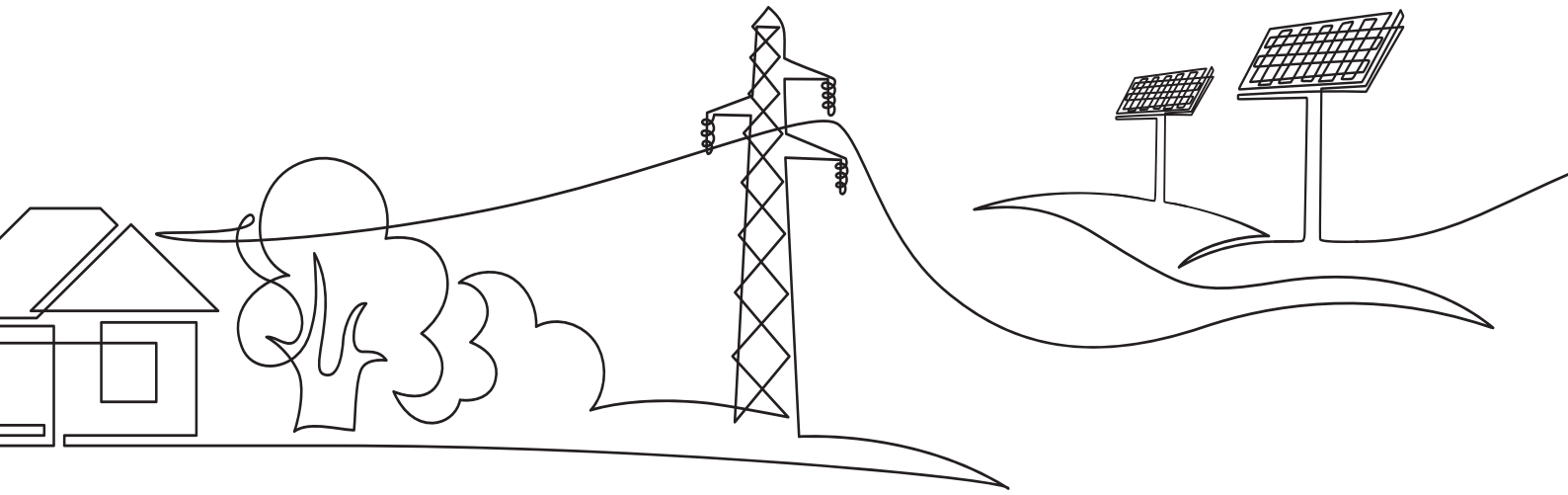
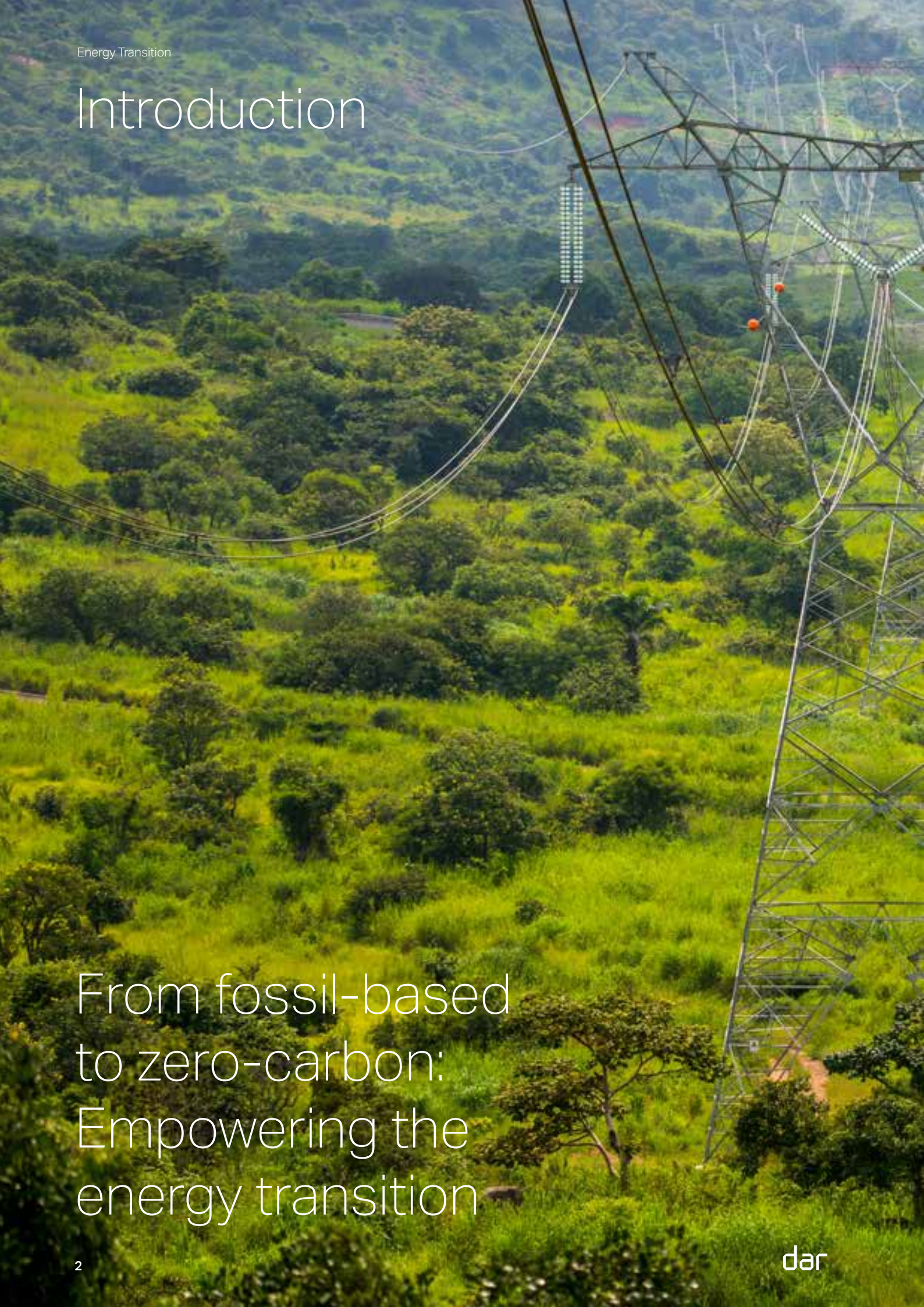
dar

