



## THE solar solutions for YOU



### OFF-GRID – AUTONOMOUS – STAND ALONE SOLAR POWER SYSTEMS

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Certified ISO 9001 by



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## 1. Tss4U (“THE solar solutions for YOU”)

### 1.1 Prime business:

Solar Power Systems (SPS)

### 1.2 Specialization

#### SERVICES:

Design  
Engineering  
Assembly  
Supply  
Installation supervision  
Commissioning  
Training  
Consultancy

#### PROJECTS

Turnkey Solar Power Systems  
for a wide variety of applications  
  
Special Solar Power Systems for  
Cathodic Protection (CP)  
  
Solar Power Systems for special  
hazardous area application

### 1.3 Mission Statement

The mission of Tss4U is to provide innovative, reliable solar power systems, solar/wind hybrid systems, solutions and supporting services whilst developing long-term partnerships with our clients and suppliers.

These relationships are built on integrity, commitment, understanding and mutual trust.

### 1.4 Introduction

Tss4U is an **ISO 9001:2000** certified company dedicated to providing customised solar power system solutions.

Tss4U stands for "THE solar solutions for YOU". Its founders and staff have a lengthy experience from the very early start of solar power systems (SPS) for industrial customers worldwide.

Turnkey design, engineering, assembly and supply of PhotoVoltaic (PV) solar power systems and solutions are the core activity. Supporting activities are development of own charge controllers, Cathodic Protection (CP) output regulators and monitoring systems. Furthermore we provide services like consultancy, installation supervision, commissioning, training and after sales.

Interacting with the marketplace on a daily basis, we know where and how to locate, screen and apply adequate tools, materials and equipment for the provided solar power systems.

Tss4U is an independent solar system integrator. The Tss4U team has serviced especially the oil and gas industry worldwide for almost 25 years. They designed engineered and assembled systems that operate in both onshore and offshore locations and in safe as well as hazardous areas. Other areas of experience are in telecommunication, instrumentation and cathodic protection

Many satisfactorily operating solar power systems for a wide variety of customers bear witness to their good performance. For details please see reference list.

## 2. Quality

### 2.1 ISO 9001:2000

Tss4U is certified to ISO 9001:2000. Audit(s) performed by BVQi.

### 2.2 Quality Policy

Our policy is to serve our clients and maintain a prominent position in our industry.

We intend to achieve this goal by a process of continuously improving the quality of our services, systems and products.

In this context we define quality to mean complete conformance to agreed customer requirements.

Accomplishing this policy depends on the commitment by all of us to participate in total quality improvement.

Every one of us at every level is responsible for:

- Identifying precisely the quality requirements of our customers, whether internal or external – and
- Ensuring that the services, systems and products we deliver meet all those requirements - specifications, designs, materials, schedules and safety – first time, every time.
- By working together we shall achieve continuing improvement in the quality of every aspect of our work and so improve our performance and competitiveness.

### 2.3 Quality Objectives

- Meet the needs of our customers both internally and externally through a process of systematic quality improvement in the way we conduct our business.
- Measure the improvement in quality as we move towards our target – zero defects.
- Be responsible for quality improvement so that we each provide and receive information, data, material and services – right first time, every time.

### 2.4 Procedures

When acting as a consultant Tss4U will work in accordance with relevant standards for Solar Power Systems (SPS).

When acting as contractor Tss4U will work in accordance with relevant standards for the design and engineering of SPS.

For the assembly and installation works HSE standards, own or clients, will be observed.

QA/QC will be in compliance with Tss4U's manual and/or client's specific requirements.



## 2.5 ISO 9001:2000 certificate



### 3. The “Solar Power Systems” concept

- **CONCEPT STUDY**

Our extensive experience and expertise make us well qualified to come up with solutions for conceptual ideas or designs for our (potential) clients.

These solutions may provide the basis for consequent cost savings for you.

- **PRELIMINARY DESIGN**

As your turn-key solar power system supplier you will get a "state-of-the-art" solution.

- **DETAILED DESIGN**

If we have participated in the foregoing stages you can drastically reduce the design work. We don't get carried away with complex technology, but apply effective methods and tools to design a reliable easy-to-use solar power system.

