



Commissioning Checks for Solar Power Plants

Service Description – Prices

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1. Introduction

Before taking over the solar power plant the investor should make a independent check of the quality of the delivered work. In addition the commissioning should be done according DIN EN 62446:

- Check of the compliance of the offered components with the required technical specifications.
- measurements of the strings (Uoc, Isc, ground resistance, partially U-I-curve, thermography)
- Determine potential problems.
- Assessment of the O&M-concept.
- Ensure of the long term availability of the power plant.

After having finished the independent commissioning work the investor is ready to formally take over the power plant.

2. Description of services

on-site-checks	<ul style="list-style-type: none"> - visual check of the installation - measurement of cabling/modules according IEC 61557-1:2007 - I-V-curve measurement of strings - check of cabling in order to secure mechanical and UV-protection. - check of lightning protection and earthing - check of the structure for proper mounting - check of the inverters to secure operation, mechanical and electrical protection. - check of communication devices - check of the complete documentation on site, schemas on different places of the installation. - check of the security system with functional check - independent power supply for monitoring and security system
documentation	<ul style="list-style-type: none"> - review of the completeness of the technical documentation. - check of strings and string plans. - check of the flash reports
plausibility checks	<ul style="list-style-type: none"> - dimension of the inverters - dimension of the cables - design of electrical protection - if requested a flash test in a independent institute (option, not included in basic cost)
yield estimation	<ul style="list-style-type: none"> - assessment of the yield estimation of the seller
operation and maintenance	<ul style="list-style-type: none"> - check of maintenance organization - Check of security concept - check of contracts (completeness, cost) - check of the functionality of the monitoring system - check of the operational design (for example accessibility of components that need maintenance - check of the practical framework for the maintenance (for example how to get on the roof, how to access string boxes, fuses and inverters etc.)
report	summary report with to do list
additional audits	if needed additional visit after having done the to do list.

Resources and equipment used:

- Meteonorm 7 including access to actual meteorological data, Meteonorm and SoDa
- Tri-Ka I-V-curve analyzer
- Infrared-camera
- GMC PVSun Memo Tester
- thermographic drone
- data base with production values
- other measuring equipment

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4. References

commissioning references

Projects before 2014	Power	Services	Mandated by	Date
roof mounted power plant in Albaterra South Spain	0.5 MW	commissioning audit	Swiss utility	July 2010
carport power plant in Huelva South Spain	2.6 MW	commissioning audit	Swiss utility	March 2011
roof top power plant near Sevilla South Spain	0.1 MW	commissioning audit	private investor	June 2011
green house power plant near Granada South Spain	4.3 MW	commissioning audit	Swiss utility	Apr 12
ground mounted power plant near Taranto/Italy	1.0 MW	Complete technical inspection on-site	Swiss Investor	Nov 12
ground mounted solar power plant near Nîmes/France	4.3 MW	commissioning audit	Swiss utility	Nov 13
roof mounted solar power plant Basel/Switzerland	0.8 MW	commissioning audit	Swiss utility	Nov 13
Projects 2014	Power	Services	Mandated by	Date
roof mounted solar power plant near Basel/Switzerland	2.0 MW	commissioning audit	private investor	Jan 14
roof mounted solar power plant near Basel/Switzerland	1.9 MW	commissioning audit	private investor	Feb 14
roof mounted solar power plant Basel/Switzerland	1.2 MW	commissioning audit	private investor	March 2014
roof mounted solar power plant Steg/Switzerland	0.45 MW	commissioning audit	private investor	Feb 14
roof mounted solar power plant Bellerive/Switzerland	0.30 MW	commissioning audit	private investor	March 2014
roof mounted solar power plant near Nyon/Switzerland	0.30 MW	commissioning audit	private investor	March 2014
ground mounted solar power plant near Aix/France	9.4 MW	commissioning audit	Swiss utility	Apr 14
In total we conducted in two years technical DD works and commissioning inspection for almost 70 MW . The complete power plant experience is 24 years, 92 MW and 90 installations, construction, quality management, technical DD, commissioning inspection.				

Technical DD references 2012

Projects 2012	Power	Services	Mandated by	Date
ground mounted power plant in Sicily/Italy	2.6 MW	Complete technical inspection on-site	Swiss Investor	January 2012
roof top power plant near Alès/France	1.0 MW	Complete technical inspection on-site	consulting company	May 2012
roof top power plant near Bordeaux/France	4.3 MW	Complete technical inspection on-site	consulting company	June 2012
ground mounted power plant in Piemonte	2.5 MW	Complete technical inspection on-site	Swiss Investor	Aug 12
roof top power plants in South Germany	1.4 MW	preliminary check	German Investor	Aug 12
ground mounted power plant near Bari/Italy	1.0 MW	Complete technical inspection on-site	Swiss Investor	Nov 12
ground mounted power plant near Taranto/Italy	0.9 MW	Complete technical inspection on-site	Swiss Investor	Nov 12
ground mounted power plant near Taranto/Italy	1.0 MW	Complete technical inspection on-site	Swiss Investor	Nov 12
Projects 2013	Power	Services	Mandated by	Date
roof top power plant near Zurich	0.1 MW	technical inspection on-site and control of documentation	Swiss utility	Feb 13
ground mounted solar power plant near Nîmes/France	4.3 MW	quality management during construction	Swiss utility	start Feb. 2013
roof top power plant near Milano	3.3 MW	Complete technical inspection on-site	Swiss Investor	March 2013
ground mounted power plant near Bari/Italy	1.0 MW	Complete technical inspection on-site	Swiss Investor	June 2013
ground mounted power plant near Brindisi/Italy	1.0 MW	Complete technical inspection on-site	Swiss Investor	June 2013
ground mounted solar power plant near Marseille/France	9.4 MW	quality management during construction	Swiss utility	start July 2013
ground mounted solar power plant near Marseille/France	4.5 MW	quality management during construction	Swiss utility	start July 2013
Projects 2014	Power	Services	Mandated by	Date
ground mounted power plant near Ravenna	2.3 MW	technical assessment	Swiss Investor	Jan 14
In total we conducted in two years technical DD works and commissioning inspection for almost 79 MW . The complete power plant experience is 24 years, 92 MW and 90 installations, construction, quality management,				

Cham, 24 April 2014