INDUSTRIAL SOLAR
OFF-GRID APPLICATIONS

Energy Supply Solutions for the Industrial
and Agricultural Sectors

Energy is here
THE ADVANTAGES OF GOING HYBRID

Clean, renewable energies from local sources can become the basis of energy independence for your business. This will help you to reduce your generation costs and give you a competitive edge with regards to security of supply at steady prices and environmental responsibility in the eyes of your customers.

SAVE OPERATION COSTS

Prices for solar systems have come down by more than 60 percent in the last three years. In many countries of the world, it is economically viable to use the energy the sun provides every day. Especially if you are operating remote from the public electricity grid and need to rely on diesel generators, you can count on short payback times for a solar system that is designed according to your specific energy needs.
REDUCE EXPOSURE TO RISING DIESEL PRICES

Beyond the high operation cost, there is a big financial risk connected to a diesel-based energy supply – the costs of the fuel. It depends on global speculations, government decisions and many other factors outside the influence of commercial consumers. With juwi’s concepts for integrating solar energy into the diesel generator grid or powering water pumps directly via solar modules, generation costs and the dependency on fuel price fluctuations can be reduced considerably.

Example – 1 MWp Solar Fuel Saver in the Philippines

Replacing a fraction of your energy supply with photovoltaics helps you to reduce OPEX. Depending on determining factors like solar irradiation and the cost of fuel, your investment will pay back within only a few years. See here a cash flow example for a Solar Fuel Saver project:

HELP THE ENVIRONMENT WITH CLEAN ENERGY

Each liter of diesel fuel burned emits 2.64 kg of CO₂ – a negative impact on the global climate that can be avoided.

Your customers will appreciate seeing the environmental responsibility your company assumes by complementing your energy management with clean and renewable sources.

STATE OF THE ART TECHNOLOGICAL SOLUTIONS

juwi’s Solar Pumping and Fuel Saver solutions are the latest technology in a new upcoming market of own consumption of renewable energies in industrial applications. Be part of the development of a new technology and benefit from the many advantages:

- Automatic operation
- Modularly scalable
- Monitoring energy consumption
- Low maintenance

MAKE USE OF JUWI’S TRACK RECORD OF RENEWABLE ENERGY SYSTEMS

juwi plans and builds on-grid and off-grid renewable energy systems all over the world. With over two gigawatt (GW) of installed renewable power in more than 20 countries, the juwi group is one of the biggest renewable energy project developers worldwide. We have strong partners in the fields of hybrid energy applications, energy control & storage, and fuel saving solutions.
From engineering to installation, logistics or training, we offer you a series of services with regard to your off-grid energy project.

ENGINEERING
We are experts in the development and design of solar and hybrid systems. Thanks to our competence in engineering, we are able to offer individual solutions for any type of project. Our specialized engineers will work together with you to design just the right system for your industrial plant or agricultural farm requirement.

LOGISTICS
juwi is active in many sunbelt countries. We have framework agreements with several transportation and forwarder companies and can support you in the import process. Special packaging for sea, air or land freight is possible as well as organizing special handling on site (e.g. with dangerous goods). With the established export network, we can ensure safe and well-timed delivery. As a non-governmental organization, you can profit from tax exemptions. juwi assists you with all necessary procedures. Make use of our expertise!
INSTALLATION

We accompany the entire development process, including the installation of the power plant on site. Therefore, juwi has built a strong partner network with local installation companies in many sunbelt countries. Please contact us to see which local partner is closest to your project site. Depending on the system size, juwi can also support the installation with our own construction managers. We can also visit the construction site for commissioning and training. juwi’s approach is to transfer as much technical knowledge as possible to the local operators as we believe this to be the basis for a sustainable operation of the system and a prerequisite for a long-lasting partnership.

OPERATIONS & MAINTENANCE

The biggest challenge for a successful solar project in the sunbelt countries is its sustainable operation and long-term maintenance. Our partners can support you with the operation and maintenance of your plant. Moreover, through the cooperation with the local communities and juwi’s various models for funding, accounting, and service, customers can easily find the commercial operation model best suited for their individual power plant. All systems are equipped with a remote monitoring device that allows you to supervise the plant even from a distance.