ENERGY
TRANSITION

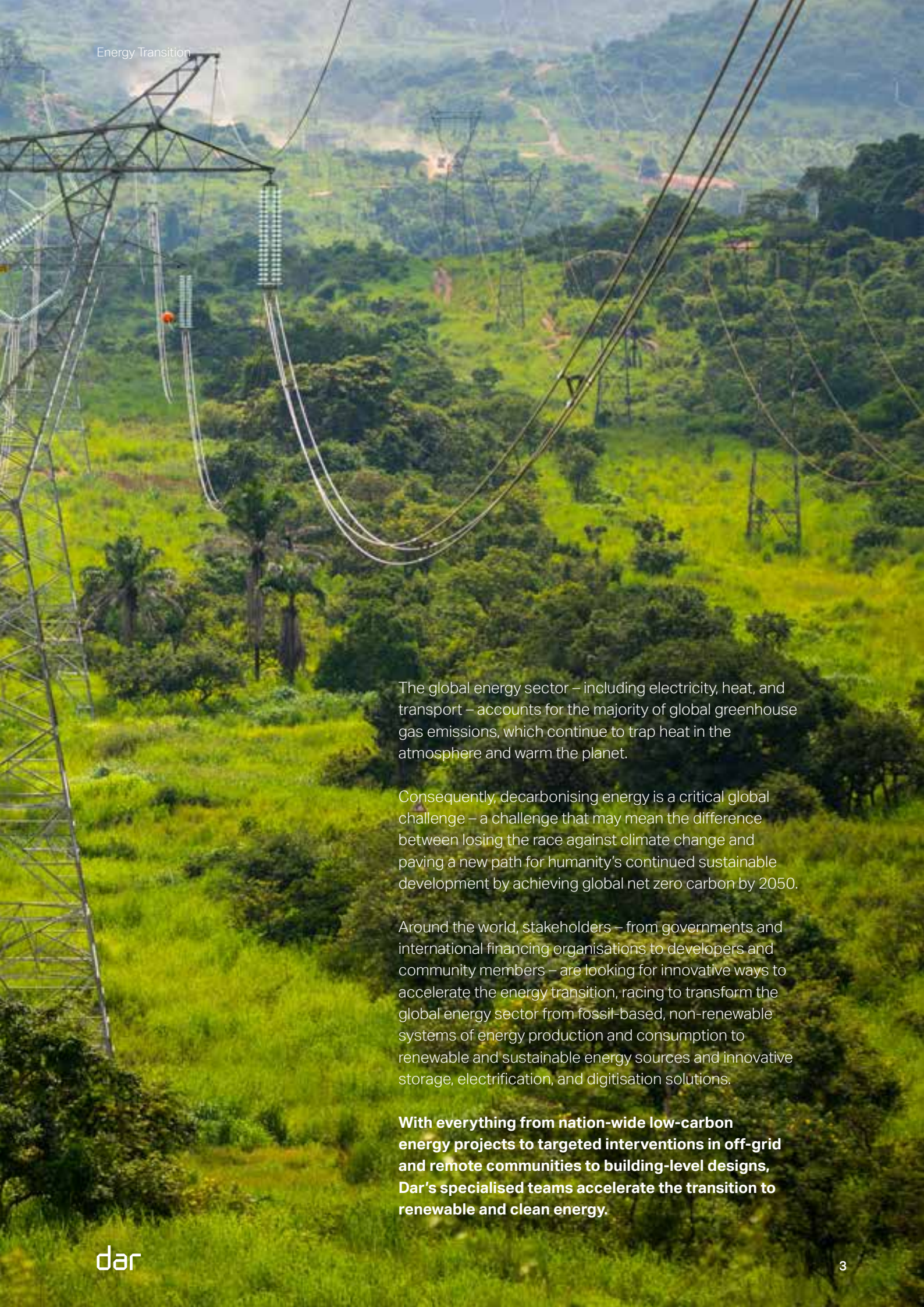
CONTENTS



Introduction



From fossil-based to zero-carbon: Empowering the energy transition



The global energy sector – including electricity, heat, and transport – accounts for the majority of global greenhouse gas emissions, which continue to trap heat in the atmosphere and warm the planet.

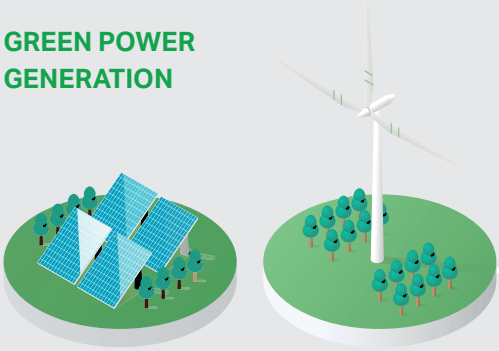
Consequently, decarbonising energy is a critical global challenge – a challenge that may mean the difference between losing the race against climate change and paving a new path for humanity's continued sustainable development by achieving global net zero carbon by 2050.

Around the world, stakeholders – from governments and international financing organisations to developers and community members – are looking for innovative ways to accelerate the energy transition, racing to transform the global energy sector from fossil-based, non-renewable systems of energy production and consumption to renewable and sustainable energy sources and innovative storage, electrification, and digitisation solutions.

With everything from nation-wide low-carbon energy projects to targeted interventions in off-grid and remote communities to building-level designs, Dar's specialised teams accelerate the transition to renewable and clean energy.

As a signatory to the United Nations Global Compact and the World Green Building Council's Net Zero Commitment and as one of the region's earliest advocates for sustainability and sustainable infrastructure, Dar is committed to driving the energy transition and empowering our clients as they decarbonise their own energy operations and assets. Led by our energy experts and engineers, our multidisciplinary teams cover:

GREEN POWER GENERATION

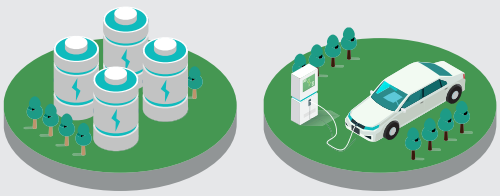


Planning, designing, and supervising the delivery of green and renewable energy generation infrastructure (including solar energy, hydropower, wind farms, and natural gas power plants)hydraulic works.

RESILIENT ENERGY TRANSMISSION AND DISTRIBUTION NETWORKS

Tailoring major transmission and distribution infrastructure for the energy transition

INNOVATIVE ENERGY TRANSITION TECHNOLOGIES



Designing innovative, fit-for-purpose, solutions, including microgrids, battery storage systems, electric mobility, and smart city solutions

With our global network of companies Sidara, we can also cover other innovative alternatives including hydrogen, waste-to-energy schemes, and geothermal power generation.

The energy transition — decarbonising operations and assets

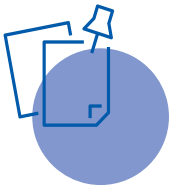
Installation of Transmission Lines associated with the Combined Cycle Power Plant Project, Luanda Region

The transition to clean energy — simplified & streamlined.

When it comes to convincing our clients to incorporate clean energy technologies, we don't leave anything to chance. That's why we provide end-to-end comprehensive engineering and project management consultancy to ensure that the final product offers exceptional returns on investment, in every performance indicator that matters:

The Financial

With the incredibly promising fall in prices for renewable energy technologies and battery storage systems, renewable energy systems have a new advantage to add to their list of benefits: they make financial sense. Our economists and financial experts help clients build a strong economic case for renewable energy solutions as well as other energy transition technologies.



PRE-FEASIBILITY AND DETAILED FEASIBILITY STUDIES

Dar's experts conduct detailed studies to arrive at an optimal solution for energy transition systems, one that balances energy considerations, uncertainty risks, and the potential for investment returns.

ASSESSMENT OF ALTERNATIVES

The options for energy transition energy technologies can seem endless. Dar's technical experts work with clients to choose the technologies that work best within their particular context and ambitions.

The Technical

When it comes to the engineering nuts and bolts, Dar's specialists are second to none. We design exceptional energy transition systems and conduct every type of technical study needed to optimise their performance. To deliver these services, our teams are equipped with advanced relevant software packages including but not limited to Bentley for hydraulic analysis; Siemens PSS/E and ETAP for electrical studies; PLS-CADD, PLS-TOWER, for overhead lines and steel structures; PVSYST software for design and energy yield simulation of photovoltaic systems; and HOMER for microgrids.

ENGINEERING TECHNICAL STUDIES

Dar's engineers and experts perform various types of engineering studies to design high quality energy transition systems.

GRID IMPACT STUDY

Integrating renewable energy systems into the local or national grid has the potential to create enormous benefits, but there are challenges. Grid impact studies can help integrate renewable energy systems while minimising risks related to network disruptions or load uncertainty, empowering utility stakeholders to incorporate this incredibly beneficial resource.

ENERGY YIELD SIMULATION

To give insights into the field performance of the proposed electrical system, we conduct energy yield simulations that track system design characteristics and technical components, location-specific data, and other essential data to give a clear picture of the system's expected output under actual conditions.

ENVIRONMENTAL IMPACT ASSESSMENT

While renewable energy systems are clean and highly sustainable sources of energy, their installation can have impacts on land use and the surrounding environments. Environmental impact assessments are essential in ensuring that any risks are properly mitigated, while positive impacts are maximised.

DESIGN REVIEW

With many energy transition projects being implemented under EPC contracts, Dar provides design review services to ensure the production of the high-quality design using state-of-the-art technologies.

FULL DESIGN

Dar's engineers prepare full designs, bills of quantities, and specifications for various types of projects associated with the energy transition.

TENDER AND CONTRACT DOCUMENTS AND TENDERING SERVICES

Dar's engineering and contract specialists prepare high-end tender documents for all energy transition projects. Dar also assists clients with tendering services and in the preparation of contracts.

PROJECT MANAGEMENT AND SITE SUPERVISION

To ensure the quality of an energy transition venture, Dar provides project management, technical assistance, and site supervision services.

