
Technical Certification Rating Concept for Photovoltaic Systems

Differentiating Quality PV

Standards & Methods for Underwriting Certainty

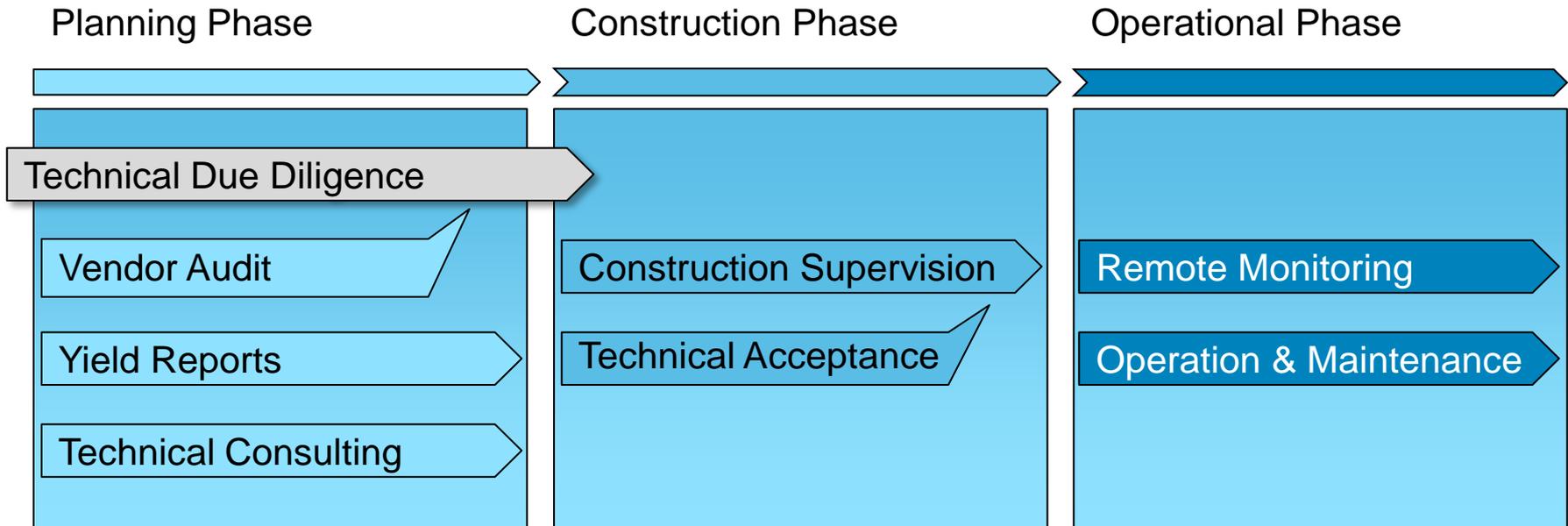
San Francisco, California

March 6, 2012

Benjamin A. Compton

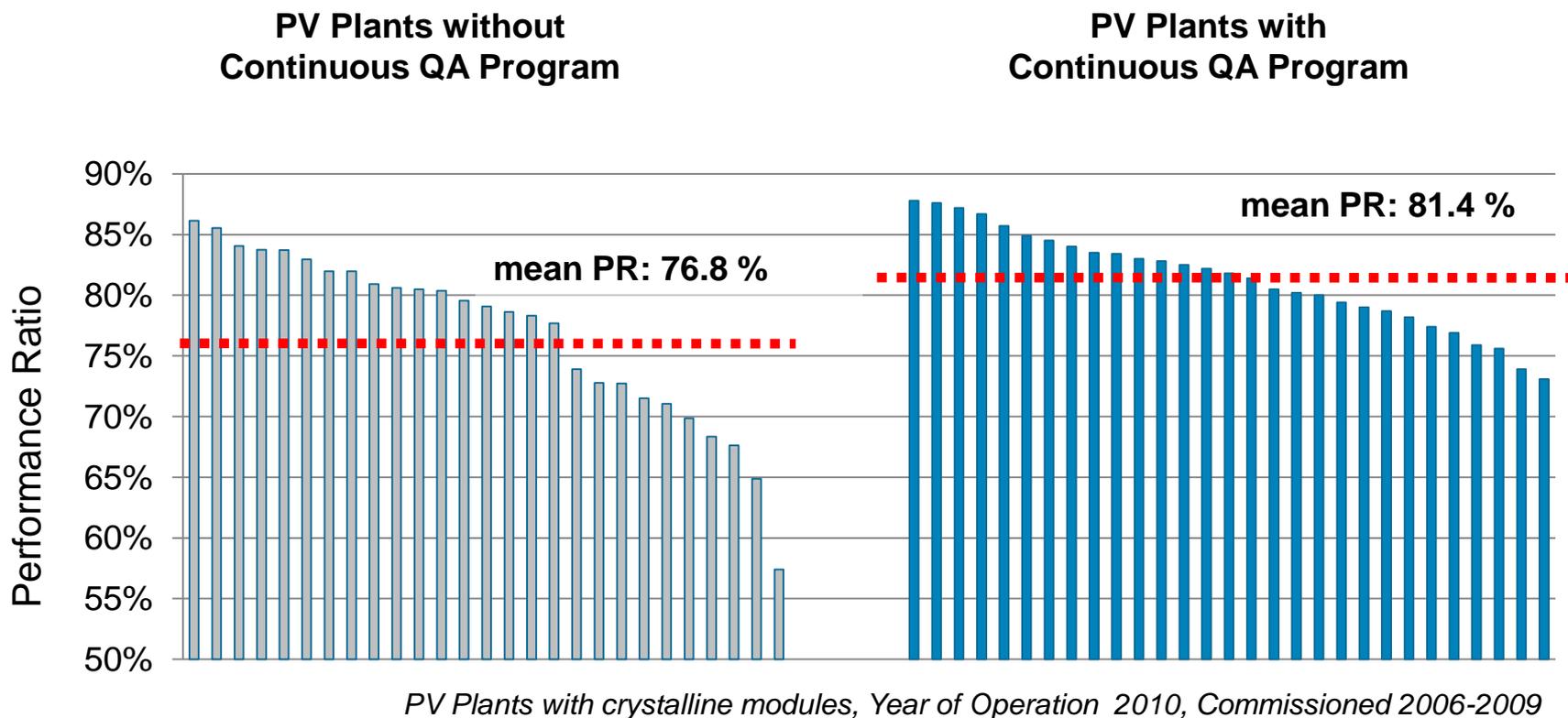
COO & VP Commercial Operations

Ensuring Higher Yields through Continuous Quality Assurance in Every Project Phase



1. Secure basis for investment decisions.
2. Early detection and correction of construction errors leads to fault-free start-up.
3. A professional monitoring system ensures stable returns.

Average Energy Yield Loss without Monitoring and Continuous Quality Assurance is 4% to 5%