TRAINING

As an integral part of the project realization, we ensure to train the local electricians and operators. The training material is provided in English or French. Depending on the size and the complexity of the installation, juwi undertakes several trainings for different stakeholders. Our trainings cover planning, installation, and maintenance, as well as service and operation of solar power systems.
Integrating solar power into diesel generator-based energy systems enables consumers to save fuel and cut down on operation costs.

The Solar Fuel Saver (SFS) combines solar power with new or existing diesel generators. It consists of a solar plant, a controller unit, and a sophisticated monitoring system. The generated solar power directly reduces the load of the generator and thus decreases fuel consumption. To ensure that the generator operates with maximum efficiency, the Solar Fuel Saver regulates the power output of the solar plant.
TECHNICAL FEATURES

- Fully adaptable to customers’ demands and project requirements
- Compatible with all leading diesel generator brands – in single or multiple generator systems
- Prevents the diesel generator from running below minimum partial load
- Can be operated in systems with or without storage capacity
- Easy installation
- Data logging of the system performance
- Remote monitoring via Internet

SIMPLICITY AT WORK

With the additional solar power from the PV plant, the load on the generator is reduced. As the solar power increases, the generator is slowly driven towards its minimum partial load. The controller then regulates the power output of the solar plant in order to keep the generator operating above minimum partial load, thus ensuring optimal operation. In multi-genset systems, more fuel can be saved as individual generators can be switched off, provided that there is a short-term storage capacity available.

The Solar Fuel Saver acts as the interface between the solar plant and your diesel generator, regulating the solar power output to ensure an efficient operation of the diesel generator.

This graph shows the interplay between the diesel generator and the solar power output as regulated by the Solar Fuel Saver. The diesel generator output approaches its minimum partial load, the solar output is throttled by the SFS. This temporary reduction of the solar power ensures the efficient operation of the diesel generator.

THE SOLAR FUEL SAVER – TAILORED TO YOUR NEEDS

juwi’s experienced engineers design individual solutions according to any energy scheme. Not only do we work in close cooperation with companies specialized in controlling power generation systems and storage, we have also developed an in-house solution for the Solar Fuel Saver. This enables juwi to offer economic standard packages where applicable and, at the same time, we can tailor the optimal fuel saving solution individually to each project.

The Solar Fuel Saver is the perfect solution to cut down electricity generation costs for all kinds of applications in sunny regions. It is ideal for industrial customers with large parts of their load in the daytime or mines that are remote from the public grid. Furthermore companies in the agricultural sector with a high cooling load or health centers and tourist resorts, which depend on reliable electricity supply, will benefit significantly from juwi’s Solar Fuel Saver solution.
SOLAR PUMPING

juwi’s solar pumping concept allows to integrate solar power into existing or newly installed pumping applications for irrigation or drinking water.

SOLAR VARIABLE SPEED DRIVE (sVSD)

The sVSD PV plant can power the pump in a Solar-Only Mode or in Co-Generation with existing energy sources, such as a diesel generator or the public grid. It consists of photovoltaic modules and the solar Variable Speed Drive. These systems can drive the pump either at constant head or at constant water flow rate. Many industrial water pumps can be operated with variable frequency drives – in this case the solar plant can be coupled directly to the existing AC pump and no other source of energy is necessary.

