



SOLAR-POWERED **IRRIGATION AND** **WATERING**

UNMATCHED FLEXIBILITY
FOR FARMERS AND RANCHERS

A man with short, dark hair, wearing a red and white plaid shirt over a white t-shirt, stands with his arms crossed in a rural setting. The background shows a green field, a wooden fence, and a large white structure, possibly a greenhouse or covered walkway, under a clear sky.

REDUCE ENERGY DEPENDENCY AND **SAVE**

ENERGY IS ONE OF THE HIGHEST COST ITEMS FACING FARMERS AND RANCHERS. IN REMOTE AREAS, OR WHERE ENERGY PRICES ARE HIGH, GRUNDFOS SOLAR WATER SOLUTIONS DELIVER RELIABLE AND ECONOMICAL WATER SUPPLY FOR CROPS AND LIVESTOCK

A highly optimised solar water solution from Grundfos delivers unmatched flexibility for reliable water supply from groundwater or surface water. This meets all crop irrigation, livestock watering and domestic water requirements on the farm or ranch. With zero impact on your business from energy prices, you reap the long-term benefits of economically sustainable operation. Following the initial investment, the payback time is surprisingly short, even with large systems.

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.

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 irrigation and watering requirements. We ensure delivery of a solar water solution optimised precisely to the specific requirements on the farm or ranch.

OUR DELIVERY BUILDS ON:

- An established distribution network and an ability to advise partners about their solar investment
- We optimise the entire solar water solution cycle, including system monitoring and control
- A global player that leads the way developing sustainable water solutions
- Our expertise is part of our offering to our partners and customers

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

- **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**

INCREASE PRODUCTION USING SOLAR ENERGY

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 irrigation and watering. 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.

This provides the basis for effective and efficient irrigation, watering and domestic water supply for all applications on the farm or ranch, including:

- **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 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 the rancher decides

- **WILDLIFE AND GAME FARMS**

Provides watering for wildlife and game within the confines of the reserve; the water supply can be managed as for livestock

- **PUMPING TO TANK**

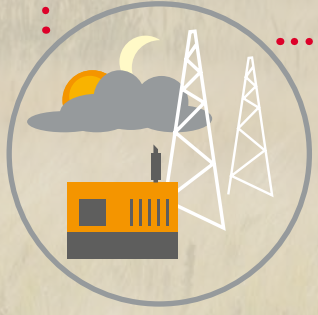
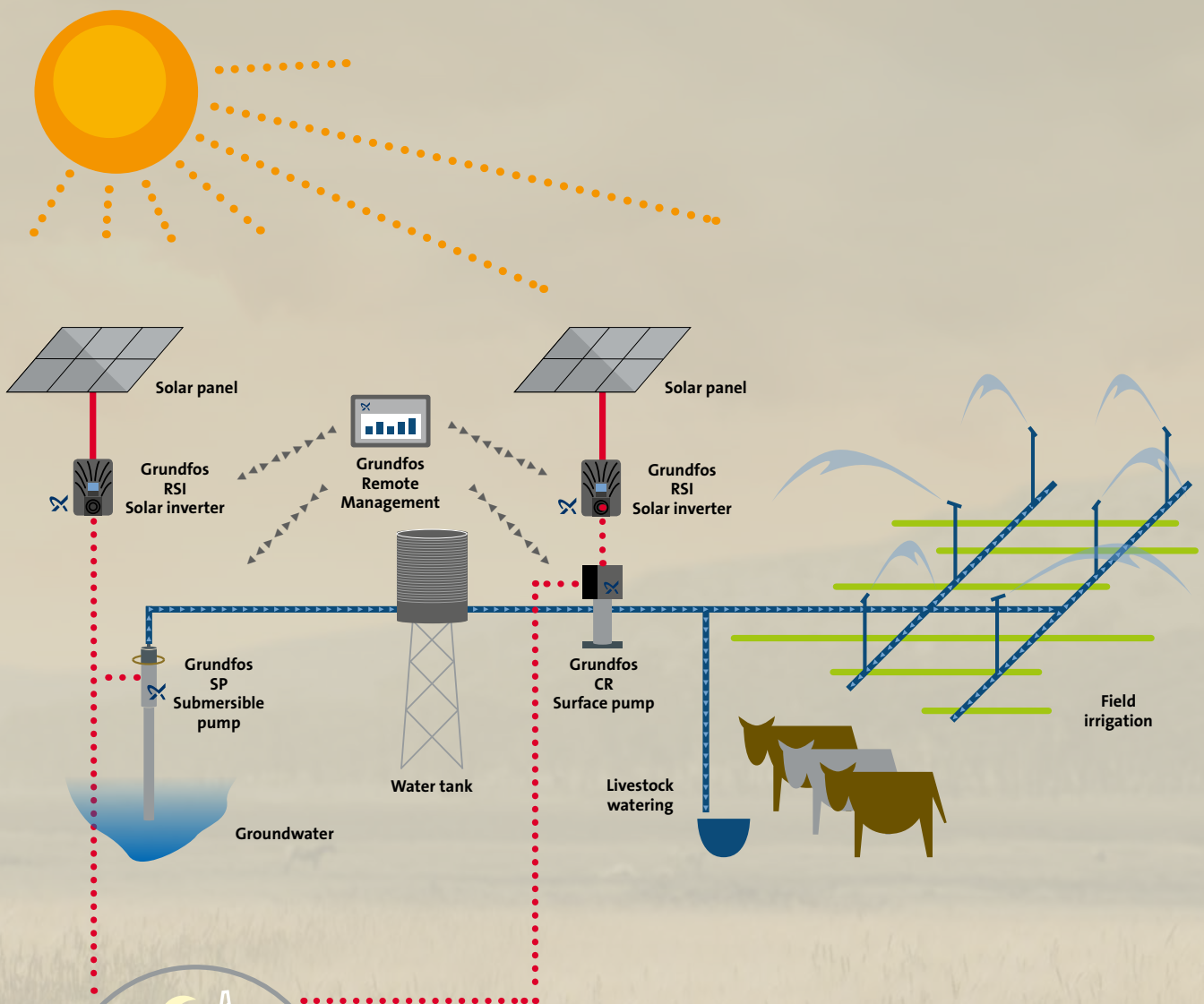
Offers the advantage of solar water pumping to a holding tank while the sun is shining, from where water is released either pressurised or by gravity feed