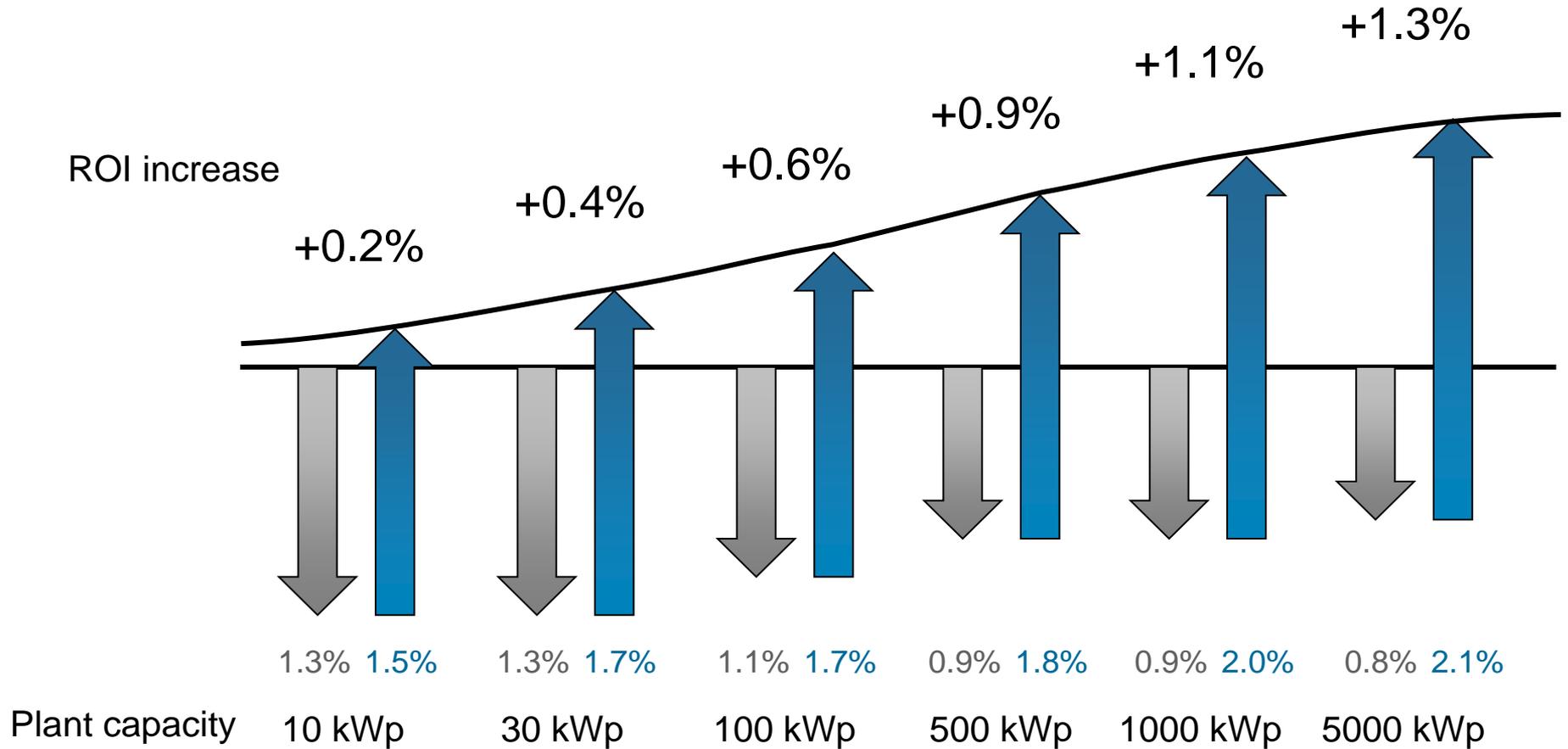


For comparison – according to Fraunhofer ISE

Yield Loss without continuous quality assurance: 3.6%

(Source: K. Kiefer, LBBW Renewable Energy Conference Leipzig, 2008)

Increased Financial Yield (ROI) with Monitoring and Continuous Quality Assurance Program



The ROI calculation is based on a typical plant configuration and standard assumptions for financing and taxes.

Why Rating/Certification of PV Power Plants?

- Investors and banks require a consistent and reliable basis of assessment for investment decisions
- Standards help insurance companies assess market risks uniformly
- Certifications / Ratings are a common instrument to cover these requirements
- Creates the ability to compare different projects



Ratings Scales of Large Credit Rating Agencies

Moody's	Standard & Poor's	Fitch	Designation	Description
Aaa	AAA	AAA	Prime	Credit risk is almost zero
Aa 1/2/3	AA +/-	AA +/-	High Grade	Very low credit risk. Safe investment with only slight risk of default
A 1/2/3	A +/-	A +/-	Upper Medium Grade	Low credit risk. The investment is safe without any unforeseen events
Baa 1/2/3	BBB +/-	BBB +/-	Lower Medium Grade	Moderate credit risk. On average, a good investment.
Ba 1/2/3	BB +/-	BB +/-	Non-Investment Grade Speculative	Speculative investment. Possible failures.
B 1/2/3	B +/-	B +/-	Highly speculative	Speculative investment. Likely failures.
Caa 1/2/3	CCC +/-	CCC	Substantial risks	Only with favorable development conditions are there no expected failures.
	CC		Extremely speculative	
	Ca		In default	
C	D	DDD/DD/D	In default with little prospect for recovery	In default. Major failures with little prospect for recovery.

