SOLAR-POWERED WATER SUPPLY

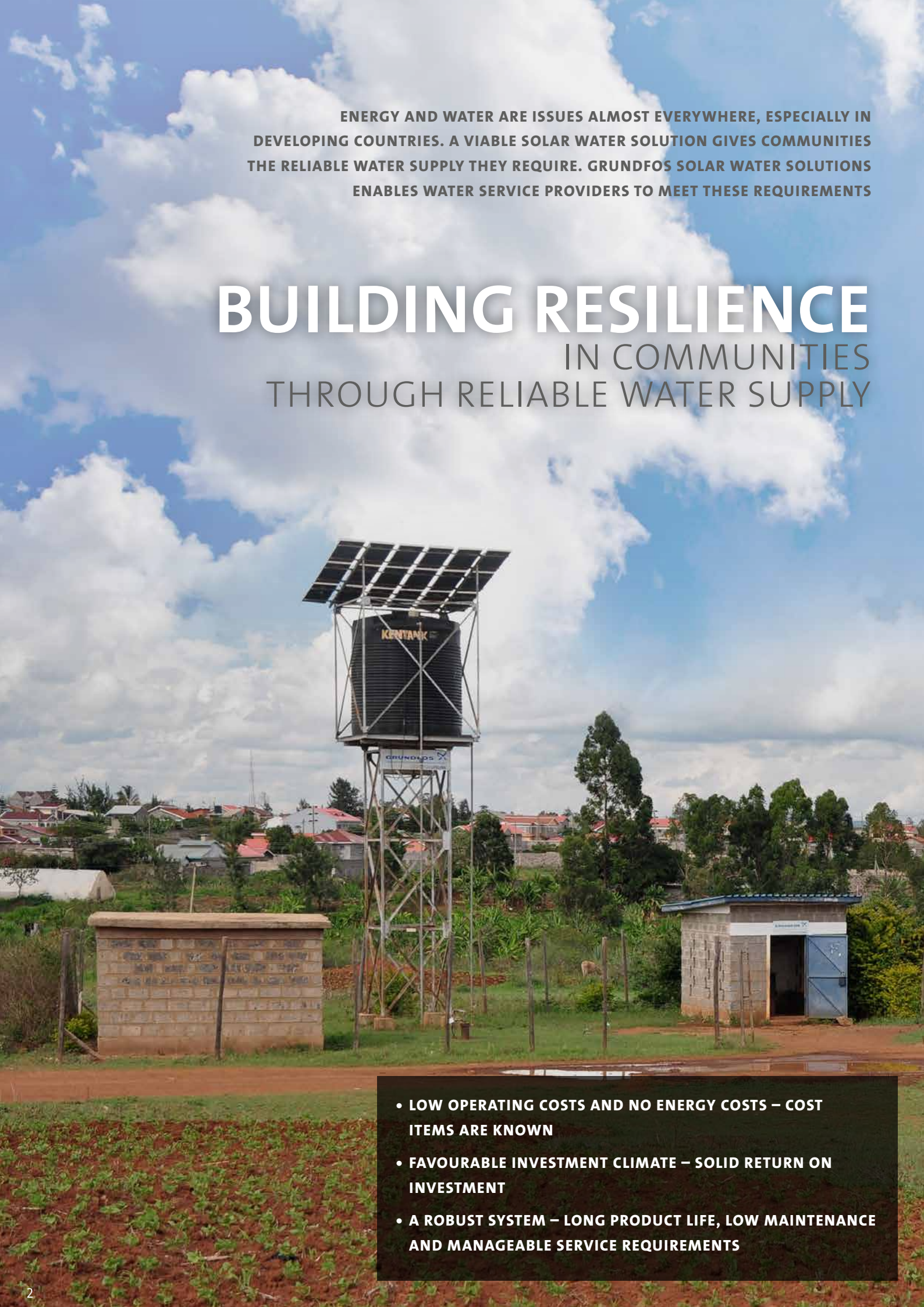
UNMATCHED FLEXIBILITY FOR WATER SERVICES TO COMMUNITIES

be
think
innovate

GRUNDFOS

ENERGY AND WATER ARE ISSUES ALMOST EVERYWHERE, ESPECIALLY IN DEVELOPING COUNTRIES. A VIABLE SOLAR WATER SOLUTION GIVES COMMUNITIES THE RELIABLE WATER SUPPLY THEY REQUIRE. GRUNDFOS SOLAR WATER SOLUTIONS ENABLES WATER SERVICE PROVIDERS TO MEET THESE REQUIREMENTS

BUILDING RESILIENCE
IN COMMUNITIES THROUGH RELIABLE WATER SUPPLY



- **LOW OPERATING COSTS AND NO ENERGY COSTS – COST ITEMS ARE KNOWN**
- **FAVOURABLE INVESTMENT CLIMATE – SOLID RETURN ON INVESTMENT**
- **A ROBUST SYSTEM – LONG PRODUCT LIFE, LOW MAINTENANCE AND MANAGEABLE SERVICE REQUIREMENTS**

A Grundfos solar water solution provides community water supply from source to tap with zero energy costs and extremely low running costs. It also delivers the high levels of reliability and viability required by water service providers.