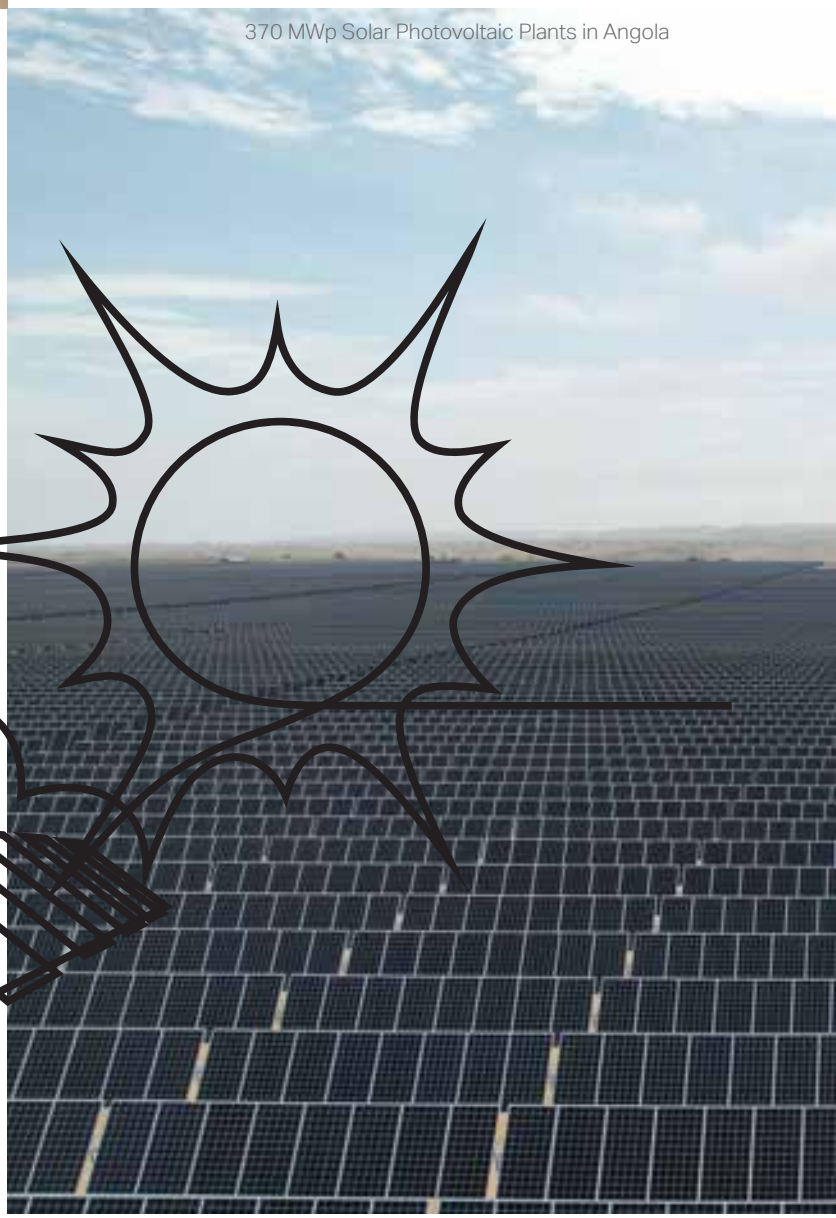
Green Power Generation

Dar empowers clients and communities to set and achieve ambitious energy transition targets — whether those include reaching a high benchmark of energy independence, increasing the share of renewables in the energy mix, setting a more positive carbon footprint, leveraging cheaper and more environmentally-friendly sources of energy, or delivering more resilient energy systems. Our specialists consistently track the latest research in green energy, test state-of-the-art technologies, and design technically innovative and economically-efficient solutions that are tailored to the distinctive context and requirements of individual projects, clients, and communities.

SOLAR ENERGY

Dar has been providing comprehensive services for solar-based energy systems since the evolution of photovoltaic energy on a commercial scale. We have worked with numerous forms of on-grid and off-grid photovoltaic systems, ranging from grid-scale photovoltaic solar farms to rooftop building-integrated photovoltaic systems.

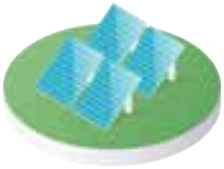
370 MWp Solar Photovoltaic Plants in Angola



25+

PROJECTS WITH SOLAR COMPONENTS

Consultancy Services for a 100 MW Photovoltaic Plant in Madonah, Jordan



Ground-mounted photovoltaic systems

From solar farms and utility-scale photovoltaic power stations to community-owned renewable energy initiatives, we lead projects that leverage large numbers of ground-mounted photovoltaic systems to take advantage of under-utilised space and produce cost-effective and clean renewable energy.

Rooftop photovoltaic systems

Whether in corporate headquarters and industrial factories or standalone residential buildings, rooftop photovoltaic systems can boost a building's energy independence, cut utility costs significantly, and enhance the building's environmental impact and general attractiveness.

Building integrated photovoltaic (BIPV) systems

Drawing on the expertise of our multidisciplinary architects and engineers, we empower ambitious, forward-thinking clients and developers to use BIPV systems, replacing conventional building materials in the building envelope (roof, facade, glazing, etc.) with technologies that can provide an ancillary, or even principal, source of electricity to power the building's performance.

Solar street lighting

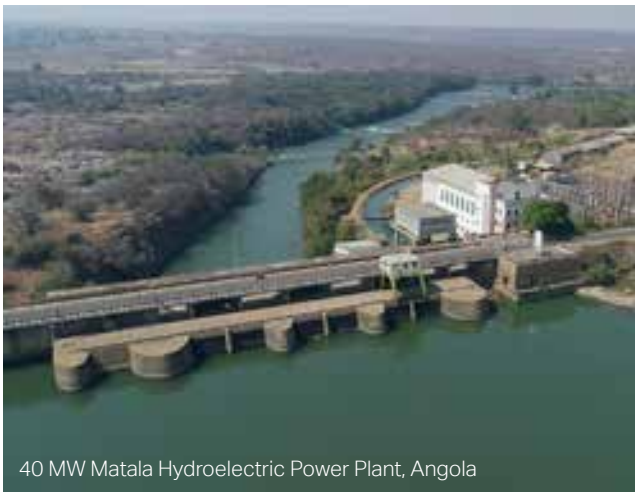
Designed to work automatically without external power connections or infrastructure investments and with limited human interventions, solar street lighting is fast becoming a more and more attractive option.

Innovative photovoltaic solutions

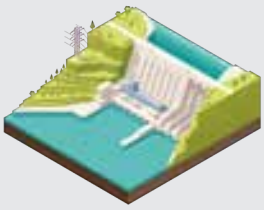
From entire hybrid and smart micro-grid systems to solar-powered pumping stations, Dar works with clients and communities in both dense urban areas and remote, isolated communities to create innovative solutions that boost energy resilience and create energy generation patterns that are cleaner, cheaper, and more future-fit.

HYDROPOWER

Dar provides specialised consultancy services for the feasibility studies, design, development, maintenance, rehabilitation, expansion, or upgrade of hydropower systems and dams, together with all associated hydraulic works.

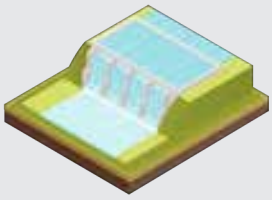


40 MW Matala Hydroelectric Power Plant, Angola



Large-scale hydropower plants

Hydroelectrical power plants have played a major role as reliable renewable sources of energy in different parts of the world.



Mini-grid hydropower plants

Mini-grid hydropower plants are playing a major role in providing clean renewable sources of energy for remote areas that previously relied solely on diesel generators.

288MW Cambambe Dam Heightening Project, Angola

WIND FARMS

Dar provides consultancy services for clients looking to develop wind energy solutions to diversify their energy mix and increase their share of renewable energy.