meteocontrol Provides Comprehensive Quality Assurance in All Project Phases

Planning Phase

Construction Phase

Operational Phase

Technical Due Diligence

Vendor Audit

Yield Reports

Technical Consulting

Construction Supervision

Technical Acceptance

Remote Monitoring

Operation & Maintenance

PV Plant Technical Rating (Certification)



Comprehensive Catalog Reviews and Evaluates 469 Relevant Criteria

Planung	Kriterium	50%	25%	3	2	1	0	
Technisches Konzept & technische Komponenten	Strukturplan	A	3	Alle Vertragsbedingungen festgelegt und beschrieben	3	2	1	0
	Strukturplan in EPC Vertrag	A	3	alle Vertragsbedingungen festgelegt und beschrieben	3	2	1	0
	Definition und Beschreibung aller Vertragsbedingungen	A	3	vollständig	3	2	1	0
	Beschreibung Vertrags- und Lieferumfang	A	3	vollständig	3	2	1	0
	Lieferzeitpunkt	B	2	> 95% Nebenabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
	Status der Pläne	B	2	> 95% Hauptabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
	Status der Pläne	B	2	> 95% Hauptabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
Technische Kriterien	Definition und Beschreibung aller Vertragsbedingungen	A	3	vollständig	3	2	1	0
	Beschreibung Vertrags- und Lieferumfang	A	3	vollständig	3	2	1	0
	Lieferzeitpunkt	B	2	> 95% Nebenabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
	Status der Pläne	B	2	> 95% Hauptabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
	Status der Pläne	B	2	> 95% Hauptabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
	Status der Pläne	B	2	> 95% Hauptabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
Technische Dokumentation	Definition und Beschreibung aller Vertragsbedingungen	A	3	vollständig	3	2	1	0
	Beschreibung Vertrags- und Lieferumfang	A	3	vollständig	3	2	1	0
	Lieferzeitpunkt	B	2	> 95% Nebenabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
	Status der Pläne	B	2	> 95% Hauptabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
	Status der Pläne	B	2	> 95% Hauptabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
	Status der Pläne	B	2	> 95% Hauptabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
Betriebsphase	Definition und Beschreibung aller Vertragsbedingungen	A	3	vollständig	3	2	1	0
	Beschreibung Vertrags- und Lieferumfang	A	3	vollständig	3	2	1	0
	Lieferzeitpunkt	B	2	> 95% Nebenabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
	Status der Pläne	B	2	> 95% Hauptabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
	Status der Pläne	B	2	> 95% Hauptabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0
	Status der Pläne	B	2	> 95% Hauptabrechnung	3	2	1	0
	Erstprobetrieb	B	2	> 95% Hauptabrechnung	3	2	1	0

1. Planning phase
2. EPC contract
3. Construction phase
4. O&M contract
5. Operational phase

- Division into five assessment categories
- Weighted score for each criterion
- “Exclusion criteria“ results in devaluation
- Accredited process is the basis for rating
- Detailed report
- Feedback on the principal points
- Identification of weaknesses

- Detailed list of criteria to be applied for PV projects
- Clearly structured process for rating/certification
- Objective, reproducible assessment of all projects
- Accreditation by the German Accreditation Body (DAkkS) has begun
- Regular, independent quality assurance by DAkkS
- Objective: establishment of industry standards



1. • Provide all necessary materials and documents
2. • Yield simulation based on system configuration
3. • Technical Acceptance of the plant including performance check
4. • Assessment of the plant based on Criteria Catalog
5. • Examination of the rating result by the rating committee
6. • Presentation and disclosure of the client ratings
- Observation and repeat of the rating (3 to 5 years)

*A Technical Rating Certificate will be awarded
after review by the Rating Committee*