Our delivery to water service providers – including NGOs and government utilities – gives them the flexibility they require to support remote communities and informal settlements.

This helps communities build a stronger base for sustainable development and greater resilience when facing challenges from, for example, climate change or lack of infrastructure.

SMARTER SOLAR-POWERED WATER SUPPLY

Grundfos supplies a full range of proven solar water solutions, including for large-scale water supply, with all components for a complete solar powered water supply system. Following the initial investment, the payback time is surprisingly short, even with large systems.

As a global company with a strong local presence around the world, Grundfos has a long history of solar water solutions development. From our first off-grid water supply system in 1980, we have stayed ahead of the field with innovative off-grid technology development.

A solar-powered water supply from Grundfos offers unmatched flexibility for specific applications in the community, from irrigation and watering to safe drinking water. We ensure delivery of a solar water solution tailored to the water project.

OUR DELIVERY BUILDS ON:

- **An established distribution network and an ability to advise all partners about their water solution investment**
- **We optimise the entire solar water solution cycle, including system monitoring and control**
- **A trusted partner for all stakeholders**
- **A leader in water technology innovation**
- **A global player that leads the way developing sustainable water solutions**

The trend towards increased investment in solar power – and renewable energy sources generally – is set to continue:

"RENEWABLE ENERGY WILL REPRESENT THE LARGEST SINGLE SOURCE OF ELECTRICITY GROWTH IN THE YEARS UP TO 2020"

* International Energy Agency (IEA): "Renewable energy - Medium-term Market Report 2015", available from www.iea.org/newsroomandevents

INCREASE PRODUCTION AND IMPROVE FOOD SECURITY

A GRUNDFOS SOLAR WATER SOLUTION CAN INCREASE CROP YIELDS AND ENSURE EFFECTIVE WATERING FOR LIVESTOCK AND GAME

Grundfos solar water solutions offer smarter and more viable ways to deliver reliable water supply for communities. In addition to reducing energy costs to zero, operating costs are also extremely low. This, ultimately, is what keeps the solar water solution economically sustainable and in operation long-term.

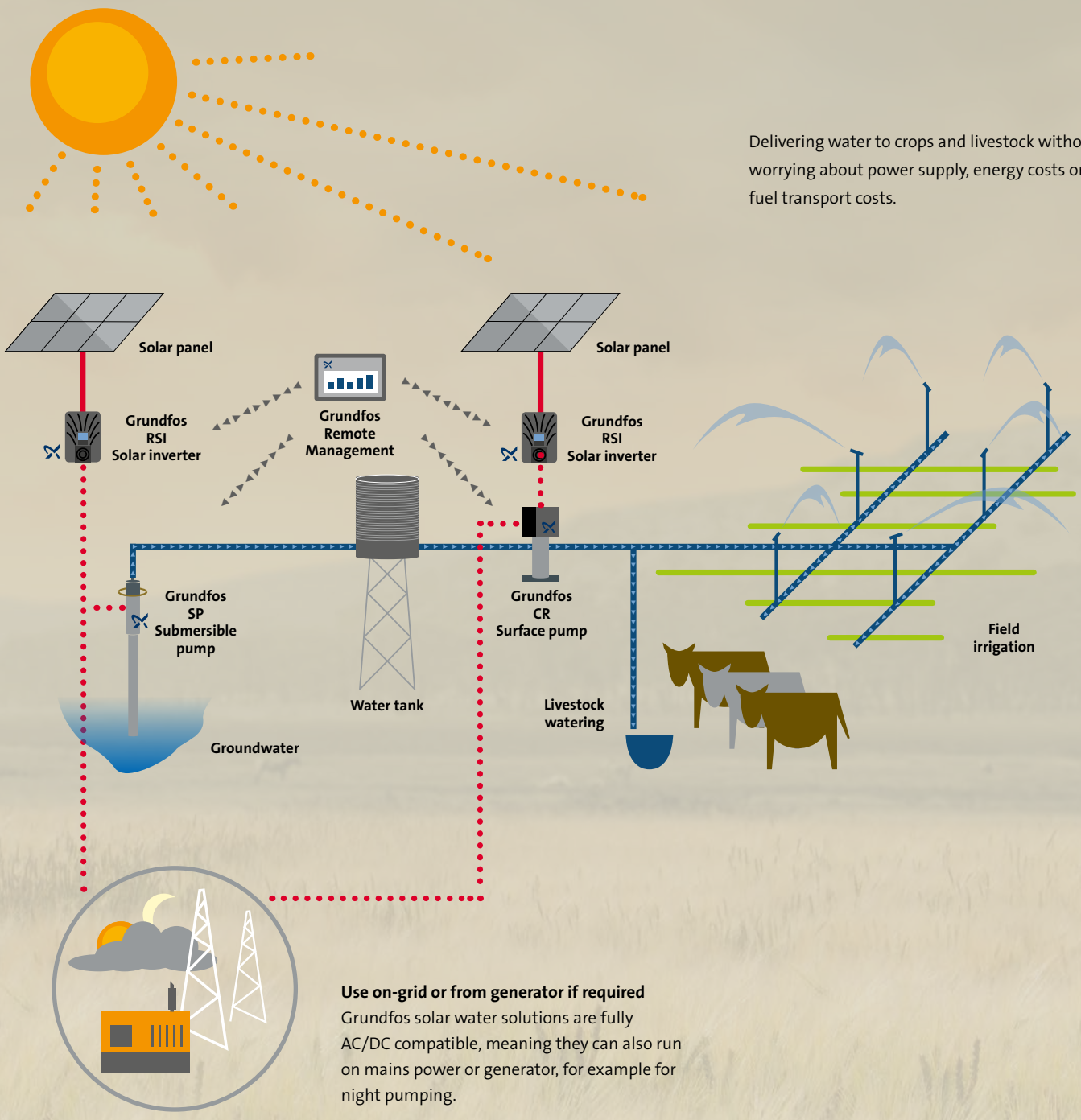
Effective and sustainable irrigation and watering for communities in developing countries supports efforts to meet the water and energy challenges we face when producing enough food. To meet future demands, we need to produce with greater efficiency, and this means a greater focus on the amount of water and energy used for food production. Irrigation and watering increases food production and food security.