YOUR ADVANTAGES

- Solar-Only Mode or Co-Generation Mode with public grid or diesel generator
- Savings of up to 95 percent of OPEX
- Less dependency on fuel price fluctuations
- Automatic operation
- Soft-start function integrated
- Connection to the existing pump, no new pump required
- Modularly scalable
- Low maintenance
- Quick construction, no special tools required
- Short payback time: less than 5 years
  (based on diesel fuel costs of approximately 1 €/liter)*
- Reduced environmental impact

*The payback time depends on many factors, among them solar irradiation, load curve during the day, diesel price, etc.
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TECHNICAL DATA

- Pump power: starting from 30 kW
- Voltage: 400 Vac
- DC overvoltage protection
- Irradiation sensor
- Industrial steel cabinet for indoor installation and outdoor on request
- Protection class IP54
- DC power supply soft load
- Temperature up to +50°C

THE WORKING PRINCIPLE

The PV system is directly connected to the pump without the need of batteries, which reduces investment costs as well as operation and maintenance costs. The inverter is capable of forming an electric grid and running in a pure solar operation mode (Solar-Only Mode). Additional power sources like a diesel genset or the public grid can be connected to co-power the pump during periods of low irradiation. The pump driven by a 3-phase AC motor draws water from a deep well. The pumped water is then fed into a reservoir or connected directly to irrigation systems.

The solar pumping inverter monitors and controls the system operation. It drives the pump by converting the DC power produced by the PV plant to AC power.

The inverter uses an internal algorithm to adjust its output frequency according to the level of the solar irradiation in real time, so that the whole system is always operating at optimal level to maximize the water flow (variable speed drive system of the pump).

The performance curve of the pump can be derived from the characteristics of the pumping system. It determines the frequency at which the pump generates the minimum water flow required – typically a range from 30 to 50 Hz. According to the respective frequency, the minimum power threshold and the operating capacity of the pump are defined and therewith the optimal size of the PV plant can be concluded.

SOLAR PUMPING – TAILORED TO YOUR NEEDS

Thanks to juwi’s expertise in engineering, we are able to offer individual solutions for any type of application. For each system, the parameters and set points will be adapted and programmed respecting the characteristic pressure curve of the pipeline and the total head of the irrigation system.

The sVSD is the perfect solution to cut down power generation costs for pumping applications in sunny regions. It is ideal for the agricultural sector and industrial customers with pumping hours in the daytime - especially in regions remote from the public grid.
CONTAINERIZED SOLUTIONS

For an easy and cost effective implementation of your project, juwi offers autonomous energy plants in isolated shipping containers.

Containerized power solutions have many advantages, amongst them are quick deployment, standardization of equipment and cost savings in terms of on-site construction. Due to its modular nature, the energy containers can be combined to increase system capacity, and can be duplicated across a region to ensure a harmonized deployment that simplifies maintenance. Our energy containers primarily use solar energy and can be equipped with other energy sources as well.

juwi develops own container solutions for energy systems from 50 kWp to several MWp. Depending on customer’s preferences, we can deliver a complete ready-to-use solution: a completely equipped container which only needs to be connected. The second alternative is a kit with inverters, solar modules and all other appliances for assembly on-site. Either way, you will receive a convenient plug & play solution with little installation effort and a secure way of storing the electrical equipment in an isolated container protected from heat and humidity.
Regions with unreliable public grids often suffer from electricity blackouts, which can lead to financial losses in small businesses or to critical situations in hospitals. Backup systems are a suitable solution to deliver a sustainable power supply even during grid failures. If such systems are combined with solar power, the energy in the battery storage is supplemented, thus extending the bridging time of the backup system. This also represents a desirable alternative to diesel generators as they require regular testing and maintenance.
Getting Started

We are happy to design an energy system according to your needs. Please complete the questionnaire which you can find on our website and email it back to us.

www.juwi.com / Off-Grid Power Supply
off-grid@juwi.com

Based on this information, we are able to draft a preliminary system layout and budget for your project.

The juwi Group

juwi is one of the world’s leading specialists for renewable energy with a strong regional presence. juwi offers project development as well as services for the energy turnaround. Our goal: 100 percent renewable energy. Our impetus: work together with passion to realize renewable energy economically and reliably. juwi was founded in 1996; today, the company employs around 1,500 people in more than 15 countries.

Company headquarters are located in Wörrstadt in Germany. From the headquarters and the subsidiaries, juwi develops, engineers and constructs off-grid projects – worldwide. These systems are energy supply solutions that are not connected to the public grid. They provide clean and renewable electricity for industrial and agricultural applications.