Solar-Powered Water Supply

Unmatched flexibility
Unparalleled energy savings

GRUNDFOS

Possibility in every drop

Reduce Energy Dependency and Costs

Grundfos solar water solutions deliver a safe, reliable water supply, eliminate energy costs and offer climate-friendly independence from power grids. No matter what the application, solar water solutions provide unmatched flexibility for an economically and environmentally sustainable water supply.

Economical

Minimal maintenance and zero energy expenses mean lower, more predictable operating costs for supplying water to urban communities and rural areas.

There's a smart revolution going on

An optimised Grundfos solar water solution can be deployed almost anywhere, whether it is in a small waterworks, in farming and irrigation applications or in providing water to remote areas that lack grid-based power and water infrastructure.

A strong, solid return on investment

The payback time for a solar water system is surprisingly short, even with large systems, because energy costs are eliminated from the first day of operation.

Autonomous source-to-tap water

From providing remote villages with water to improving the operations of suburban waterworks stations, our complete solar water solutions ensure the long-term viability of water services to communities. Our solar systems help communities, farmers and water service providers become independent of grid power while ensuring a safe, reliable water supply.

A Pioneer in Solar

Grundfos is a global company with decades of experience in solar water systems and a strong local presence in countries worldwide. Our history of pioneering solar water solutions stems back to our first off-grid water supply system in 1980.
Today, our solar water systems are scalable, digitally enhanced for easy setup and monitoring and provide an autonomous and decentralised alternative to traditional grid power and water systems.

Our delivery builds on:

- An established distribution network and ability to advise partners about their solar investment
- Optimisation of the entire solar water solution cycle, including system monitoring and control
- Our history as a global pioneer in developing sustainable water solutions
- Our expertise, which is part of our offering to our partners and customers

Reliable

Grundfos solar water systems can integrate with traditional energy sources to provide primary – or secondary – power in areas where grid power is unreliable or too expensive.

Climate Friendly

Solar is one of the most effective means of reducing the climate impact of energy production and water distribution and treatment.

Powered by AC/DC

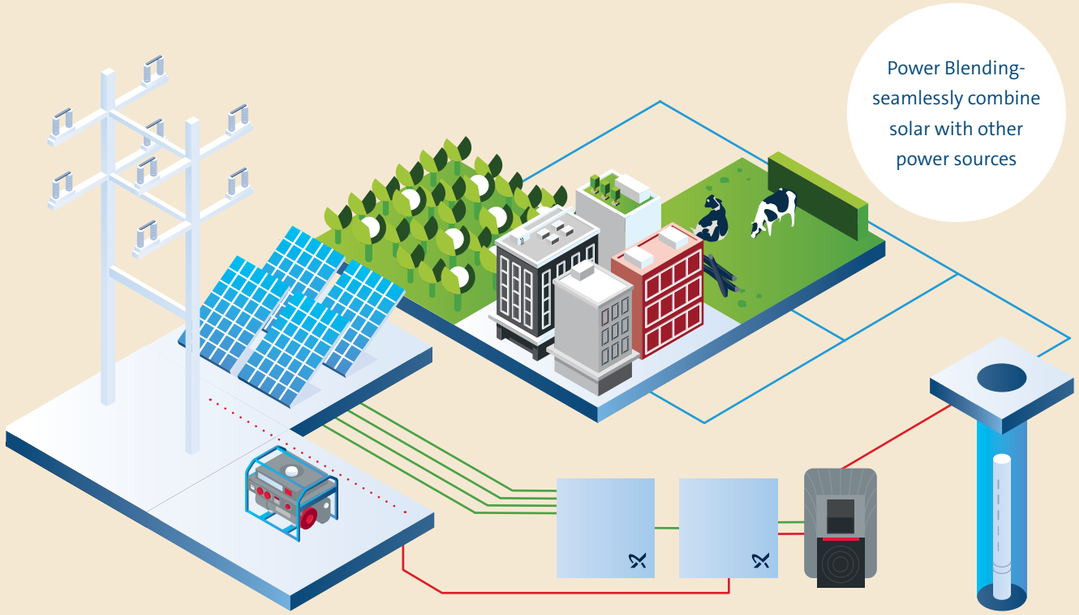
Our unique PowerAdapt system can blend solar (DC) with grid (AC) power to ensure reliable, consistent performance - even when the sun is not shining.