- **DRIP AND SPRINKLER IRRIGATION**
  Perfect when using smaller pumps with an integrated solar inverter, as the drippers or emitters are most water-efficient and work with both pressurised and gravity systems
- **FLOOD AND PIVOT IRRIGATION**
  These applications generally require a larger pump with an external solar inverter. Pivots are most effective in pressurised systems, whilst flood irrigation works well with pressurised or gravity feed
- **LIVESTOCK WATERING**
  Pump water either directly to the watering station or to a tank, flowing to the watering station when required
- **PUMPING TO TANK**
  Offers the advantage of solar water pumping to a holding tank while the sun is shining, from where water is released either pressurised or by gravity feed

FIND OUT MORE ABOUT HOW GRUNDFOS SOLAR WATER SOLUTIONS WORK WITH ANY WATER SUPPLY APPLICATION AT GRUNDFOS.COM

COMPLETE SOLAR WATER SUPPLY SOLUTIONS FOR CROP IRRIGATION AND LIVESTOCK WATERING

Delivering water to crops and livestock without worrying about power supply, energy costs or fuel transport costs.



Use on-grid or from generator if required
Grundfos solar water solutions are fully AC/DC compatible, meaning they can also run on mains power or generator, for example for night pumping.

PROVIDING A RELIABLE SUPPLY OF WATER

FOR REMOTE COMMUNITIES AND INFORMAL SETTLEMENTS

GRUNDFOS DELIVERS SOURCE-TO-TAP SOLUTIONS FOR WATER TO HOUSEHOLDS AND SMALL BUSINESSES IN REMOTE COMMUNITIES AND INFORMAL SETTLEMENTS

