat for industrial applications, solar air conditioning and desalination of seawater to enhanced heavy oil recovery and district heating & cooling networks. Solarlite has been engineering molten salt based power projects in Italy and Greece thereby providing constant daily solar heat and power. Solarlite is planning several high-temperature district heating networks in Europe.

MAIN PROJECTS/CLIENTS

- Process heat supply for a chemical plant in Oostende; Belgium
- Process heat application project for a chemical plant in the port of Antwerp; Belgium
- Duke – direct steam generation at high temperatures; Spain
- World's first solar direct steam generation power plant; Kanchanaburi, Thailand

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SOLMOVE GmbH

Solmove's core product is an innovative multi-functional surface for streets and other sealed areas. The modular system produces green electricity, light for more safety, data for better traffic management and later inductive charging for electric cars. Benefits are preserving the land available for agricultural use, added value for existing assets and enable each community to contribute locally to the energy transition and e-mobility. Solmove is certified for supporting the UN Sustainable Development Goals for clean energy; industry, innovation, and infrastructure and sustainable cities and communities. Solmove has entered the international market with a first project in the Dubai, where they want to support sensors for environmental data in a sustainable city area.

MAIN PROJECTS/CLIENTS

- Solarstreet 50m² , RAG AG; Gelsenkirchen, Germany
- Sidewalk 3,3m² , RheinEnergie AG, Cologne, Germany
- Bicycle lane 187m² , City of Erftstadt; Germany

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SPG Steiner

SPG Steiner GmbH is a German-based family-owned company with a history looking back to the year 1701. With our business units, we are providing innovative technologies and supply of high-quality special turnkey components for the energy and petrochemical industry worldwide such as: Gas process packages; Combustion technology (Flare Systems, Industrial Burners); Energy storage of low-temperature & cryogenic products. Through the integration of the business unit technologies, SPG Steiner provides as an EPC contractor complete small and mid-scale plants and terminals. For the global transition to a low-carbon future we focus on: Increasing brownfield plant efficiencies; Modular design concepts for decentralized energy supply; Storage technologies for low-temperature and cryogenic products; Distribution technology for low-temperature and cryogenic products.

MAIN PROJECTS/CLIENTS

- Air Products, ACWA Power and NEOM, NEOM Green Hydrogen Elements, world largest Ammonia Storage Tanks (EPC), KSA
- BASF Antwerp Belgium, Cold Ammonia Tank Replacement, Ammonia Tank 53.000 tons
- Kuzey Marmara, Turkey, Underground Gas Storage Expansion Project of Silica Gel Adsorption Units (EP)
- Linde Portovaya, Russia, LNG Storage 42.000m³ Tank, record project execution time of 22 months only

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Sunfire GmbH

Sunfire GmbH is a global leader in the production of industrial electrolyzers based on pressurised alkaline and solid oxide (SOEC) technologies. With its electrolysis solutions, Sunfire is addressing a key challenge of today's energy system: providing renewable hydrogen and Syngas as climate-neutral substitutes for fossil energy. Sunfire's innovative and proven electrolysis technology enables the transformation of carbon-intensive industries that are currently dependent on fossil-based oil, gas, or coal. The company employs more than 400 people located in Germany and Switzerland.

MAIN PROJECTS/CLIENTS

- Sable Chemicals, Zimbabwe: 100 MW pressurised alkaline electrolyzer, H_2 for ammonia/fertiliser production
- Demo4Grid, Austria: 4 MW next-generation pressurised alkaline electrolyzer, sector coupling and grid servicing
- MultiPLHY, Netherlands: 3 MW SOEC electrolysis, H_2 for biofuel refining
- GrInHy2.0, Germany: 1 MW SOEC electrolysis, H_2 for green steelmaking

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SYNLIFT Industrial Products GmbH & Co. KG

Synlift is a system integrator for smart technologies in water supply and water & energy combined supply with a special focus on flexible water treatment and water conveying systems as pre-engineered units with up to 10,000 m³ /d and tailor-made solutions with 100,000 m³ /d and more – directly and/or indirectly powered by solar and/or wind energy. For temporary and permanent use, Synlift is currently developing a floating REdesal (Desalination powered by renewables energies) unit with up to 50,000 m³ /d in cooperation with industry partners. Synlift is engaged in early stage investigations, technical planning, project and product development, turnkey implementation and operation management.

MAIN PROJECTS/CLIENTS

- Large-scale PV powered desal and pumping project, Trends; Chile
- Large-scale PV powered pumping project, SQM; Chile
- Large-scale wind powered floating desal units; worldwide
- Wind power project; Masdar, UAE

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thyssenkrupp Industrial Solutions AG

thyssenkrupp Industrial Solutions offers a unique set of solutions for synthesis of green chemicals. thyssenkrupp offers alkaline water electrolysis, which produces green hydrogen with high efficiency. With decades of experience in industrial application, thyssenkrupp's alkaline water electrolysis has been thoroughly designed and tested. The standardized modules easily add up to large installations needed for industrial application. With industrial scale, thyssenkrupp has a track record plus a unique portfolio of downstream processes: green ammonia, methanol, synthetic natural gas, fertilizers and more. thyssenkrupp can offer a full range of Power-to-X technologies and complete project execution from a single source, enabling green value chains for decarbonising our society.