NATURAL GAS

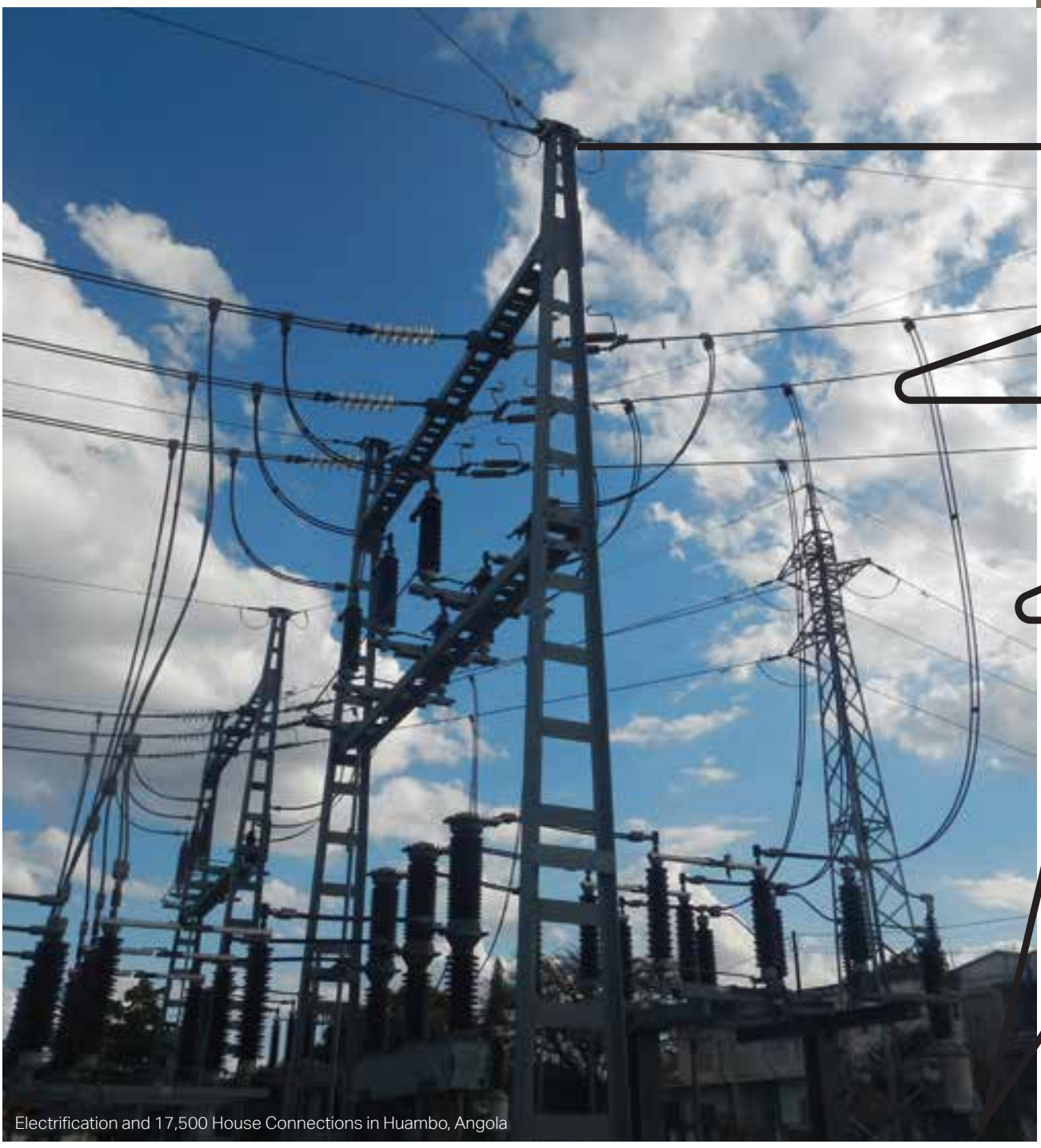
Dar provides a range of services – including design review, supervision, project management and commissioning – covering all systems for natural gas power plants.

Leona Wind Farm

Soyo 750 MW Gas-Fired Power Plant, Angola

Soyo 750 MW Gas-Fired Power Plant, Angola

Transmission and Distribution

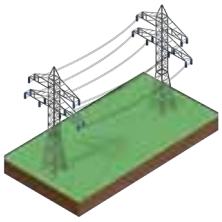


Electrification and 17,500 House Connections in Huambo, Angola

Laúca Transmission Lines and Substations, Angola

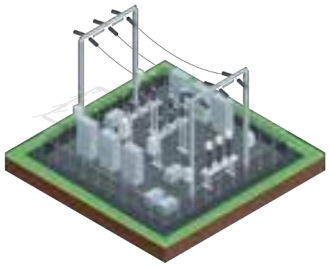
Across the Middle East, Africa, and Asia, Dar partners with energy providers to design and deliver transmission and distribution networks that expand access to reliable and adequate energy services.

We conduct feasibility studies, perform grid impact studies and design transmission and distribution systems that cater to renewable and green energy generation sources.



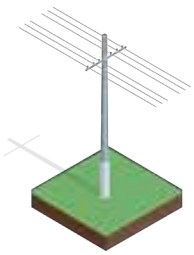
Transmission lines

Dar provides a full range of design services for overhead transmission lines and underground cables for voltages up to 400 kV. The services include plan/profile drawings, tower spotting, tower layouts, tower families, insulator strings, earthing systems, load trees, foundations, etc.



Substations

Dar has vast experience in providing design services for air-insulated, GIS-insulated, and hybrid substations with voltages up to 400 kV. Our scope covers the primary and secondary systems including main single line diagrams, substation layouts and sections, equipment specifications, AC/DC systems, protection and control, communication systems, earthing systems, etc.



Distribution networks

Dar has a track record of designing hundreds of distribution networks from new cities to prestige compounds to the electrification of rural areas in Africa. Our projects incorporate the latest technologies in order to create smarter distribution grids.