- **IMPLEMENTATION**

Adequate tools and clear procedures allow us to complete orders and/or projects on time, within budget, according to specifications and in compliance with quality requirements. All components and systems are thoroughly tested and documented before delivery.

- **INSTALLATION**

Thanks to well established procedures and instructions you can install our solar power systems yourself. Nevertheless you may call on our installation supervision services to ensure that everything will be mounted in the right place and in the right way and so provide training on the job.

- **COMMISSIONING**

This is where you gain the benefits of efficient engineering, proven solutions and extensive testing. Our experienced commissioning engineers are familiar with the equipment and have been involved in the design, engineering and assembly of the solar power system from the very beginning.

- **OPERATION**

Maintenance, inspection and operating procedures are an integral part of the system. By applying these procedures you can maintain the aimed availability at lower operating costs, which means savings.

**Including Tss4U in the initial decision making process will save time and money, and result in an optimal functional and reliable system.**

## 4. Solar Power Systems

Solar power systems have been installed in a wide variety of applications. Solar power systems require low maintenance, allow unmanned operation and have a long lifetime -in other words cost of operation is low-. An additional advantage is that using solar power fits in a sustainable development strategy.

### 4.1 Stand-alone solar power systems

Solar power systems for stand-alone use consist of solar modules, batteries and regulator equipment. Depending on the application there are various design requirements for the total system set-up.

The design and sizing is carried out using advanced computer models. The program takes into account the local solar insolation, the performance of the modules and the type of battery, to ensure that the system meets the load requirements and optimises battery lifetime. The programme calculates the number of solar modules and the battery capacity, taking into consideration the required/requested autonomy. Autonomy means the number of days that the system can operate without power from the modules (e.g. during cloudy days.)

### 4.2 Pipelines: solar power for telemetry, telecommunication and cathodic protection

Pipeline operation generally requires various equipment to control or monitor trouble free performance like telemetry, telecommunication, blocking valves or cathodic protection systems.

#### Telemetry and telecommunications

An important issue is monitoring or alarms signalling the status of the solar generator. The usual alarms of a solar generator can be connected to the (tele-)communicating device and allow warning of maintenance personnel at a central location. Such warnings include pre-warning low battery voltage and load-disconnect.



*A telemetry system along a pipe line in U.A.E..  
Load =145 W continuous, area of the modules = 14 m<sup>2</sup>.*

### Cathodic protection

Solar powered cathodic protection units are normal solar power systems except for a special output regulator and some-times additional advanced monitoring equipment. Tss4U has developed its own output regulator for Cathodic Protection. This output regulator controls the output voltage and output current to the protected object. The current is constant under normal conditions with a maximum voltage to prevent excessive power flow to the protected object. Under normal conditions the voltage is less than the maximum voltage, and in this way the output regulator adapts automatically to varying soil resistance. As an option the regulator could measure the actual protection voltage on the object and control the power according to the required voltage.



*A Cathodic Protection system installed in West-Africa. Controllers and batteries installed in a 40 foot isolated seacontainer. Load =1200 W continuous.*

### **4.3 Offshore: solar and solar/wind hybrids for unmanned operations**

Solar and solar/wind hybrid generators offer attractive features like high reliability and low maintainability for offshore platforms, in hazardous or safe area. There are numerous examples of these types of applications of which the Iron Duke platform in the south Chinese Sea near Brunei is currently the largest.

The loads can range from DCS (distributed control systems), motor operated valves and remote telemetry units, to navigational aids and lights. During drilling



*Eex Zone 1 certified solar power generator for a unmanned platform in the South China Sea. Load = 2.71 kW continuous, area of the modules = 300 m<sup>2</sup>*

operation on the platform the modules are usually covered to protect them against dirt, and a generator on the rig takes over the power supply. In case the power system is installed in a hazardous area, its parts must be mounted in explosion-proof certified enclosures. Tss4U is an experienced supplier of explosion-proof certified solar and solar/wind hybrid power systems and has an exclusive license for the production of **ATEX-CENELEC zone 1 certified solar modules**.