MAIN PROJECTS/CLIENTS

- Carbon2Chem project – water electrolysis plant STORE&GO pilot project – green methane produced
- by power-to-gas technology provides a keystone for the cross-sector energy transition
- Technology and EPC partner – realized more than 2,500 chemical plants worldwide

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thyssenkrupp nucera

thyssenkrupp nucera offers world-leading technologies for high-efficiency electrolysis plants. The company has extensive in-depth knowledge in the engineering, procurement, and construction of electrochemical plants and a strong track record of more than 600 projects with a total rating of over 10 gigawatts already successfully installed. With its water electrolysis technology to produce green hydrogen, thyssenkrupp nucera offers an innovative solution on an industrial scale for green value chains and an industry fueled by clean energy – a major step towards a climate-neutrality.

MAIN PROJECTS/CLIENTS

- NEOM – a more than 2 GW electrolysis plant for one of the largest green hydrogen projects in the world, converting hydrogen into more than 3,500 tons per day of green ammonia
- Hydrogen Holland I – 200 MW green hydrogen facility for Shell in Rotterdam, producing up to 60,000 kg of green hydrogen per day for industry and mobility sector

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Tractebel Engineering GmbH

For 150 years, Tractebel has been known as an engineering leader in power generation, transmission, and distribution around the world. Today, we are focused on engineering to decarbonise and decentralised energy for the clients we serve worldwide. Digital solutions are built in from end to end. We offer the complete, integrated range of engineering and advisory services to fuel zero-carbon transition: from development and design, through construction and commissioning up to operational support, rehabilitation, and decommissioning of all sizes of energy infrastructures. This expertise extends as well to EPC, EPCM and brown-field investment projects. Our hybrid solutions combine renewable energy generation with electrical storage, power-to-gas, waste-to-X and green gases like biomethane and hydrogen.

MAIN PROJECTS/CLIENTS

- Tihama Cogeneration Expansion, Technical Advisor and Owner's Engineer Mission in KSA
- HV Reconfiguration Implementation Phase II for Emirates Global Aluminum (EGA), Dubai, UAE
- Offtaker for CSP Phase IV IPP for DEWA, Technical Advisory to Support Off-taker Project Committee, Dubai, UAE
- Environmental Impact for Export Credit Agency Credeno, Marine Infrastructure Works, KSA & UAE

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TROX® TECHNIK
The art of handling air

TROX Middle East LLC

Trox is the leader in the development, manufacture and sale of components, appliances and systems for indoor air conditioning and ventilation since it was founded in 1951. The interaction between all technical building services can make or break the whole system, therefore Trox offers everything from a single source. Air handling units and ventilation components complement each other perfectly and this results in maximum energy efficiency while the coordination effort during the design and installation stages for a project is reduced to a minimum. Working closely with its customers, Trox develops specific systems that take the relevant criteria for each building into account and meet the requirements of its occupants. This close cooperation leads to sustainable solutions that help to increase people's well-being and to protect life and the environment.

MAIN PROJECTS/CLIENTS

- Burj Al Arab; Dubai, UAE
- Dubai International Airport; Dubai, UAE
- Riyadh Metro; Riyadh, KSA
- Etihad Museum; Dubai, UAE

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Transsolar KlimaEngineering

Transsolar KlimaEngineering GmbH

Transsolar KlimaEngineering is a diverse team of engineers focused on creating climate-responsive built environments. Transsolar collaborates with their clients and partners to enhance the human experience while minimizing resource use following their self-declared attitude: Transsolar consults for a variety of projects, ranging from residential and university buildings to museum design, campus planning, and urban design. The firm also has a history of art collaboration where the knowledge and skill to manipulate a space's thermodynamic conditions are required. Notable examples are "cloudscapes" with Tetsuo Kondo and "lightscapes" with Anja Thierfelder at the 2010 and 2016 Architecture Biennale in Venice. Transsolar has been operating for almost 28 years with offices in Stuttgart, Munich, Paris and New York.

MAIN PROJECTS/CLIENTS

- ARGE Deutscher Pavillion EXPO2020; Dubai, United Arab Emirates
- Singapore Pavilion (Urban Redevelopment Authority (URA)) at Expo 2020; Dubai, United Arab Emirates
- Louvre Abu Dhabi; United Arab Emirates
- Masterplan Masdar City (Abu Dhabi Future Energy Company); Abu Dhabi, United Arab Emirates

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TUV SUD Middle East LLC

TÜV SÜD is an international testing, inspection, and certification (TIC) company headquartered in Munich with a legacy exceeding 150 years. With our multidisciplinary pool of experts located in 1,000 locations worldwide, we provide technical advisory services to optimise safety, quality, and environmental protection, while minimizing risk for individuals, organizations, communities, and nations.TÜV SÜD has a wide range of green energy services such as energy efficiency audits, carbon management certification, solar and wind plant inspections, and long-term/short-term training programmes. TÜV SÜD ME started its operations in GCC in Abu Dhabi in 2001 and now we have our offices located in Riyadh, Jeddah, Yanbu, Muscat, Bahrain, Qatar, Dubai, Iraq, and Egypt.