50

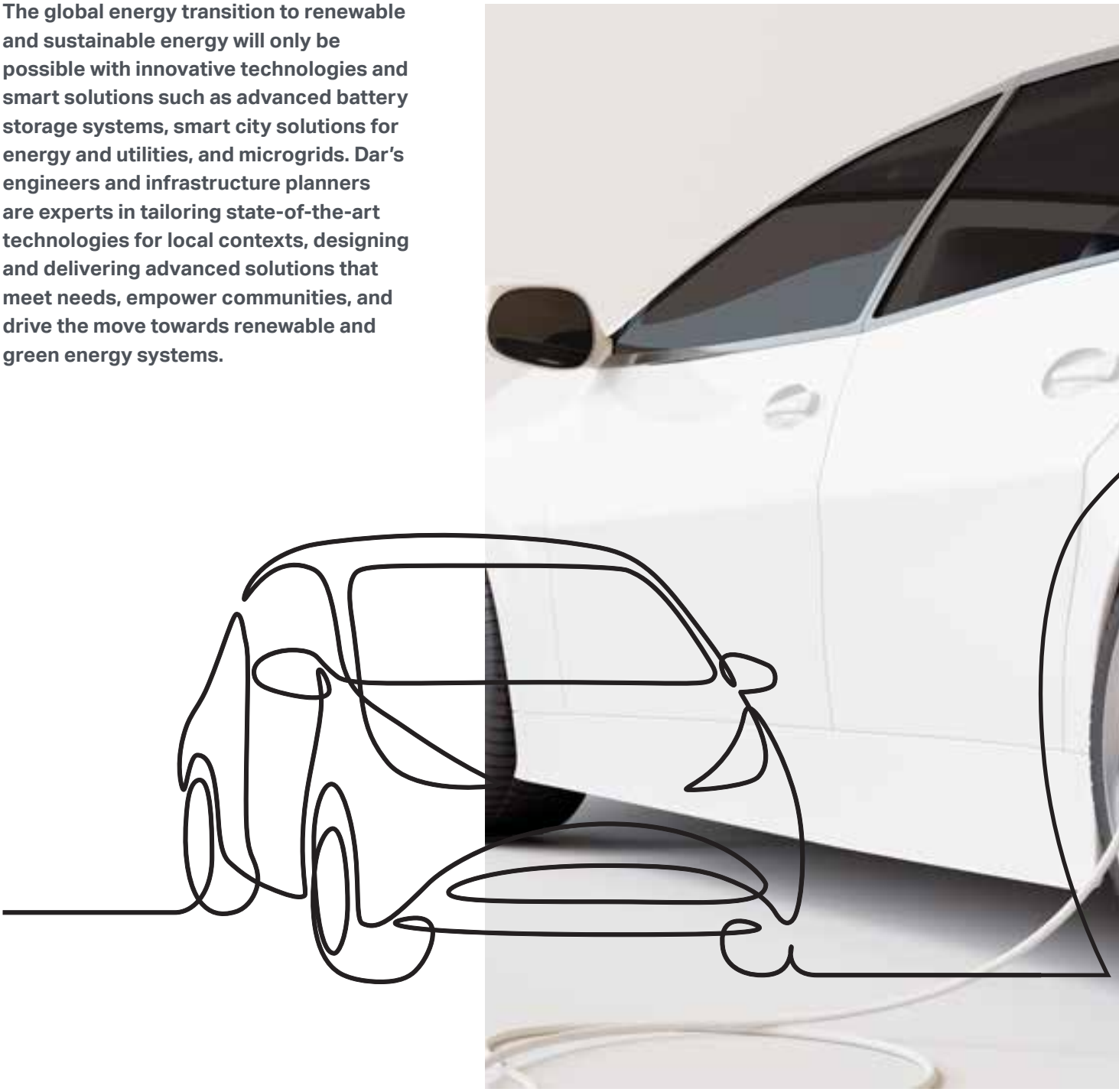
POWER SUBSTATIONS, 400 KV AND BELOW

4,000 km+

TRANSMISSION LINES

Innovative Energy Transition Technologies

The global energy transition to renewable and sustainable energy will only be possible with innovative technologies and smart solutions such as advanced battery storage systems, smart city solutions for energy and utilities, and microgrids. Dar's engineers and infrastructure planners are experts in tailoring state-of-the-art technologies for local contexts, designing and delivering advanced solutions that meet needs, empower communities, and drive the move towards renewable and green energy systems.

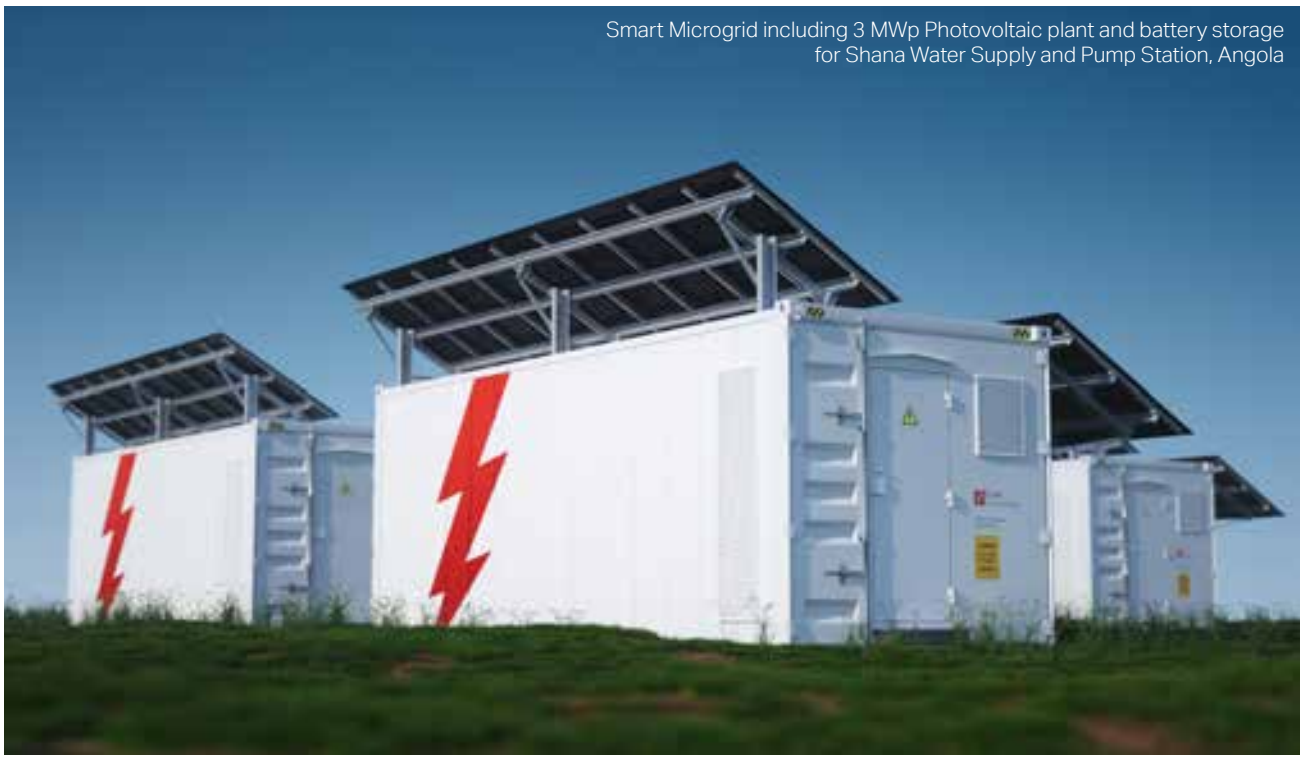


MICROGRIDS

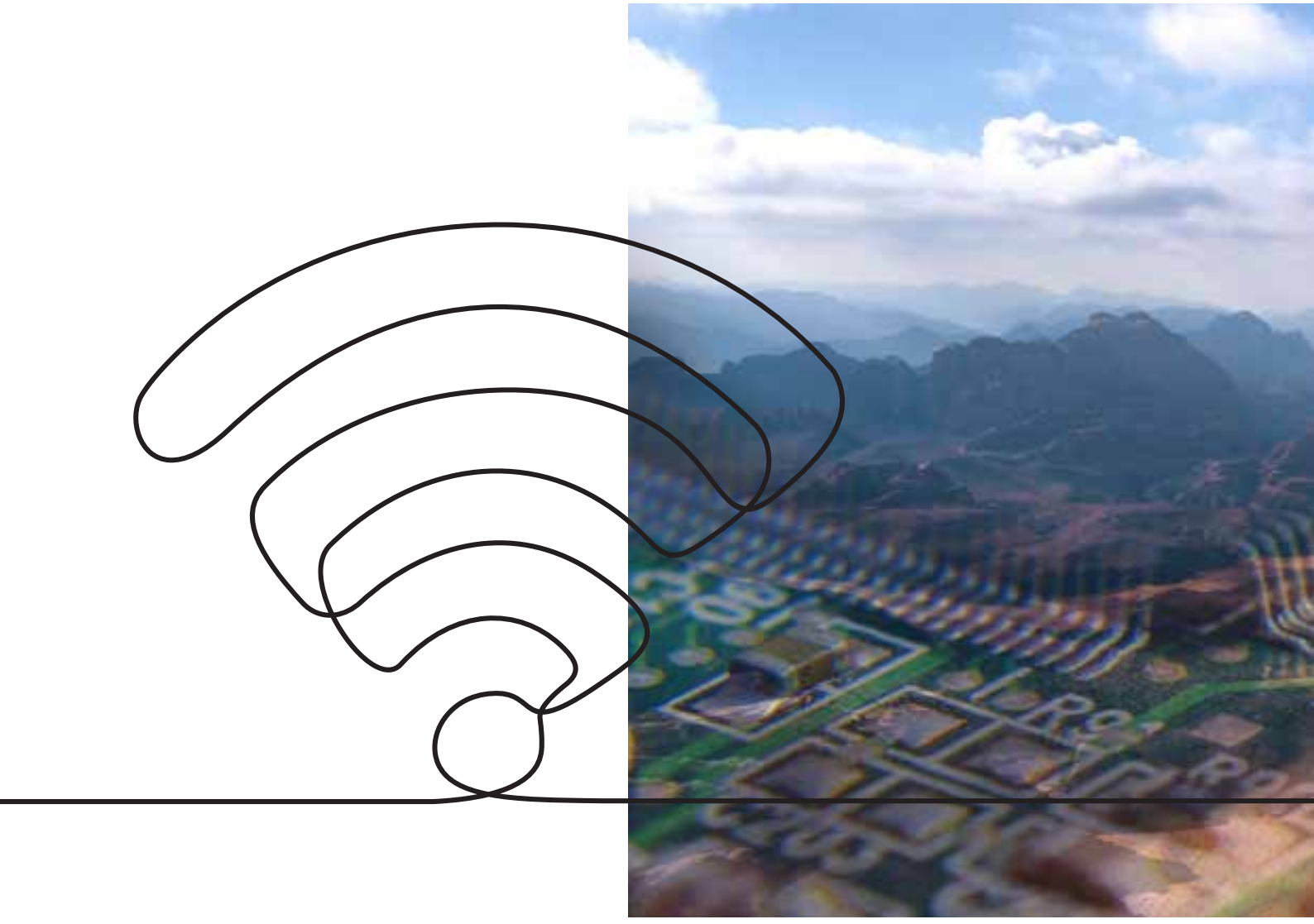
Microgrids are self-sufficient local energy grids, with power generation and distribution elements and the control capability needed to connect to and disconnect from traditional grids and operate autonomously. Microgrids not only provide a more resilient and reliable source of energy, they also make it easier to enable variable renewable energy generation and storage options, making them essential for energy transitions. Dar's experts have vast experience in designing fit-for-purpose and locally tailored microgrids that serve everything from complexes in urban areas to off-grid facilities in remote African regions.

