Maschinen & Technik, Inc.
Syntegra Solar International AG
Engagement in PV Power Plant Projects
1. MATEC / Syntegra Solar Owners Engineer/Technical Advisor Services

2. MATEC / Syntegra Solar at a glance
**MATEC / Syntegra Solar Owners Engineer Services: a powerful process to achieve most favorable conditions in PV EPC contracts**

Technical Advisor / Owners Engineer Services for PV Power Plant Projects

<table>
<thead>
<tr>
<th>Concept Development</th>
<th>PV System Engineering</th>
<th>PV Power Plant Project Development</th>
<th>PV Power Plant Project Execution</th>
<th>Plant Operations Monitoring &amp; Servicing</th>
</tr>
</thead>
</table>

**Key Milestones of a PV Power Plant Project:**
- Concept Development and Decision Support
- Technical Feasibility and Commercial Viability Studies
- Initial PV Systems Design – Simulation of Key Metrics
- Support in obtaining all required Approvals / Permits
- Detailed Energy Harvest and Cash Flow Simulations
- Support in securing Project Financing
- Vendor Due Diligence
- Tender Documents Development and Tender Solicitation
- Bid Evaluation and Expert Recommendation
- Contract Negotiation Support
- Monitoring, Validation, Commissioning/FAT Due Diligences
- Supervision of Plant Performance and O&M Services

**Syntegra Solar Services and Support:**
- Develop and provide all data for a Go/No-Go Decision
- Bankable Reports: Proof of Soundness of Concept
- Robust quantitative data for Financial Model
- Providing all required data, information, documentation
- Energy harvest / cash flow optimization, bankable report
- Optional service to secure debt financing
- Pre-Selecting specialized EPC’s with proven track record
- Comprehensive management of Tender Solicitation
- Bid evaluation process closely attuned with customer
- Focus on guarantees, warranties, and timely execution
- Timely on-site supervision of Power Plant installation
- Know-how transfer during first years of operations
One-Stop-Shop TA / OE Services for PV Power Plant Projects: Expert processes to ensure on-budget / on-time project completion

One-Stop-Shop service provision: one partner, one interface, one to take responsibility for supervision of on-time / on-budget project completion

Phases of a PV Power Plant Project, from initial concept development to commissioning and operations

**Concept Development**
- Feasibility Studies
- Permit & Approval Support
- Project Financing Support
- Go/No-Go Decisi. Support

**PV System Engineering**
- PV System Layout
- Energy yield simulation
- System cost calculation
- Engineering of electrical and mechanical details

**PV Power Plant Project Development**
- Development of Tender Documents, Vendor DD
- Tender Solicitation
- Bid Evaluation
- Contract Negotiat. Support

**PV Power Plant Project Execution**
- Project management and organization set up
- Monitoring & Validation DD during installation
- Commissioning & FAT DD
- Bankable Reports for Debt Financing Release

**Plant Operations Monitoring & Servicing**
- PV System Performance Monitoring & Evaluation
- Operations & Maintenance Supervision (optional)
- Scheduled Board Reports on Plant Performance

© MATEC / Syntegra Solar
Technical Advisor Services for PV Power Plant Projects: Providing comfort to Owners, Banks and Lenders through all project steps

Technical Advisor Services provide comfort and ensure quality throughout all project steps

Customized Technical Advisor Service Packages

A) Technical & Commercial Evaluations: Technical Feasibility Studies; Advisory on initial PV Power Plant Layouts and PV technologies deployed; Energy Yield & Cash Flow Simulations, Assessment of Economic Viability

B) Tender Solicitation & Bid Selection: Development and Solicitation of Tender Documents for selected EPC firms, based on Vendor DD; Systematic, unbiased expert evaluation of bids received, independent recommendation; Contract negotiation support with a focus on technical matters, warranties & guarantees, O&M contracts

C) Technical Due Diligences & Supervision: During installation: Incoming goods control, hardware quality assurance, hardware vendor DD if requested; Supervision of Installation, Supervision of Commissioning and Final Acceptance Test

D) PV Power Plant Monitoring & Checks: On-line Performance Monitoring and Performance Checks; Optimization Audits

Syntegra Solar Advantages:

- Owners Engineer Service covers all technical issues from Project idea to Solar Power Generation
- Over one decade of Know How and Experience gained in key PV markets in Europe and Asia
- Syntegra Solar Owners Engineer services save costs, ensure quality and advance progress
- Syntegra Solar translates complex technical issues in a comprehensible basis for decision-making

Comfort based on in-depth technology expertise and longstanding references
The Tender Solicitation, Bid Evaluation and Contract Negotiation Process is a powerful element of Syntegra’s Owners Engineer Services

The key to obtain best offers in respect to price, performance, and quality: Tender Solicitation – Bid Evaluation – Contract Negotiation Support

The organization of the Tender Solicitation process will follow a defined set of steps and involves continued communications of expert levels, covering all technical and legal aspect of a PV Power Plant project, as well as professional project management, to assure a fully transparent tendering process:

- Preparation of Tender Documents according to owners specification and legal requirements
- Vendor Due Diligences – Identification of experienced EPC contractors with ample references
- Solicitation of Tender Documents to PV EPC firms
- Systematic, unbiased expert evaluation of bids received, according to customized Evaluation Matrix
- Independent Recommendation => Bid selection and award
<table>
<thead>
<tr>
<th>Selected References:</th>
<th>Project Profile</th>
</tr>
</thead>
</table>
| **Customer: Utility**  
Philippines  
2013 – 2014  
Construction in summer 2014 | 8 MWp PV Power Plant, connected to utilities’ grid under FIT scheme  
Full Owners Engineer Service package:  
• Technical and Economical Feasibility Studies  
• Tender Solicitation, Bid Evaluation and Contract Negotiation  
• Construction Supervision and Final Acceptance Test  
• Monitoring Due Diligence during operation |
| **Customer: CEPALCO**  
Mindanao, Philippines  
2010-2011 | 2 x 10 MWp, grid connected Solar Photovoltaic Plants  
Owners Engineer Service:  
• Technical and Economical Feasibility Study, Tendering  
• Qualification of EPC contractors  
• Bid evaluation and recommendation |
| **Customer: Project Developer,**  
BULGARIA  
2012 | 6,5 MWp, grid connected Solar Photovoltaic Park  
• Owners Engineer Services from concept evaluation to Tender Solicitation  
• Technical and economical Feasibility Study  
• Bidder qualification, Tender Solicitation process |
| **Customer: Investors, EPC Contractors**  
Europe  
2008 - 2014 | Several Solar PV Power Plants in Europe, totaling 100 MWp +  
Syntegra Solar Services:  
• Feasibility Studies, Investors Advisory, TA for MLA Mandated Lead Arranger  
• Tender Solicitation, Recommendation and Contract Negotiation support  
• Construction Supervision, Final Acceptance Test and Reporting, Monitoring Due Diligence, System Optimization |
| **Customer: EPC Contractor**  
GERMANY  
2009 + 2011 | 72,4 MWp PV Power Plant, Germany under German FIT regime  
Syntegra Solar TA Services:  
• Construction Supervision and Final Acceptance Test  
• Commissioning and Grid interconnection Due Diligence |
# Selected References:

**Technical Advisor Services for PV Power Plant Projects**

## MATEC / Syntegra Solar provides in-depth PV technology and PV manufacturing process expertise for PV production plant investments