Dipl.-Ing. (FH) Martin Schneider

Managing Director, meteocontrol GmbH

M.S. Eng. Benjamin Compton
COO, meteocontrol North America



Dipl.-Ing. (FH) Robert Pfatischer

Managing Director, Head of PV Quality Services

M.S. Eng. Christopher Dunne P.E.
VP, meteocontrol North America

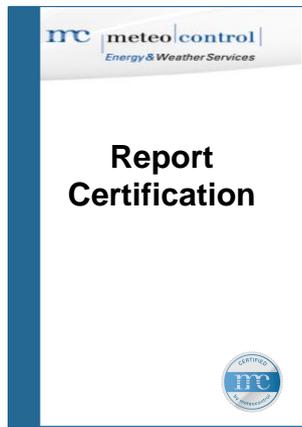


Dipl.-Phys. Dr. Daniel Faltermeier

Head of PV Technical Due Diligence

Dipl.-Phys. Dr. Henrik te Heesen
Head of Technical Operations





mc | meteo | control |
Energy & Weather Services

Technical Certificate

Photovoltaic Power Plant San Francisco

Rating Result AA+

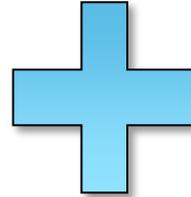
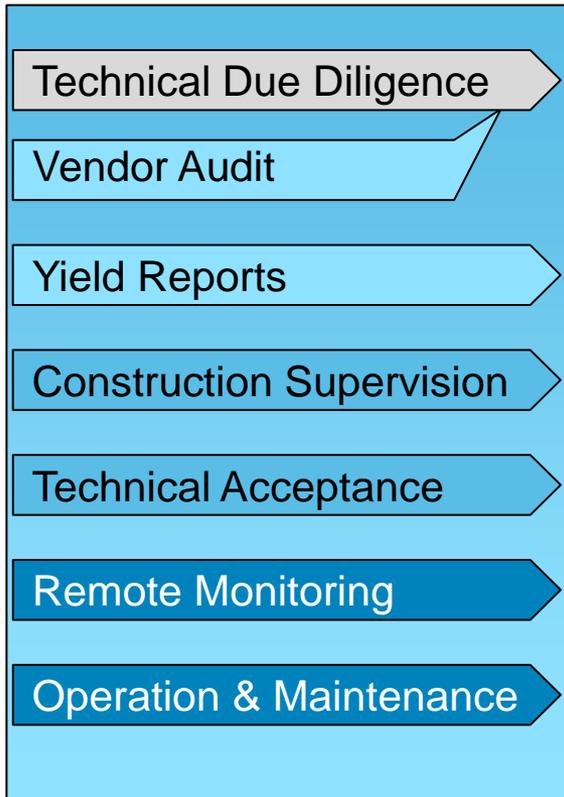
Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Lorem Ipsum