ELECTRIC MOBILITY

Decarbonising the transportation sector is one of the main pillars in the effort to achieve net-zero emissions by 2050. Our engineers have a track record in planning and designing electrical charging systems and associated electrical infrastructure in projects ranging from large scale systems to single building designs



Smart Microgrid including 3 MWp Photovoltaic plant and battery storage for Shana Water Supply and Pump Station, Angola



BATTERY STORAGE

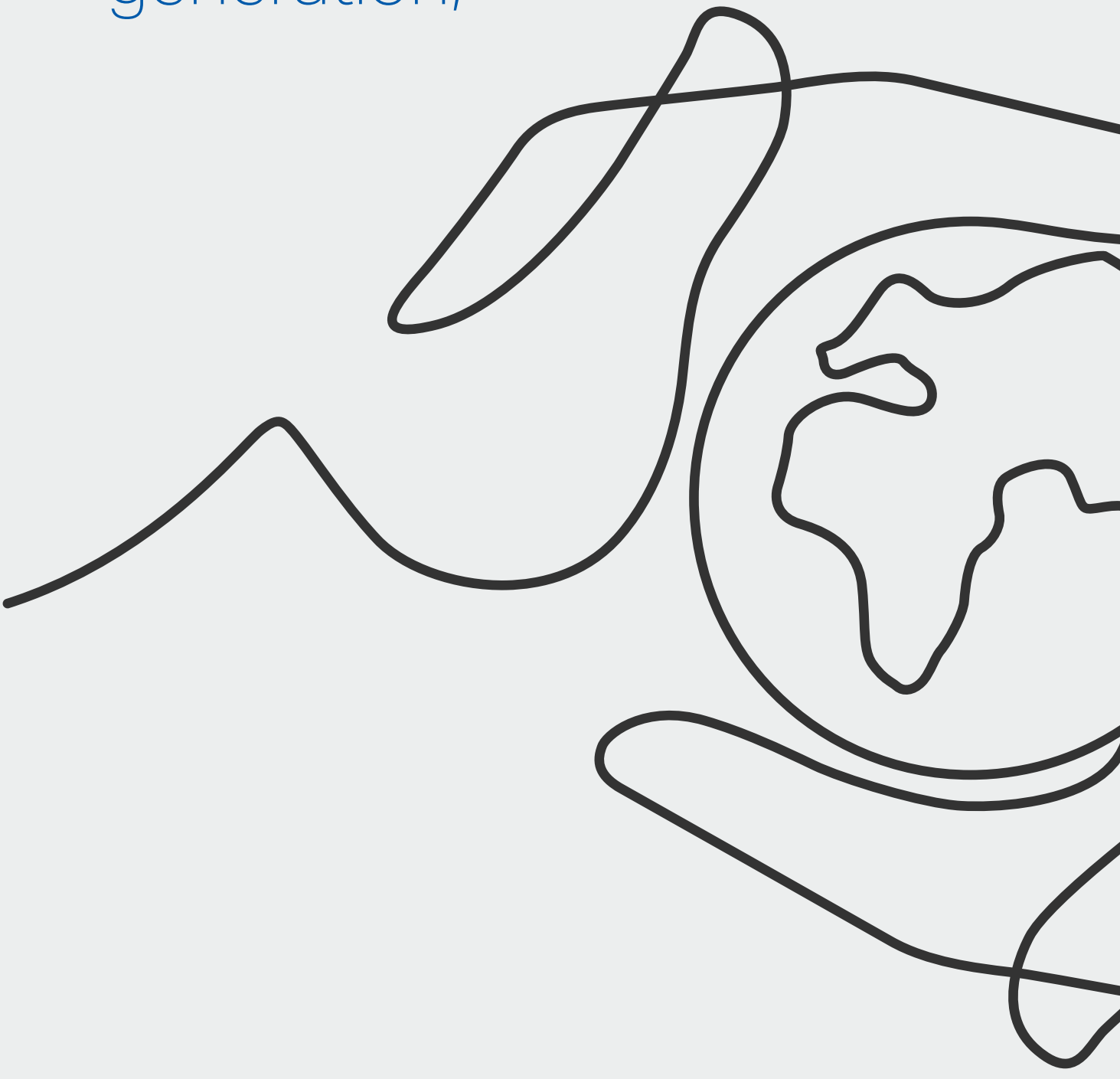
Efficient battery storage facilities are a key to the energy transition – ensuring a reliable supply of clean and sustainable electricity. Dar designs battery energy storage systems that empower energy producers to store vast amounts of electricity and release that energy when customers need it most, thereby paving the way for the increased use of renewables while still maintaining high reliability in electric supply.

SMART CITY SOLUTIONS

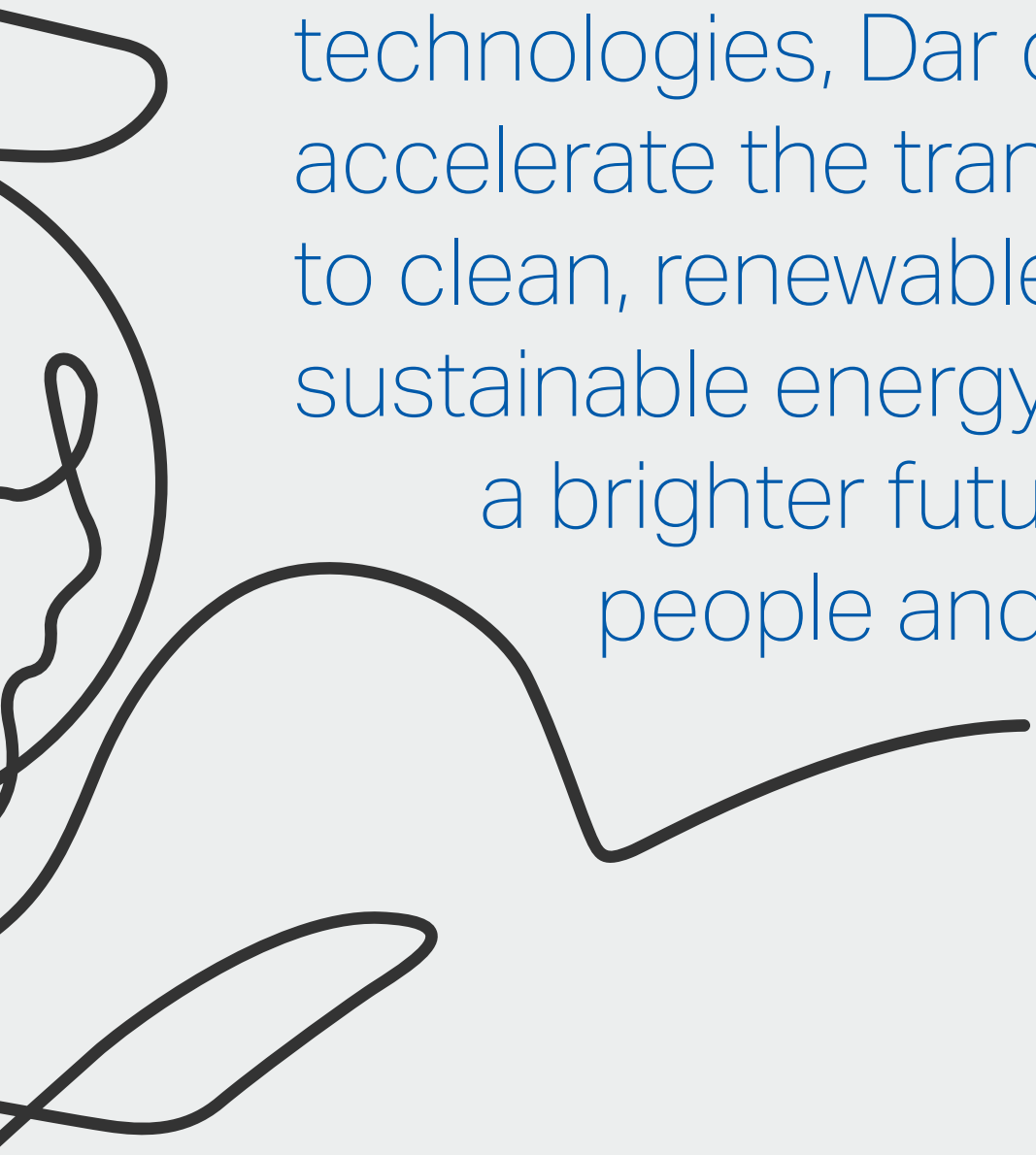
Dar's package of smart solutions empowers stakeholders to digitalise energy infrastructure and utilize energy saving smart technologies. These solutions strengthen a city's infrastructure, improve the resilience of its grid and increase energy efficiency.