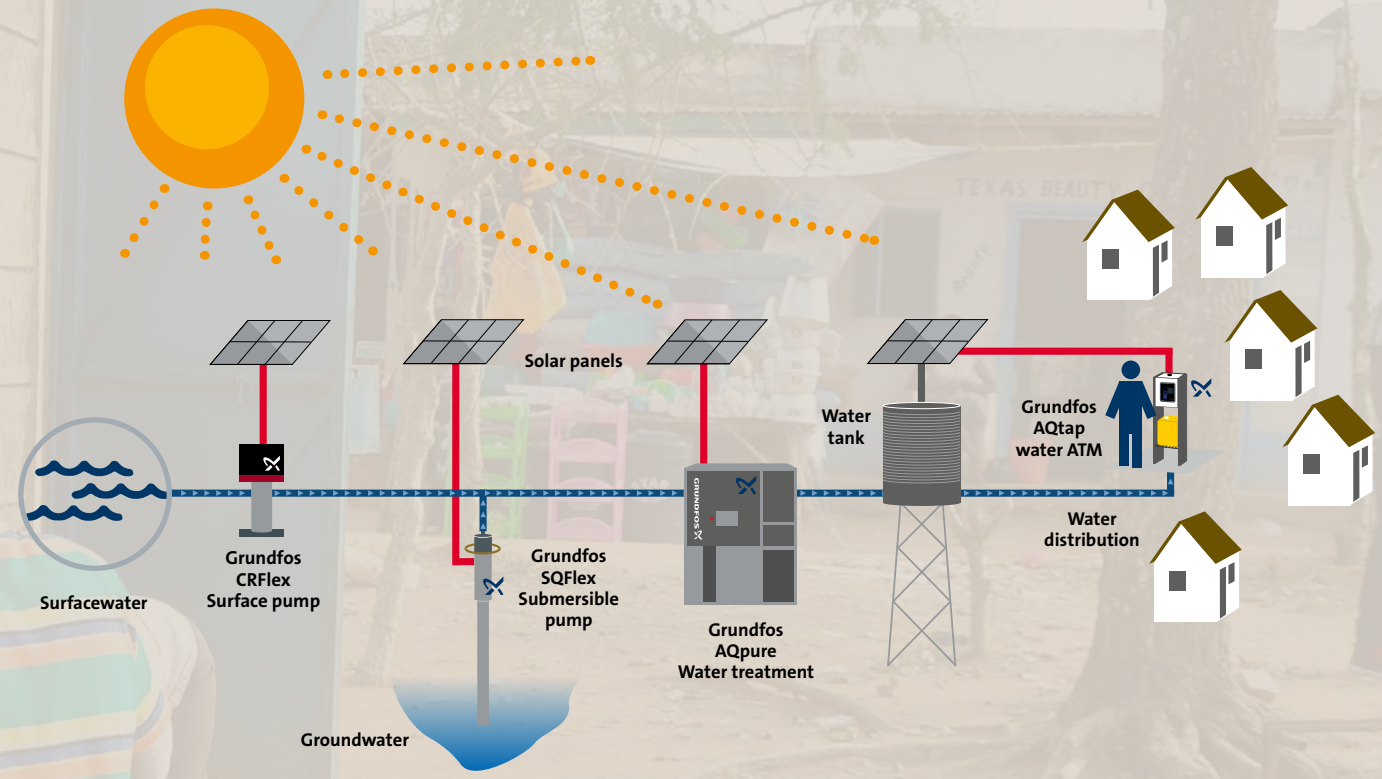
Grundfos delivers total solutions for manual or automated water kiosks connected to water supply from ground-water or surface water. The automated water kiosk solution builds on intelligent water ATMs that enable stable revenue streams for financially viable water services.

As such, our complete solutions improve the water service provider's capacity to scale up their water services when necessary, and to ensure the long-term viability of their water services to communities.

If water treatment is necessary, we can advise about adding one of our modular, cost-efficient and low maintenance water treatment systems.

Furthermore, Grundfos makes it possible for water service providers to offer easy and convenient mobile payment at their water ATMs.

COMPLETE SOLAR WATER SUPPLY SOLUTIONS FOR SAFE DRINKING WATER

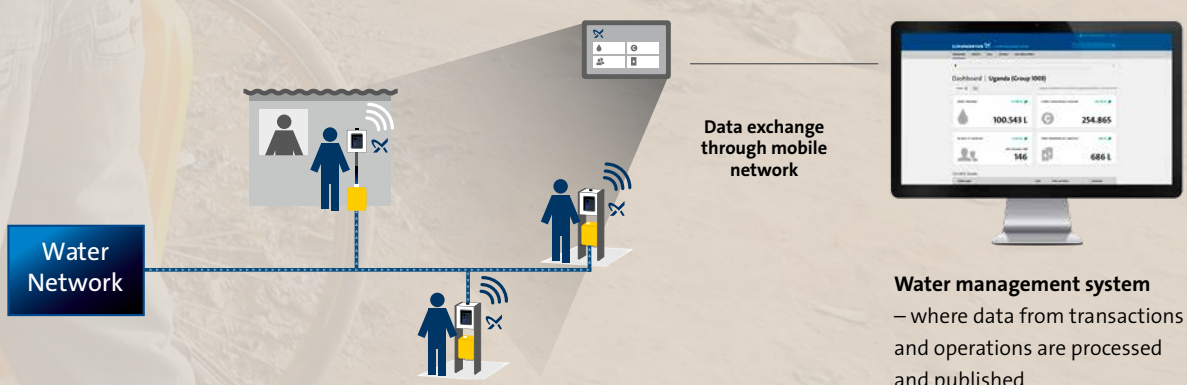


DRINKING WATER FOR COMMUNITIES IN REMOTE AREAS

Combine water supply from groundwater or surface water using solar-powered pumps with treatment systems and water ATMs for a complete and reliable solution in remote areas.

DRINKING WATER FOR COMMUNITIES IN INFORMAL SETTLEMENTS

Intelligent water ATMs require no more than connection to a solar-powered water supply or to an existing water supply network.