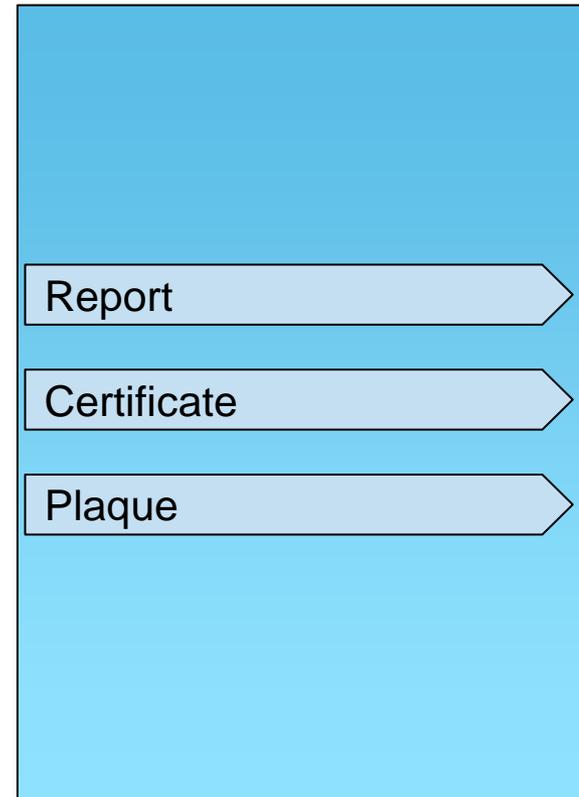


**Plaque
Certification**

Quality Assurance Concept



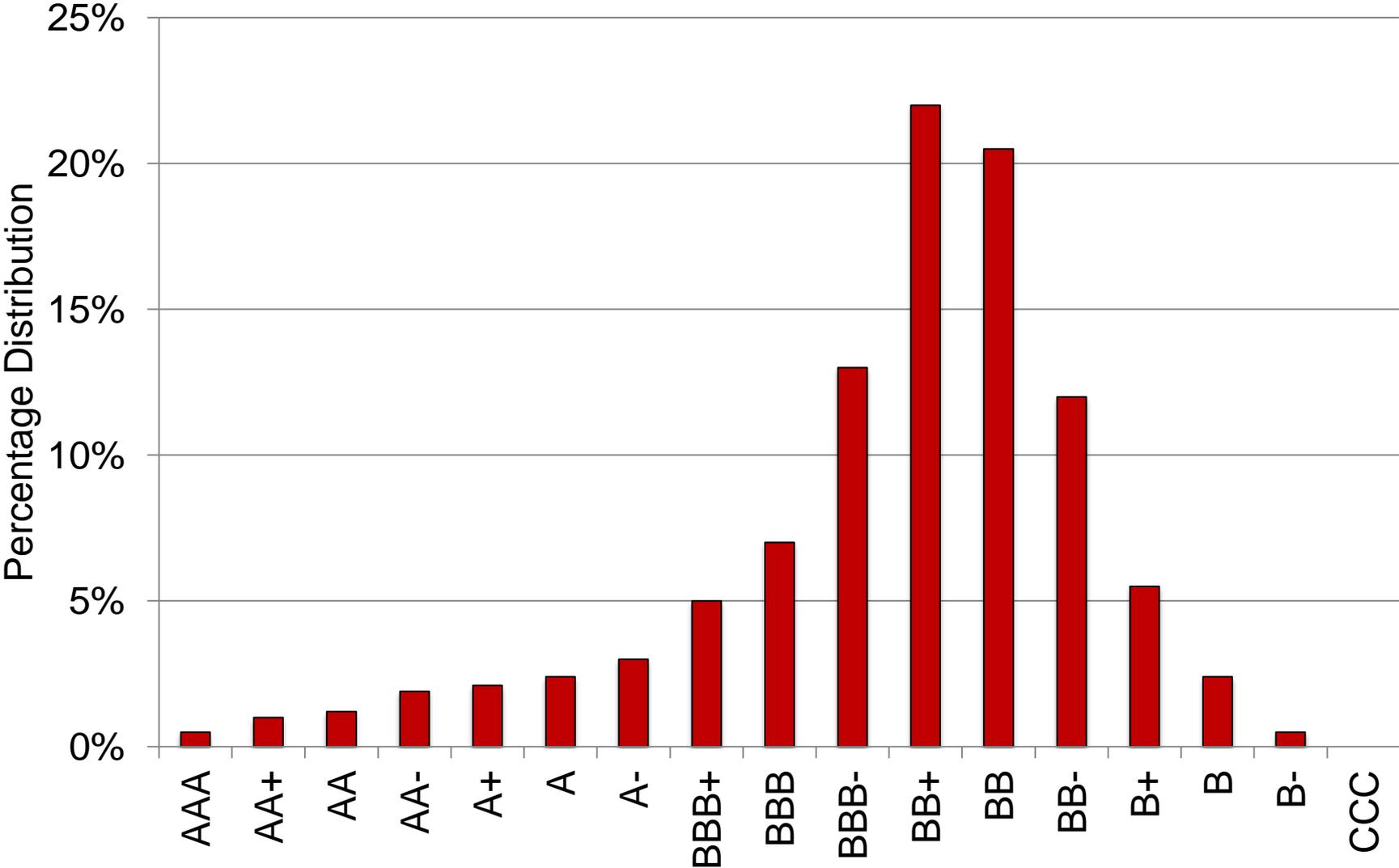
Technical Certification



Technical Ratings of PV Power Plants is based on International Financial Ratings

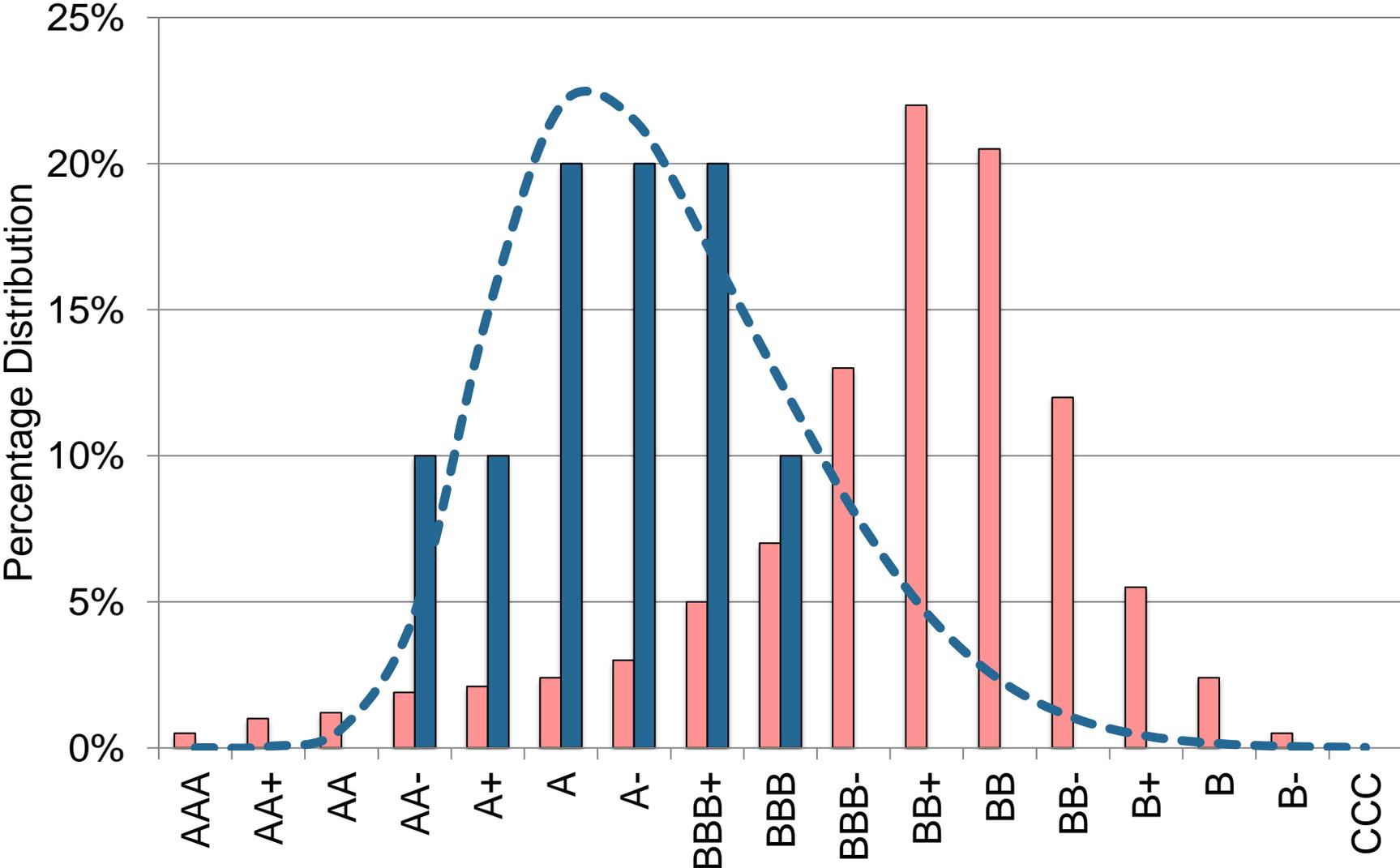
Rating	Designation	Description
AAA	Prime	Exceptionally good PV system. The risk of yield losses of the system is almost zero.
AA +/-	High Grade	Exceptionally good PV system. The risk of yield losses is low..
A +/-	Upper Medium Grade	Very good PV system. Only in the case of unforeseen events, there is a greater risk of yield losses.
BBB +/-	Lower Medium Grade	Good PV system. Under typical operation, problems may occur in rare cases that will cause greater yield losses.
BB +/-	Non Investment Grade speculative	Average PV system. Under typical operation, problems may occur that will cause a greater risk of yield losses.
B +/-	Highly Speculative	Below average PV system. Under typical operation, problems are likely that will cause greater yield losses.
CCC +/-	Substantial risks	Defective PV system. Only under favorable conditions, the risk of yield losses is minimal.
CC +/-	Extremely speculative	Very poor PV system. Only under very favorable conditions during the operation phase, the risk of yield losses is minimal.
C	In default with little prospect for recovery	Extremely poor PV system. The risk of yield losses in the normal operation of the plant is very high.