Smart Systems and Battery Storage for NEOM Base Camp, Kingdom of Saudi Arabia

Through end-to-end design and consultancy services for green energy generation,



resilient energy transmission and distribution networks, and state-of-the-art energy transition technologies, Dar can accelerate the transition to clean, renewable, and sustainable energy – for a brighter future for people and planet.



Projects Around the Globe

High Voltage Transmission (HVAC)

- Installation of Transmission Lines associated with Soyo Combined Cycle Power Plant Project, Luanda Region
- 750 MW Soyo Combined Cycle Power Plant
- Laúca Transmission Lines and Substations - Packages A and B
- 400 kV Transmission Line Laúca-Huambo and Associated Substations
- Laúca - Bita Transmission Lines and Substations, and Reactive Compensation at Selected Substations in Luanda
- HV Transmission Line Lomaum- Biopio-Benguela
- Reactive Compensation and Voltage Control Systems for the 400 kV Capanda - Viana and 220 kV Lucala - Maquela do Zombo Northern Transmission Systems
- Camama - Morro Bento 220 kV Transmission Line and Morro Bento 220 kV/60 kV Substation
- Cambambe 2 Associated 60 kV Transmission Lines and Substations
- Expansion of Cacuaco Substation
- Expansion of Viana 400 kV/220 kV/60 kV and Gabela 220 kV/60 kV Substations
- 60 kV Transmission Line between Fútila Power Plant and Belize City and Associated Substation
- Electrification Works and 17,500 House Connections in the City of Huambo
- Electrification Works and House Connections in the Municipalities of Noqui and Soyo, Zaire Province
- Bulk Power Supply System Study for Longongo Rare Earths Mine
- 132/11 kV GIS Substation at Cargo Terminal 2 at Hamad International Airport
- Studies of the Impact of the 2x40 MW System of the Longongo Minerals Factory
- 110/15 kV GIS Substation at the New Bugesera International Airport (NBIA)
- Chimuara - Nacala 400 kV Overhead Transmission Line Project - Phase I
- 66 kV High Voltage Transmission Line associated with New Main Brine Intake Pumping Station - Phases 1 and 2
- Transmission Lines and Substations associated with Caculo Cabaça Hydropower Power Plant (Electrical Studies)
- Feasibility Studies for the Expansion of the 132 kV and 33 kV Systems in Victoria Island, Ikoyi, and Lagos Island and the 132 kV High Voltage Connection to Ako Atlantic City

Solar Energy (PV)

- 370 MWp Solar Photovoltaic Plants in Angola
- 103 KWp Hybrid PV System for Ibom Industrial City, Nigeria
- 200 KWp Rooftop PV System for Headquarters of the National Bank of Kuwait in the New Administrative Capital, Egypt
- 175 KWp Rooftop PV System for Infrastructure of Central Business District at the New Administrative Capital, Egypt
- Rehabilitation and Improvement of Eastern and Western Naga Hamadi Canals, Egypt, including 2 MWp/Km Canal-top PV Systems
- 130 KWp Rooftop PV system for Headquarters of the Agricultural Bank of Egypt in the New Administrative Capital, Egypt
- Smart Microgrid including 3 MWp Photovoltaic Plant and Battery Storage for Shana Water Supply and Pump Station, Angola
- 137 kWp Rooftop PV system for Dar's New Premises in Cairo
- 1.75 MWp on-grid Photovoltaic System for Al-Khafji Land Port
- 400 KWp Rooftop PV System for Dubai Chamber of Commerce and Industry Building Extension, United Arab Emirates
- 33 MWp Photovoltaic Project in Maan
- King Abdullah Bin Abdul Aziz Extension for the Holy Haram
- 2 MW Solar Photovoltaic Farm
- 69.5 MWp Photovoltaic Power Plant Project
- On-Site Renewable Energy Strategies and Framework for Al Maktoum International Airport
- Photovoltaic Power Plant for Jordan Phosphate Mines Company
- 314 KWp off-grid PV System for Madinah Hajj City, Saudi Arabia
- Consultancy Services for the Social Security Investment Fund's Photovoltaic Plant
- Consultancy Services for 100 MW Photovoltaic Plant in Madonah

Energy Battery Storage System

- Smart Microgrid including 3 MWp Photovoltaic Plant and Battery Storage for Shana Water Supply and Pump Station, Angola
- 2 MWh Battery Storage for NEOM Mountain Base Camp

Wind Energy

- Feasibility Study for 50 MW Leona Wind Farm in Senegal
- Feasibility Study for 51 MW Wind Farm Project in Kazakhstan
- Civil Works for the 100 MW Wind Power Plant in Tafieleh

Hydropower

- Rehabilitation Works for Matala Hydroelectric Power Plant – Second Phase
- 260 MW Cambambe Heightening Project, Angola
- 40 MW Fula Rapids Hydropower EPC Project
- 125 MW Kaduna Hydroelectric Dams, Nigeria
- 40 MW Itisi Multipurpose Dam, Nigeria
- 1.5 MW Rehabilitation of Kunje Hydroelectric Plant

Electric Mobility (Charging Stations)

- Green Vehicle Charging Infrastructure at Dubai Airport (DXB)
- EV Charging Infrastructure for NEOM Mountain Base Camp
- EV Charging Infrastructure for Remote Transfer Baggage Handling Facility
- EV Charging Infrastructure for Al Maktoum International Airport

Microgrids

- Smart Microgrid including 3 MWp Photovoltaic Plant and Battery Storage for Shana Water Supply and Pump Station, Angola
- Smart Microgrid for NEOM Mountain Base Camp

Smart Cities

- Smart Infrastructure for NEOM Mountain Base Camp
- Smart Infrastructure for Qiddiya
- Smart Technology Services for East Port Said Industrial Area Smart City Services
- High-density Wi-Fi Solution, Smart Media and Content Delivery Solution for Dubai Arena
- Smart Control Centre and Smart-ready Infrastructure Services for Jordan New City
- Smart Technology Services for Al Maktoum International Airport

About Dar

OVER 60 YEARS **OF EXCELLENCE**

Together with our team of experts, we embrace challenges to empower our communities. In suburbs and city centres, deserts and metropolitan areas, war zones and sacred shrines, our projects shape people's lives.