Water management system
– where data from transactions and operations are processed and published

MATCHING THE PUMP TO YOUR WATER SOURCE AND PURPOSE

SIZING PUMPS AND EQUIPMENT CORRECTLY IS ALL-IMPORTANT FOR EFFICIENT WATER SUPPLY. TO DO THIS, YOU NEED TO KNOW ABOUT THE COMMUNITY'S WATER SOURCE AND SYSTEM REQUIREMENTS

Ensuring your solar water supply system uses the power from the sun as efficiently as possible requires a supplier who can advise about how best to optimise the solar pumping system. Our expertise is part of our offering, and we start with the water source and how to get water from the well, river or pond as efficiently as possible.

- **YOUR WATER SOURCE**
  Groundwater and surface water are excellent sources for a solar water solution. Then consider your water supply requirements need and the equipment available, and how to ensure distribution of the right amount of water.

- **GET THE SOLAR WATER SOLUTION RIGHT**
  Pumps for water supply are typically oversized and therefore unnecessarily expensive, and especially with a solar powered pump, choosing a correctly sized pump is crucial for the success of the water distribution or the water operations.

- **OPTIMISED SOLAR INVERTER**
  This is at the heart of a highly optimised solar water supply system, and the key to the unmatched flexibility of our solutions. A solar inverter is required to convert DC power from the solar panels to AC power the pump can use. Grundfos solar pumps have a solar inverter integrated into the pump, and an external Grundfos solar inverter is available for large-scale pumping. A special function of the solar inverter is 'Maximum power point tracking' (MPPT) software, which monitors power production several times per second, ensuring optimal power at all times.

- **HAVE A CONTROL STRATEGY**
  Controlling pump performance means you can start and stop water supply during predefined periods, and fill a water tank when the sun is shining for later release when required.

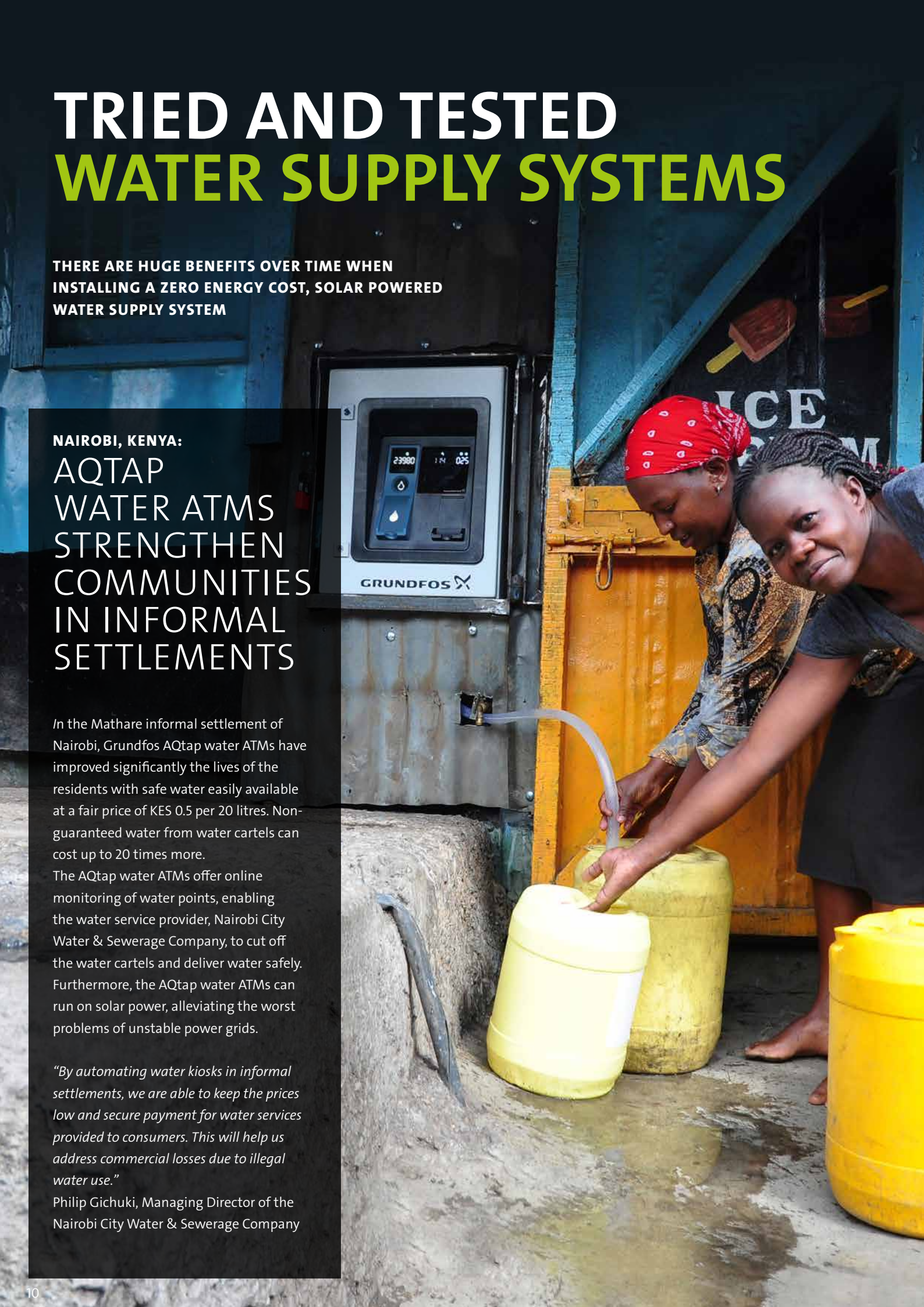
- **PROTECT YOUR PUMP**
  Motor protection further safeguards the reliable flow of water by protecting the pump from dry-running, motor breakdown or power supply irregularities, ultimately saving on maintenance and service checks.