Ratings Distribution of a Typical Medium-Sized Portfolio



Source: Creditreform

Peak Distribution of the Rating of PV Plants is at "A"



Let it shine!!

Benjamin A. Compton
meteocontrol North America, Inc.
1001 Marina Village Parkway, Suite 403
Alameda, California, 94501 USA

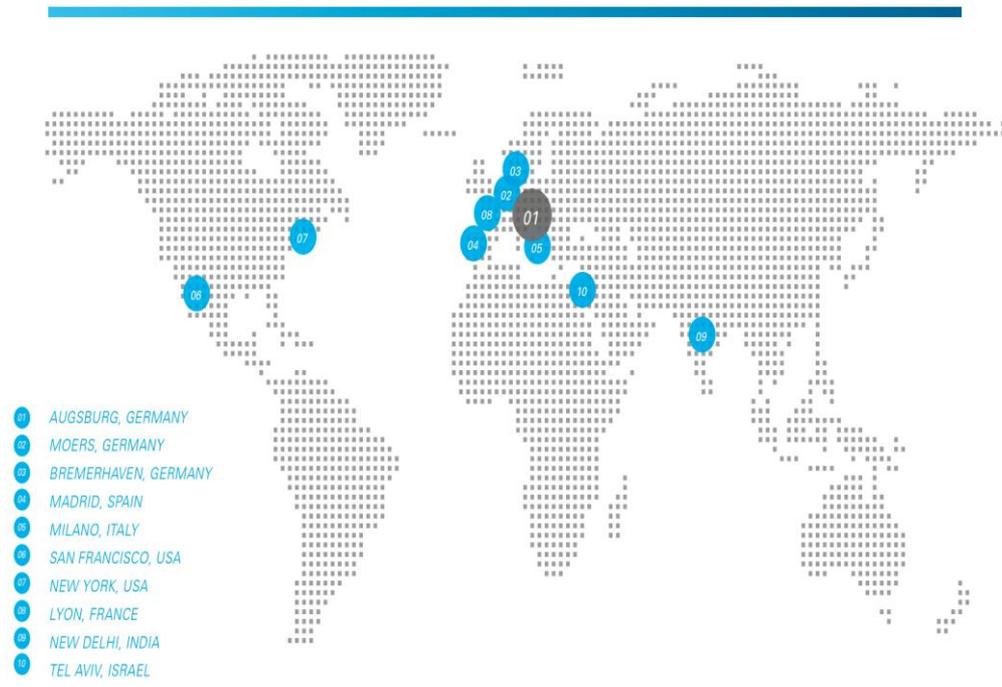
Phone +1 (510) 764-6474 | Fax +1 (510) 550-2884
info-na@meteocontrol.com | www.meteocontrol.com

Intellectual property rights:

Copyright meteocontrol North America, Inc., Alameda California (USA) and meteocontrol GmbH Augsburg (Germany). All rights reserved. Text, images, graphic arts and their layout are subject to intellectual property rights and other protective provisions. They shall not be copied for commercial purposes, nor shall they be distributed, changed or made available to third parties, without prior consent by meteocontrol North America, Inc. or meteocontrol GmbH. We explicitly state that images are in part subject to third parties' intellectual property rights.

About the company

- Over **30 years** of expertise with renewable energy systems
- **110 employees** at 8 locations
- Global leader in Monitoring and Analysis with **4.3 GWp in more than 24,000 PV Plants**
- Quality Assurance and Independent Engineering for PV plants with invested capital **over \$11 Billion**
- **150 MW+** under contract for Operations Management



METEOCONTROL OFFICES