Provide safe, reliable drinking water 24/7

6 CLEAN WATER AND SANITATION

In any water supply situation

Grundfos solar water solutions - even when the sun isn't shining



For water service providers like local waterworks and utility companies, dependability is of the utmost importance. Grundfos has developed a unique PowerAdapt power blending solution so solar energy savings can be realised without having to compromise on reliable operation.

Power blending makes it possible

PowerAdapt works by allowing solar (DC) to be used as a primary source of pump energy while topping up any additional power needs with a connected (AC) energy source. Working in conjunction with Grundfos RSI Solar inverters,this solution ensures constant pumping power, 24 hours a day, seven days a week.

To optimise operations, Grundfos digital solutions like our solar sizing app for precise specification and on site information, the Grundfos Product Center and remote management can help size, monitor and administer solar pumping operations remotely.

These are just some of the reasons Grundfos solar water solutions make sense for:

- **Subdivisions and local waterworks**
  Solar water supply saves energy and reduces energy costs to zero. Those are savings that shorten return on investment times and can eventually be passed on to utility users.
- **Water utility distribution**
  Grundfos' large renewable solar inverters (RSI) provide up to 250kW of pumping power. This makes solar a feasible energy source for even larger pumps and water utility pumping operations.
- **Off-grid locations**
  For areas without access to grid energy or places where centralised energy is sporadic or overly expensive, Grundfos solar water solutions help water suppliers create grid-independent water supply.
- **Remote communities and informal settlements**
  Grundfos delivers total solutions that help small service providers and NGOs effectively utilise ground and surface water in remote communities that lack infrastructure. In areas without running water, Grundfos can even provide manual or automated water kiosks and intelligent water ATMs that are mobile payment enabled.

Sustainable water for any environment

In water supply projects all over the world, solar water solutions are an economically and environmentally sustainable alternative. In remote locations, suburban water utilities and modern cities, Grundfos technology can provide a complete, effective and reliable solar solution for water service providers.

Toledo, Spain:

SP submersible pump and RSI solar inverter provide 40,000 m² of vineyard irrigation

When the Borbotón farm and winery, Santa Cruz del Retamar, Toledo required an estimated 2,000 m² 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.

Nyarugusu Refugee Camp, Western Tanzania:

The world's largest solar powered water system

Along Tanzania's western border in the heart of central Africa lies the world's largest solar-powered water system. The system provides safe drinking water daily to 150,000 people living in the Nyarugusu Refugee Camp.

Installation of the Grundfos system began in 2017 in cooperation with the non-profit organization Water Mission to help the camp reduce the massive energy costs of using diesel-powered generators for its water supply. In planning the project, the need for a flexible system that could mix solar (DC) and diesel (AC) generator power became evident.

Grundfos engineers developed the PowerAdapt blending solution to meet that need, and now the camp runs primarily on solar power and uses diesel generators only in backup situations.

The solar water system, which continues to grow, provides tap water to the 150,000 residents living directly in the camp from a series of boreholes equipped with Grundfos submersible pumps.

"The system has saved a significant amount of energy costs already and will continue to save more related to opearating the camp and it has meant that more people receive more water. Most importantly, the drinking water is safe and that translates directly into improved health and saving lives."

Will Furlong, Regional Director for Tanzania, Water Mission

Terdjun, Sumatra, Indonesia:

An economically sustainable community water supply

Terdjun village is a peri-urban area on the outskirts of Medan, the 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 sustainable for the community.

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, Australia and elsewhere.

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.

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 southwest of Alice Springs averages barely 280 mm of rain a year and relies completely 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

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,"