- **MANAGE FROM A DISTANCE**
  Remote management lets you optimise operation and reduce costs, whether for conserving water for irrigation and watering, or for a water management system managing water services.

FIND OUT MORE ABOUT CORRECT SELECTION AND INSTALLATION OF SOLAR WATER SUPPLY SYSTEMS AT GRUNDFOS.COM

TRIED AND TESTED WATER SUPPLY SYSTEMS

THERE ARE HUGE BENEFITS OVER TIME WHEN INSTALLING A ZERO ENERGY COST, SOLAR POWERED WATER SUPPLY SYSTEM



NAIROBI, KENYA:

AQTAP WATER ATMS STRENGTHEN COMMUNITIES IN INFORMAL SETTLEMENTS

*I*n the Mathare informal settlement of Nairobi, Grundfos AQtap water ATMs have improved significantly the lives of the residents with safe water easily available at a fair price of KES 0.5 per 20 litres. Non-guaranteed water from water cartels can cost up to 20 times more.
The AQtap water ATMs offer online monitoring of water points, enabling the water service provider, Nairobi City Water & Sewerage Company, to cut off the water cartels and deliver water safely. Furthermore, the AQtap water ATMs can run on solar power, alleviating the worst problems of unstable power grids.

"By automating water kiosks in informal settlements, we are able to keep the prices low and secure payment for water services provided to consumers. This will help us address commercial losses due to illegal water use."
Philip Gichuki, Managing Director of the Nairobi City Water & Sewerage Company

MUNARYA, UGANDA

SQFLEX SUPPORTS SMALLHOLDER COFFEE FARMERS IN UGANDA

Getting safe drinking water to smallholder coffee farmers in Munarya village on Mount Elgon, Uganda, is not without its challenges, not least the 2-3 km walk uphill to a waterfall to fetch water for drinking, washing and fermenting coffee during the harvesting season.

Two SQFlex solar submersible pumps installed in wells by a natural spring have made the long walk unnecessary. Affordable, safe water is pumped to the local community, and access sustained through a payment scheme for maintenance and operations.

The community owns the installation, which has a locally trained operator and is run by a water commission. Cooperation between a local representative, the humanitarian organisation 'Seniors without Borders' and a Ugandan NGO brought the project to fruition on-time and within the resources allotted.

Grundfos SQFlex

TERDJUN, SUMATRA, INDONESIA

SQFLEX PROVIDES SAFE WATER SUPPLY FOR A PERI-URBAN AREA

Grundfos SQFlex

Terdjun village is a peri-urban area on the outskirts of Medan, provincial capital of North Sumatra. Water supply for the 18,000 inhabitants used to be from shallow unsafe wells, and that has changed with a SQFlex pumping from 40 m underground to an overhead water tank.

With 900 W available from the solar panels, up to 5,000 litres of water is available daily from a water point. The system is community-owned and operated and the water cost ensures the system is economically viable for the community.

GLOBAL SERVICE AND CONSULTANCY

AT GRUNDFOS, WE HAVE A SERVICE SOLUTION FOR EVERY LINK IN THE CUSTOMER'S VALUE CHAIN

Our decades of hands-on experience designing, manufacturing and servicing pumps and components for solar water supply gives us unsurpassed knowledge of pump applications, processes, problems, and businesses. We continuously use this knowledge during the development of new pump products that fit changing customer needs.

We follow our customers and their partners through the phases that affect every pump owner: Selection, Installation, Operation and Replacement.

The Grundfos portfolio of global service products puts increased focus on:

- **Reducing downtime onsite at our customers**
- **Optimising pump and system installations**
- **Reducing the energy expenditure of pump installations**
- **Ensuring maximum reliability, getting the most of the investment and reducing operational costs**

READ MORE ABOUT GRUNDFOS SERVICE OFFERINGS AT GRUNDFOS.COM/SERVICE

BUILDING CROSS-SECTOR PARTNERSHIPS

Grundfos works in cross-sector partnerships with governments, water service companies, development sector organisations and the private sector. We are a global company, and our experience creates value at both local and global level.