<table>
<thead>
<tr>
<th>Selected References</th>
<th>Project Profile</th>
</tr>
</thead>
</table>
| **Customer/MLA: NORD LB and LBBW, various Landesbanken Germany 2008 – 2010** | Sunfilm a-Si Thin-Film PV Module Manufacturing Factory, 400 MWp, €150 Million Financing Vol. Owners Engineer Services with a focus on:  
- Technical Feasibility Studies on AMAT a-Si/μc-Si Thin Film Cell Technologies  
- Monitoring and Validation Due Diligences during Construction and Equipment Move-in  
- Due Diligences during Run-Up and Ramp-Up to nominal production capacity  
- Due Diligence on Commissioning, Supervision of Final Acceptance Testing  
- Operations Due Diligence during operation |
| **Customer: BTA Bank / EURASIA Investment Corporation Kazakhstan and Russia 2008 – 2010** | EURASIA Solar CIGS Thin-Film PV Module Manufacturing, 220 MWp, €165 Million Financing Vol. Owners Engineer Services with a focus on:  
- Technical Feasibility Studies on all relevant Thin Film PV Cell Technologies with a focus on CIGS TF-PV  
- Commercial Viability Analysis for > 200 MWp CIGS TF-PV Module Production Plants in Germany and Russia  
- Consulting and Advisory on available EU-wide subsidies for investments in new industry establishments  
- Contract Negotiation Support for large Investment in novel high-efficiency CIGS TF-PV Technology, focus on manufacturing equipment, advanced production processes, CIGS TF-PV cell technology innovation |
| **Customer: MASADR PV and SCB Standard Chartered Bank Germany and UAE (Abu Dhabi) 2009 – 2011** | MASDAR PV Thin-Film PV Module Manufacturing Factory 360 MWp, $220 Million Financing Vol. Owners Engineer Services with a focus on:  
- Validation on Technical Feasibility Studies on AMAT a-Si/μc-Si Thin Film Cell Technologies  
- Commercial Viability Analysis for MASDAR PV production in challenging market environment  
- Contract Negotiation Support on investment in production equipment and TF-PV cell technology innovation  
- Monitoring/Validation Due Diligences during R & D and Engineering of AMAT a-Si/μc-Si Pilot Production Plants  
- Due Diligences during Run-Up of Pilot Production and initial Ramp-Up to nominal production capacity |
| **Customer: IFC / World Bank China 2010/2011** | Suntech PLUTO High-Efficiency Mono-Crystalline PV Cell Technology, $ 103 Million Financing Vol. Consulting and Advisory Services with a focus on:  
- Technical Feasibility and commercial Viability Analysis and Studies  
- Process analysis and cost position validation on PLUTO High-Efficiency PV Cell Technology  
- Presentation of Bankable Reports to Investment Committees, Recommendation  
- Implementation Monitoring and Result Validation |
| **Customer/MLA: HSH Nord and LBB, other Landesbanken Germany 2009 - 2011** | Signet Solar Thin-Film PV Module Manufacturing Expansion to 200 MWp, €72 Mil Financing Vol. Owners Engineer Services with a focus on:  
- Monitoring and Validation Due Diligences during Construction and Equipment Move-In  
- Due Diligences during Run-Up and Ramp-Up to nominal production capacity  
- Due Diligence on Commissioning, Supervision of Final Acceptance Testing  
- Operations Due Diligence during operation |
Syntegra Solar, as a specialized PV Consulting and Advisory firm, has advised and is actively engaged in the development of a large number of PV Power Plant Projects.

In this role, Syntegra Solar enjoys an excellent track record with (strategic) investors, corporations and financial institutions.

Deep expertise along the entire PV value chain translates to superior services for PV Power Plants.
Selected References: Owners Engineer / Technical Advisor Services for PV Power Plant Projects

Selected References: General Contractor/Owners Engineer for state-of-the-art PV roof top systems

IBC 2 MWp Pilot PV Plant, 2005
Holzguenz 6 MWp Solar Park, 2010
Allmannshofen 7 MWp Solar PV Plant, 2011

Aerial views and photos of the Lieberose 73 MWp PV power plant, Germany (2008 – 2009). PV power plants of this size require substantial expertise in PV technology, installation, logistics and project management

MATEC / Syntegra Solar provides comprehensive Advisory & Consulting services for PV Power Plant projects
Selected References:
General Contractor/Owners Engineer for state-of-the-art PV roof top systems

Development incl. all permits & licenses, Design, Installation, Grid-Connection, Commissioning/ FAT, and Monitoring & Servicing

OPTOTECH 200 KW
PV roof-top system

GSI 120 KW
PV roof-top system

Lower left
St. Lucia, small 9 KW
residential PV system

Lower right
Grenada, small 12 KW
residential PV system

140 KW PV roof-top system on
small stadium, rural Germany

MATEC / Syntegra Solar develops, designs and delivers turn-key PV roof-top power systems in selected regions
Selected References:
General Contractor/Owners Engineer for state-of-the-art PV roof top systems

Development incl. all permits & licenses, Design, Installation, Grid-Connection, Commissioning/ FAT, and Monitoring & Servicing

11.76 kWp
PV roof-top system
Orphanage

4.32 kWp
PV roof-top system
Elem. School

Lower left
Alabang, small 7.6 kWp
residential PV system

Lower right
Alabang, small 12.74 kW
residential PV system

22 kWp Commercial PV roof-top system on Quezon City (3 phase)

MATEC / Syntegra Solar develops, designs and delivers turn-key PV roof-top power systems in selected regions
A 52 MWp PV Power Plant being is developed in Phase I on a high-altitude property located 40 km north-east of Santiago de Chile, adjacent to large Mining Strip areas operated by two mining companies (Anglo American, Codelco). The property and all property rights are owned by a privately held Investment Group “Toro Blanco”.