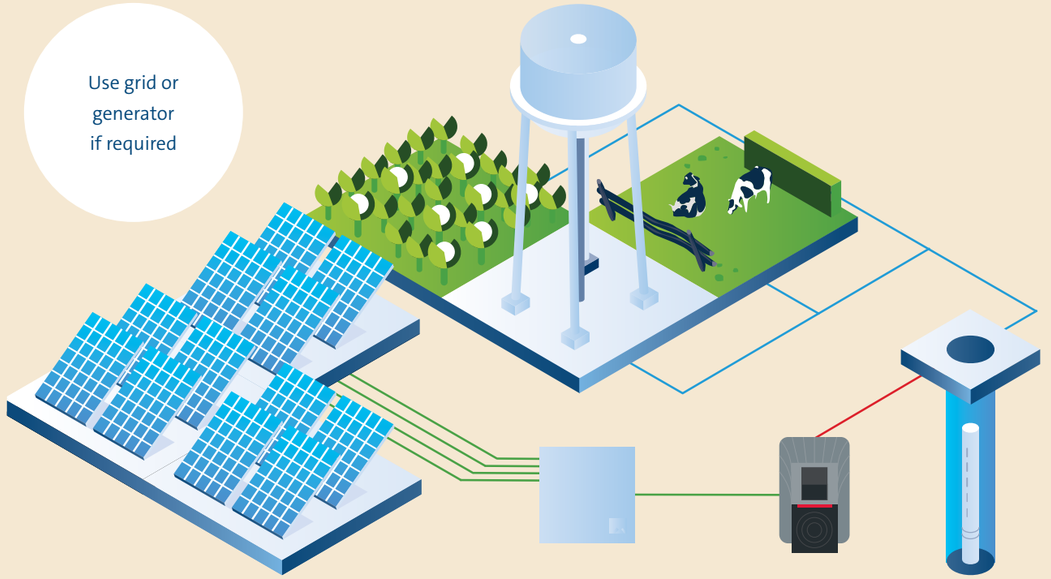
Artur Pissarro, Owner.

Increase Production Using Solar Energy

13 CLIMATE ACTION

In agriculture and farming

A Grundfos solar water solution can increase crop yields and ensure effective watering for livestock and game



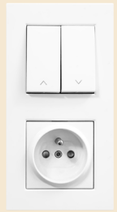
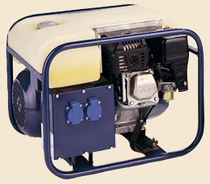
Grundfos solar water solutions offer a smarter and more viable means of delivering reliable water for irrigation and livestock. In addition to reducing energy costs to zero, system operating costs are also extremely low. This, ultimately, ensures a solid return on investment and makes the solar water solution economically sustainable in the long-term.

- **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, including supplying potable water for homes

Maximised flexibility

Energy source



Product




SQFlex submersible pump | **MGFlex motor** | **RSI solar inverter** | **POWERADAPT**

Combine with

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

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. The RSI comes in 2 different enclosure classes from up to 37kW with IP66 and from 45 to 250kW it is in IP54.

Combine with

PowerAdapt is a system companion to RSI and is used to mix AC and DC power.


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: 2.5kW
- 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 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: 2.2kW to 250kW
- Voltage supply: DC or 3-phase AC
- Enclosure class: IP54 and IP66
- Analog and digital input

Solar inverter Cabinet

PowerAdapt

Used in conjunction with a RSI unit, this enables a Grundfos pump to safely mix solar (DC) power with a secondary (AC) source like the grid or a generator.

Benefits

- Allows for a partial solar system when there is not enough space or budget for a full panel installation
- Provides a seamless, 24/7 system with constant power
- Enables solar to be used as a backup in areas with poor grid stability
- Maximises water pumping time for low-yield boreholes

Technical data

- Voltage 3 X 380 - 415 V
- Enclosure class: IP54
- Three models that fit with a corresponding RSI:
  16A (510x540x260mm)
  31A (640x640x310mm)
  72A (650x640x310mm)

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/NK/NKG Single-stage end-suction standard pump

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 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
- Housing, impeller and wear ring in different materials for improved corrosion resistance, no sticking elements

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

CIU 903 SQFlex control

The CU 903 s a combined status, control and communication unit especially developed for the SQFlex system. Combined with the GRM modem CIM 280, it enables monitoring over the GSM network iwith GRM. The CIU 903 also enables connection of a level switch. CIU 903 is the control unit to be used with SQFlex pumps also for the range above 1.4kW

Benefits

- Communication between the CIU 903 and the pump
- System monitoring and alarm indication
- Start, stop by external contacts.
- Works with Grundfos GO for remote control
  Option for GRM with CIM 280 module

Technical data

- Voltage: 30-300 VDC, 8.4 A, 90-240 VAC, 12 A
- Power consumption: maximum 11 W
- Max. communication length 300m between CIU 903 and SQFlex
- Enclosure class: IP55

CU 200 SQFlex control

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

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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

GRUNDFOS Holding A/S
Poul Due Jensens Vej 7
DK-8850 Bjerringbro
Tel: +45 87 50 14 00
www.grundfos.com

GRUNDFOS