Entering into partnerships is not only a pledge to the future of sustainable water but also a value-adding proposition for water service delivery. This expertise is part of our offering to our partners and customers.

GRUNDFOS PRODUCT CENTER

CORRECT SIZING, SELECTION AND INSTALLATION RIGHT FROM THE START RESULTS IN A SURPRISINGLY QUICK PAYBACK TIME

Getting pump sizing right is critical for solar water supply systems and should always start with the specific application and a focus on the entire system. Taking into consideration the seasonal and geographical fluctuations in the availability of solar energy is also necessary.

The **Grundfos Product Center** is our free digital product catalogue and sizing tool, offering one-point access for all product information including pump curves, CAD drawings, and service manuals.

- **A basic sizing requires just three input values: Head, daily water demand and location. From this, we can quickly size and recommend the most energy efficient system for your needs.**
- **For more customised and advanced needs, options are available for retrofit recommendation, life cycle cost calculation, user-defined solar panel, and much more.**

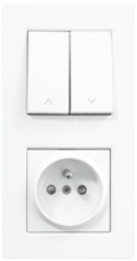
Available online and as a Desktop (offline) edition, Grundfos Product Center is optimised for viewing on mobile devices such as your smartphone or tablet.

FIND THE GRUNDFOS SOLAR WATER SOLUTIONS SIZING TOOL AT: PRODUCT-SELECTION.GRUNDFOS.COM

MAXIMISED FLEXIBILITY

ENERGY SOURCE






PRODUCT

SQFlex submersible pump

High efficiency SQFlex solar submersible pumps are ideal for plug and pump, flexible, low flow water supply

MGFlex motor

RSI solar inverter

COMBINE WITH

The MGFlex motor can pair with nearly all Grundfos pumps, depending on your requirements. Versatile application possibilities.

COMBINE WITH

The Grundfos Solar Inverter (RSI) works with almost any Grundfos pump for large-scale water supply

PRODUCT RANGE

SOLAR WATER SUPPLY PUMPS

SQFLEX SOLAR SUBMERSIBLE PUMP

Intelligent pump with high efficiency permanent magnet motor available with helical or multistage centrifugal hydraulics. The helical rotor can generate lot of pressure to start delivering water even on a cloudy day with only minimal sunlight.

BENEFITS

- High efficiency permanent magnet motor with built-in MPPT software and motor protection
- Flexibility to various power sources from AC or DC
- Tank filling system by connecting to CU200 and remote monitoring through GSM by connecting to CIU Flex

TECHNICAL DATA

- Motor size: 1.4 kW (P1)
- Flow rate (Q): 18 m^3/h
- Head (H): 250 m

CRFLEX SOLAR SURFACE PUMP

High efficiency and reliability from multistage CR pump hydraulics and with the MGFlex motor designed specifically for solar applications. Built-in frequency converter with MPPT software and motor protection.

BENEFITS

- Built frequency converter with MPPT software and motor protection
- Compatible to both AC and DC, with 3 x analog input and 2 x digital input
- Uniquely designed cartridge shaft seal offers excellent reliability

TECHNICAL DATA

- Motor size: 0.88 kW or 1.73 kW (P1)

SOLAR INVERTER

RENEWABLE SOLAR INVERTER (RSI)

Designed to power Grundfos pumps, the intelligent IP66 off-grid Renewable Solar Inverter (RSI) greatly expands possibilities for solar energy water supply systems with substantially reduced lifecycle costs.

BENEFITS

- IP66 enclosure class means the RSI is weather-proof and allows outdoor installation
- Advanced MPPT software which continuous optimise the system with respect to temperature as well as the solar panel conditions
- Quick setup Wizard with pre-defined parameters suits the Grundfos submersible MS motor.

TECHNICAL DATA

- Power size: 2.2 kW to 37 kW
- Voltage range: DC or 3-phase AC
- Enclosure class: IP66
- Analog and digital input

COMMUNITY WATER SUPPLY

AQTAP WATER ATM

AQtap is an intelligent water ATM that addresses some of the main challenges of providing a reliable and sustainable water supply in the developing world. Through an integrated platform for revenue collection and online management of water kiosks, AQtap supports the financial viability and accountability of water service operations.

BENEFITS

- Positive and transparent water tapping experience with a simple and intuitive interface and a closed water credit system using smart cards
- Efficient revenue collection platform that is flexible to be fitted to customers' organisation and setup
- Intelligent water management via remote data management to optimise and document the performance of each single water point

TECHNICAL DATA

- Nominal dispensing capacity: 1 m^3/h
- Inlet and outlet connection: 3/4"
- Inlet pressure: 0.2 to 4 bar

AQPURE WATER TREATMENT

Modular and prefabricated water treatment system that produces drinking water quality by filtering bacteria, viruses and particles from raw source water, providing a reliable and affordable water supply for local communities, even in remote areas.