- **DOMESTIC WATER SUPPLY**


Meets domestic needs on the farm, ranch or any remote location, and for private homes in urban areas with high or unpredictable energy prices

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

GRUNDFOS COMBINES THE PUMPS, CONTROLS AND MONITORING, SOLAR PANELS AND COMPONENTS REQUIRED FOR A COMPLETE SOLAR-POWERED WATER SUPPLY



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.



MATCHING THE PUMP TO YOUR **WATER SOURCE** AND EQUIPMENT

SIZING PUMPS AND EQUIPMENT CORRECTLY IS ALL-IMPORTANT FOR EFFICIENT WATER SUPPLY. TO DO THIS, YOU NEED TO KNOW ABOUT YOUR 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 energy-powered pump, choosing a correctly sized pump is crucial for the economic viability of the water supply system. The pump must match the flow and pressure requirements of the water distribution system.

• **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 irrigation during predefined periods, conserve water by not irrigating in direct sunlight or with strong winds, 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.

• **MANAGE FROM A DISTANCE**

Remote management from your PC, tablet or smartphone lets you optimise operation and reduce costs. It also offers the possibility for full automation with weather data, soil moisture sensors, and rain sensors working together with the pressure control.

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

PROVEN SOLAR PUMPING TECHNOLOGY

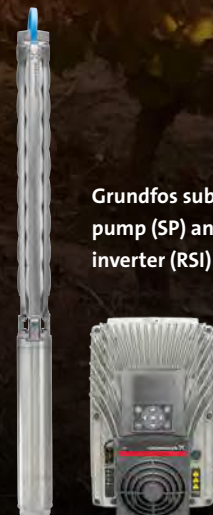
THERE ARE HUGE BENEFITS OVER TIME WHEN INSTALLING A ZERO ENERGY COST, SOLAR POWERED WATER SUPPLY SYSTEM. RENEWABLE ENERGY SYSTEMS ARE INCREASINGLY COMMON IN, FOR EXAMPLE, IRRIGATION SYSTEMS IN THE OLIVE GROVES AND VINEYARDS OF SOUTHERN EUROPE AND FOR CATTLE WATERING IN THE UNITED STATES

TOLEDO, SPAIN:

SP SUBMERSIBLE PUMP AND RSI SOLAR INVERTER TAKES CARE OF 40,000 M² VINEYARD IRRIGATION

When the Borbotón farm and winery, Santa Cruz del Retamar, Toledo required an estimated 2,000 m³ of water per hectare for 2,700 of their vines, they turned to Grundfos for a high-capacity solution to utilise the 6,000 W generated by their solar panels. Grundfos delivered an SP7-27 W submersible pump for water extraction from the aquifer at a depth

of more than 100 m. The Grundfos Solar Inverter (RSI) ensured power supply from the solar panels to the pump. Antonio Mayoral, owner of the Borbotón farm, says the selected system is the best and most efficient solution for the vineyard, giving him the reliability and peace-of-mind he needs while his vines mature.



Grundfos submersible pump (SP) and solar inverter (RSI)

HAMILTON DOWNS, AUSTRALIA:

SQFLEX WATERS SHORTHORN CATTLE IN THE OUTBACK

No commodity is more precious in the vast Australian Outback than water. Hamilton Downs, a 2,000 km² cattle property 80 km south west of Alice Springs, averages barely 280 mm of rain a year, and relies totally on underground water. Requiring a robust and low maintenance water supply system, Jamie Evans, the Manager at Hamilton Downs, chose a SQFlex solar submersible pump with a 3" helical rotor.

Set in the well at a depth of 64 m, the SQFlex is powered from 12 PV solar modules, which produce a maximum of 546 W.

"When drilling new wells, we would certainly look at installing SQFlex pumps in future... They certainly require less maintenance and are a heck of a lot safer and easier to repair than windmills,"

Jamie Evans, Manager, Hamilton Downs

Grundfos SQFlex



FERREIRA DO ALENTEJO, PORTUGAL:

SQFLEX PROVIDES GREENHOUSE IRRIGATION ON THREE HECTARE PROPERTY

With 1500 m² of greenhouses growing cucumbers and melons, and 700 fruit trees and an olive grove, Artur Pissarro and Fátima Mourão quickly found out that the SQFlex solar submersible pump was by far the most economical and sustainable solution. Monthly power savings for watering alone are estimated at EUR 90.

"At dawn, the pump is switched on and works until the end of the day. The higher the solar peak, the greater the water pressure... Electricity costs are zero,"

Artur Pissarro, Owner.

Grundfos SQFlex



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](https://www.grundfos.com/service)



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 m³/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 continuously 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



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

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/