Services

- Planning and Strategy
- Architecture and Design
- Engineering
- Environmental
- Economics
- Project and Construction Management

Markets

- Civic and Commercial
- Cities
- Transportation
- Water
- Power
- Telecommunications
- Oil and Gas
- Heavy Industry

5 principal design centres

49 offices in the Middle East, Africa, Asia, & Europe

9,000+ employees

60+ countries

950+ clients

Accreditations & Affiliations

- Quality Management Systems ISO 9001:2015
- Occupational Health and Safety Management Systems ISO 18001:2007
- Environmental Management Systems ISO14001:2015
- Information Security Management System (ISMS) ISO 27001:2013

- **172** LEED Accredited Professionals
- **198** LEED Green Associates
- **3** USGBC LEED® Faculty™
- **15** GSAS Certified Green Professionals
- **14** ESTIDAMA Pearl Qualified Professionals
- **31** SITES Accredited Professionals
- **4** WELL Aps
- **3** BREEAM Accredited Professionals
- **5** Certified Energy Managers
- **1** Certified Carbon Auditing Professional
- **1** Certified Measurement and Verification Professional
- **3** Envision Certified Professionals

- **12** GSAS 4-star certified projects
- **8** GSAS 3-Star certified projects
- **11** GSAS 2-star certified projects
- **6** GSAS registered projects
- **2** Projects targeting 4-Star GSAS
- **3** Projects targeting 3-Star GSAS
- **17** ESTIDAMA Pearl Certified projects
- **8** EHS registered projects
- **30** LEED certified projects (3 Platinum, 13 Gold, 8 Silver, 6 certified)
- **45** LEED registered projects, some of them targeting LEED Gold and Platinum certification and compliance

Committed to excellence through the implementation of a Quality Management System involving all the levels of management and every employee.

Dar belongs to the **Sidara Collaborative.**

Sidara operates from a total of

308

offices in

60

countries spanning the Americas, Europe, Australasia, Middle East, Africa, and Asia.

With a workforce of over

20,000+

assisting clients in

100+

countries

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Introba Currie & Brown MAFFEIS engineering

We are committed to service excellence and have been consistently ranked among top ten consultants by Engineering News Record (ENR) for over 30 years.

10th in the
TOP 225 INTERNATIONAL DESIGN FIRMS

3rd in Middle East

3rd in Africa

6th in USA

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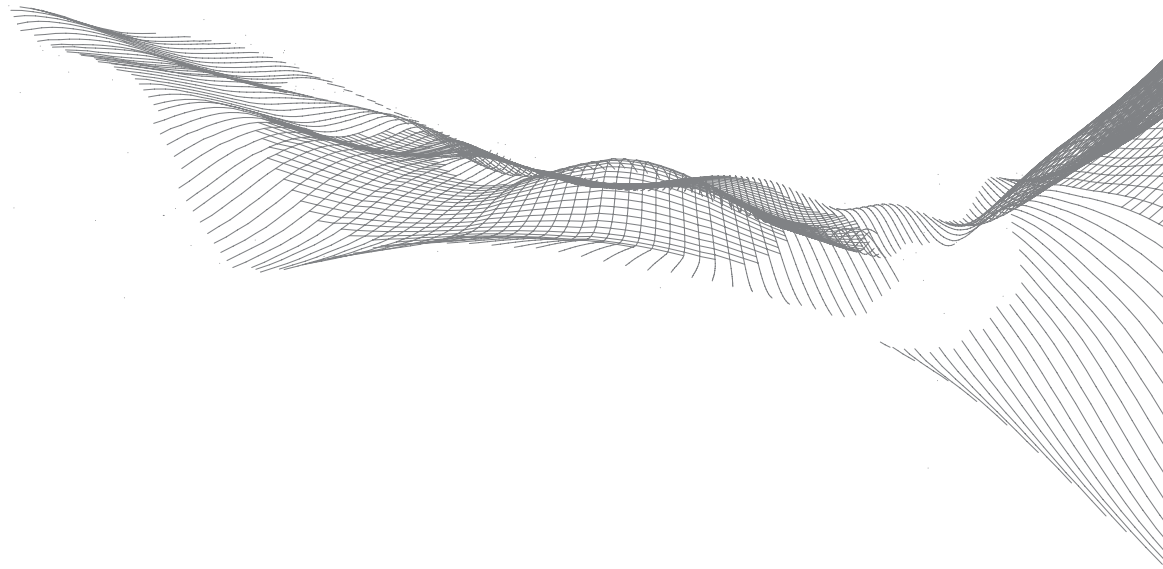

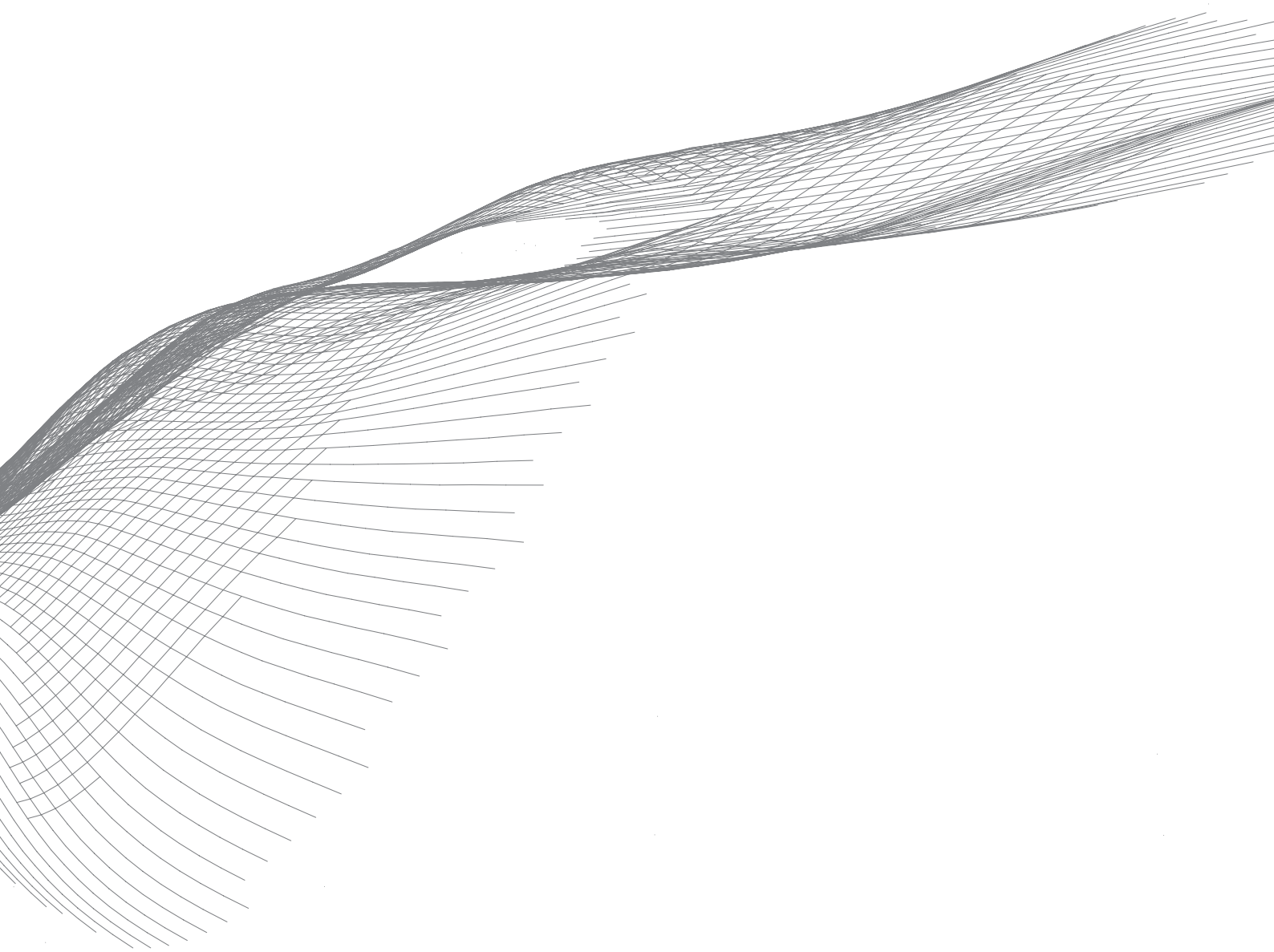


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