BENEFITS

- Prefabricated to simplify local installation and commissioning
- Self-adaptive control to provide automated and stable operation to ensure long service intervals
- Modular design approach to offer superior simplicity in sizing and selection process and to ensure attactive pricing

TECHNICAL DATA

- Water production: Up to 50 m^3/d
- Membrane type: Ultrafiltration; hollow-fibre; dead-end
- Pore size in membrane: 0.03 µm

PRODUCT RANGE

WATER SUPPLY PUMPS

SP SUBMERSIBLE PUMPS

Complete range of submersible pumps for groundwater applications built to deliver optimum efficiency during periods of high demand, with long product life and easy maintenance.

BENEFITS

- State-of-the-art hydraulics provide high efficiency and low operating costs
- Made entirely of stainless steel to ensure high reliability and long lifetime, even in corrosive environments
- One supplier of the pump, motor and controls for an optimal pumping system

CR MULTI- STAGE CENTRIFUGAL PUMPS

Modularity for a complete range of pump solutions; from four material variants, thirteen flow sizes (up to almost 50 bar of pressure), a variety of shaft seals, rubber materials, and supply voltages. Pump parts can be optimised and designed for specific requirements.

BENEFITS

- Available with **Grundfos Blueflux** IE3 motor efficiency, reducing energy costs
- Multi-flange fits a variety of standard connections for a more flexible solution
- Uniquely designed cartridge shaft seal increases reliability, reducing downtime

NB/NBG/NBE/NBGE SINGLE-STAGE END-SUCTION STANDARD PUMPS

Multi-purpose end-suction pumps for reliable and cost-efficient applications such as water supply. Non-self-priming, single-stage, centrifugal volute pumps with axial suction port, radial discharge port and horizontal shaft.

BENEFITS

- Optimised hydraulics in housing and impeller for unimpeded liquid flow
- O-ring seal between pump housing and cover means no risk of leakage
- Housing, impeller and wear ring in different materials for improved corrosion resistance, no sticking elements

NK/NKG/NKE/NKGE SINGLE-STAGE END-SUCTION STANDARD PUMPS

Multi-purpose end-suction pumps for reliable and cost-efficient applications such as water supply and irrigation. Back pull-out design enables removal of the motor, coupling, bearing bracket and impeller without disturbing the pump housing or pipework; these long-coupled pumps comply fully with either EN733 or ISO2858.

BENEFITS

- Optimised hydraulics in housing and impeller for unimpeded liquid flow
- O-ring seal between pump housing and cover means no risk of leakage
- Back pull-out design for easy dismantling for service

MONITORING AND CONTROLS

GRUNDFOS REMOTE MANAGEMENT (GRM)

A cost-effective and straightforward way to monitor and manage pump installations, GRM reduces the need for onsite inspections and in the event of an alarm or warning, the relevant people are notified directly.

BENEFITS

- Get the full overview of the operation, performance and trends and see the status of your entire system on your own map or image
- Live monitoring, analysis and adjustments, monitoring of energy consumption, and optimisation of system performance
- Manage service & maintenance; plan service work on the basis of actual operating data and get notification when service is due

COMMUNICATION

- CIM/CIU communication interfaces enable data transmission via GPRS, SMS and Internet from Grundfos pumps and controllers
- Built-in multi-purpose I/O board allows the connection of sensors and switches
- A fixed low fee covers data traffic, hosting costs and system support, including back-up of all data

CU200 CONTROL UNIT

The CU 200 is a combined status, control and communication unit especially developed for the SQFlex system. The CU 200 also enables connection of a level switch.

BENEFITS

- Communication between the CU 200 and the pump
- System monitoring and alarm indication
- Start, stop and reset the pump with the on/off button

TECHNICAL DATA

- Voltage: 30-300 VDC, 8.4 A, 90-240 VAC, 8.4 A
- Power consumption: 5 W
- Max. communication length 300m between CU 200 and SQFlex
- Enclosure class: IP55

ABOUT GRUNDFOS SOLAR WATER SOLUTIONS

Grundfos is a global leader in advanced pump solutions and a trendsetter in water technology. We contribute to global sustainability by pioneering technologies that improve quality of life for people and care for the planet. With an annual production of more than 16 million pump units and more than 80 companies in 55 countries, we offer a full range of modular, energy-efficient and intelligent products and services for applications within buildings, industries and water.

Grundfos Solar Water Solutions consist of a broad range of proven products that build robust and reliable solar water supply systems with long product life, low maintenance and manageable service requirements. A highly optimised Grundfos solar water solution offers low risk for your investment with low operating costs and no energy costs.

For more information, please visit grundfos.com/

0916/Channel Marketing/12217-BrandBox

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