MAIN PROJECTS/CLIENTS

- Energy Efficiency Audit in Muscat, Sultanate of Oman
- GHG – ISO 14064 Training Programme – SEZAD OMAN
- Renewable Energy Training Programme – NTF – OMAN

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Uniper Global Commodities SE

Uniper is a leading international energy company, has around 11,500 employees, and operates in more than 40 countries. Roughly 33 GW of installed generation capacity make Uniper one of the world's largest electricity producers. The company's core activities include power generation in Europe and Russia, global energy trading, and a broad gas portfolio.

An important strategic focus is the expansion of the renewable energy portfolio with photovoltaic and onshore wind power plants in the European core markets. Moreover, Uniper is a hydrogen pioneer, is active worldwide along the entire hydrogen value chain, and is conducting projects to make hydrogen a mainstay of the energy supply.

MAIN PROJECTS/CLIENTS

- Power generation business in Europe to be carbon-neutral by 2035
- Gas portfolio amounting roughly 400 TWh long-term contracted gas volumes annually
- 8 bcm of underground gas storage capacity (Germany, Britain, Austria)
- Solid sustainability ratings: MCSI ESG rating: BB; CDP: B; EcoVadis: Silver
- €1.8 billion in EBITDA

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Viessmann Middle East FZE

The Viessmann Group is one of the leading international manufacturers of heating-, cooling-, steam- and climate control technology. The product range includes advanced heating systems for every type of fuel (oil, gas, solar, bio-fuel and natural heat) and for every output range from 1.5 to 116,000 kW, commercial cooling technology and temperature controlled rooms. Viessmann Middle East is owned by Viessmann Werke GmbH & Co. KG Germany, an ISO 9001 & 14001 certified German manufacturer, listed with UN and WHO and with subsidiaries and representation in 74 countries and 120 sales offices around the world. The success comes from leading innovation through outstanding product development, high quality standards using advanced design principles, offering multi–range of products from a single source ensuring a perfect solution for every demand and every budget.

MAIN PROJECTS/CLIENTS

- Hilton The Pearl Residences, Domestic hot water supply by 3 pcs. cascade connected Vitoplex 200 gas fired boilers, Qatar.
- Marriott Mena House, food storage designed and delivered 11 freezer and cold rooms, Egypt.
- Deira Water Front, Solar thermal domestic hot water system - 61 pcs. of Vitosol 100-FM collectors and matched 5000 L calorifiers, UAE
- Chemtech, cold rooms with antimicrobial Smart Protec coating for storing sensitive medical supplies, Mauritius

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WAGO Middle East FCZ

The WAGO Group is an international, standard-setting supplier for electrical interconnection and automation products as well as for interface electronics. The company is the world market leader in spring pressure connection technology. Wago has continued to grow since being founded in 1951, with a worldwide workforce of more than 8,500. The company achieved sales of € 932 million in 2018. The energy market needs to change towards something new and more CO_2 neutral. This leads to new ideas and new infrastructure for topics such as Power-to-X. To achieve this, control systems from production to consumption need to be integrated into intelligent communication networks. Wago supports the energy transition with state-of-the-art control and measurement technology and software solutions that enable simple and secure connection via telecontrol protocols or to any cloud.

MAIN PROJECTS/CLIENTS

- Automation systems and electrical components for Hydrogen refueling stations (HRS); UK
- Remote I/O systems incl. intrinsically safe I/O modules for HRS (65kg/day); Brussels, Belgium
- Remote I/O systems incl. intrinsically safe I/O modules for HRS (780kg/day); Hamburg, Germany
- Remote I/O systems incl. intrinsically safe I/O modules for HRS (130kg/day); Stuttgart, Germany

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WENGER
Engineering GmbH

Wenger Engineering GmbH

Wenger Engineering from Ulm is a leading global technology developer for hydrogen technology, renewable energies and energy efficiency. Since 2007, we have been working as a development partner for global corporations, leading medium-sized companies, ambitious startups and research institutes on six continents. In over 750 projects, our customers have been mainly driven by one thing: pushing the state of the art to make the energy transition possible. Let's talk about how we can work together to raise your state of the art to a whole new level, as well.

MAIN PROJECTS/CLIENTS

- Hydrogen Research Center: Test center for MW scale electrolysers, fuel cells and H_2-CHP systems
- PV to H_2 with Refueling Station: Electrolyser with direct coupling to PV system, hydrogen storage, refueling station and energy management
- Electrolyser with Trailer Filling: 2.5 MW electrolyser, compressor, trailer filling station

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