



Improving performance, securing returns.

## OPERATION AND MAINTENANCE SERVICES FOR SOLAR POWER PLANTS





## EVERYTHING YOU NEED FOR SMOOTH OPERATIONS. We put together your total care package

### **Maximum yield from optimal operations: 24 hours a day, 7 days a week, 365 days a year**

Your photovoltaic power plant will only deliver full return on your investment if it runs as smoothly as possible over its lifetime. As an operator of a solar power plant you also have to comply with regulations and standards and observe a fixed maintenance schedule with the associated audits.

Moreover, being prepared for risks is crucial: The problem need not be a short circuit in the inverter station, it might „simply“ be a rodent gnawing through a cable or a shadow being accidentally cast on the modules. The bottom line is that there is a threat of diminished output or even downtime that could have a permanently negative effect on returns.

- Inspections and maintenance work not carried out may result in damage to individual components and necessitate even greater repair work
- Damage, such as from a bolt of lightning or the cables catching fire through overheating, may cause losses of up to 10 percent of forecast yields
- The utility company can disconnect your solar power plant if the regulations on inspection and maintenance are not fulfilled and as an operator you may have to pay high fines as well
- Failure of individual components may invalidate a warrantee if certain precautions were not carried out professionally, such as the necessary cooling of the inverter station, proper cabling, etc.
- If work on the plant or on the site is not carried out by certified experts, you could be made liable and be required to pay damages

We can relieve you of these worries.

### **Today, Phoenix Solar already monitors and maintains a plant volume of way over 140 MWp in Europe alone**

As a photovoltaic system integrator with international operations, we combine professional operations management with preventive maintenance to ensure the continuous optimisation of your solar plant's output. We offer a wide range of one-stop shop services which can be selected and combined in accordance with your individual needs.

## OUR SERVICES – INDIVIDUAL OR AS A PACKAGE

### Service options

Phoenix Control Center  
 -----  
 – 24 × 7 × 365 monitoring  
 – Monitoring reports  
 (monthly/quarterly/yearly)  
 – Access with own login  
 -----  
 Annual inspection & maintenance  
 -----  
 Medium - voltage maintenance  
 -----  
 PV site maintenance  
 -----  
 Inverter maintenance  
 -----  
 Repair costs flat rate  
 -----  
 Low voltage supply for PV plant operation  
 -----  
 Site security

Can be taken individually  
 or combined as a  
 package

### Service packages

Monitoring	Basic	Comfort	Premium
x	x	x	x
	x	x	x
		x	x
			x
			x
			x
			x
on demand			

Version 07/2010



#### Phoenix Control Center monitoring system

##### 24×7×365 monitoring

Thanks to seamless remote monitoring with automated error analysis, we are able to ensure optimal steady-state operation and, if necessary, to implement immediate measures via our local service network in an emergency. Our goal is to be on-site before any faults occur.

##### Monitoring reports

##### (monthly/quarterly/yearly)

Uniform, standardised reporting with in-depth analyses shows the actual yield and the effective capacity utilisation of your photovoltaic power plant whatever the weather. The reports are issued monthly, quarterly and year on year. This means you have full transparency at all times.

#### Your own login

Your online access to the Phoenix Control Center allows you to view all key performance data at any time. All operating data and statistics are updated at 10-minute intervals and logged. So you can monitor all components in real time, independent of their manufacturer.



#### Annual inspection

Whether occupational health and safety or fire safety management, the inspection requirements placed on operators of photovoltaic power plants are very stringent. Our expert staff carries out annual inspection and maintenance, checks all the operating hardware and coordinates with the certified sub-contractors and the utility company involved. We make sure you are in compliance with all regulations, including the statutory audits and documentation.



#### **Medium-voltage maintenance**

All grid-connected photovoltaic power plants are linked up to the high-voltage network and are therefore a danger zone. Only qualified personnel are permitted access. There are extensive regulations governing the switching station itself. Maintenance must be carried out every two years and proof provided of any measures taken—such as changing the transformer oil, checking resistance to short-circuiting etc. If this is not done the power company may disconnect the power plant. Besides downtime, this will incur lost revenue and hefty fines.



#### **PV site maintenance**

High grass on the site and bushes and trees in the immediate vicinity can have a substantially negative impact on output. Site maintenance therefore involves cutting the grass and weed clearance. All work must be carried out in accordance with the regulations on occupational health and safety and the zoning ordinance, even if entrusted to a sub-contractor. If the customer wishes, we will also clean the modules.



#### **Inverter maintenance**

The inverter is the heart of the solar power plant. An ideal operating environment improves its efficiency and is the precondition for asserting warranty claims against the manufacturer. Consequently, the inverter station must have proper heating and cooling systems. Regularly exchanging the filter mats is also recommended, along with software updates and the cleaning of the inverter's components. We can take care of this.



#### **Repair costs flat rate**

Instead of setting aside large amounts of reserves, our customers can protect themselves against high repair costs by paying flat rate. As a result, the costs are calculable for the plant's life cycle and can be included in the profitability projections.



#### **Low-voltage supply**

Why not use the solar electricity you produce to run your own operations? Depending on prevailing regulations in the respective country and the plant's technical configurations, we can feed the electricity required through the plant's own cable connected up to the main grid. We will negotiate the best possible conditions with the local energy supplier and support you in all administrative tasks.





## **YOU CAN COUNT ON PHOENIX SOLAR.**

### **We are there – before you even need us**

#### **We secure and optimise your plant's performance on an ongoing basis**

- The solar parks which we currently monitor average 97 percent technical availability per calendar year at minimum
- We monitor all components and we ensure the timely replacement of individual components as required (condition management)
- Our repair costs flat rate makes forming reserves unnecessary
- Your personal emergency contact person and our on-site readiness ensure that potential downtime is kept to an absolute minimum

#### **This is what makes our monitoring and maintenance services so special**

- Phoenix Control Center: proprietary software solution enabling us to monitor in real time irrespective of the manufacturer, with SQL archiving of all data for a minimum of 20 years
- Preventive maintenance management: ongoing identification of failure and the fastest possible elimination during running operation
- Performance test: 14-day performance test of the entire plant, including detailed logging with full solar irradiation
- Expert know-how: carrying out of all work involved in technical operations, maintenance and repair by our own specialists