Specific Characteristics
The Toro Blanco property covers 4942 acres at an altitude of 1800m - 2900m. The area enjoys excellent solar radiation all year round with more than 2.240 KWh/m².

Key parameters are:
• 4942 Acres (app. 2000ha) at an altitude of 1800 m - 2700 m.
• Excellent conditions for very high daily energy yield at 6.15 kWh/m² average, peak of 9.2kWh/m², which translates to a simulated energy yield in excess of 2000 KWh/KWP (10 year average).
• Infrastructure readily available: a high-voltage power line runs through property allowing for comparably easy grid-connection.
• Toro Blanco PV Power Plant(s) are to be connected to the Chilean Central Grid, where favorable PPA’s and power rates apply. The option to serve the Santiago de Chile Metro Region, where peak power prices in excess of 300 US$/MWh currently apply, is being discussed.
• Due to extensive Mining Operations in the area, road infrastructure fully available

Status
• PV Power Plant project approved by Toro Blanco Investment Group.
• Lead investor and Project Financer in Toro Blanco identified, MOU signed
• For Phase I of the Toro Blanco Project, a PV system lay-out for a 52 MWp Power Plant has been designed.
• Technical feasibility and environmental assessment studies confirm suitability for a larger PV power plant installation.
• Grid connection Study commissioned – negotiations with grid operator under way
• Kick-off for installation of PV Power Plant in Summer 2014
1. MATEC / Syntegra Solar Owners Engineer/Technical Advisor Services

2. MATEC / Syntegra Solar at a glance
Syntegra Solar is a specialized Consulting & Advisory and Project Development firm recognized for its focus and expertise in renewable energies and clean technologies.

Its partners are previous industry executives, investors and entrepreneurs with a proven track record of a long-standing, direct experience in the clean technology sector, namely in Photovoltaics.

Syntegra has build an extensive network in the RE/PV industry, enjoying an excellent reputation with corporations, strategic investors and financial institutions, as well as government agencies.

For details and references please visit our website www.Syntegra-solar.com
MATEC is a Philippine company with a multi-disciplinary staff of Electrical and Mechanical Engineers and industry specialists with extensive experience in solar power system design and installation. Our capabilities range from small residential solar system all the way to a commercial and industrial grid-tied PV plants. We will strive to find the most optimal PV power systems for each customer's need.

For details and references please visit our website [www.matec.com.ph](http://www.matec.com.ph)
MATEC / Syntegra enjoys an excellent track record with PV Industry Players worldwide as well as with strategic investors and financial institutions, with ample references.

### Seasoned PV Experts and Entrepreneurs, with decades of proven track record

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Children</th>
<th>Languages</th>
<th>Fields</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathias G. Kothe</td>
<td>57</td>
<td>Four children</td>
<td>German, English</td>
<td>Photovoltaics, Solar Thermal</td>
<td>20+ years of experience as entrepreneur, consultant and executive in the PV industry</td>
</tr>
<tr>
<td>Christoph Biedermann</td>
<td>57</td>
<td>Three children</td>
<td>German, English, French</td>
<td>Photovoltaics, Wind Energy, High Power Semiconductors</td>
<td>20+ years of experience in management positions and top management consulting</td>
</tr>
<tr>
<td>Dr. Guido Agostinelli</td>
<td>44</td>
<td>Three children</td>
<td>Italian, English, French</td>
<td>Photovoltaics, Storage, Smart Grids, e-mobility, Energy Efficiency</td>
<td>18 years of experience as manager in the clean technology vertical in R&amp;D, industry and finance</td>
</tr>
<tr>
<td>Tobias Preuss</td>
<td>31</td>
<td></td>
<td>German, English, Spanish</td>
<td>PV Power Systems, PV Power Plants</td>
<td>Certified expert in PV system design and engineering, due diligence, damage appraisal</td>
</tr>
<tr>
<td>Gianni Operto</td>
<td>58</td>
<td>Four Children</td>
<td>German, English, Italian, French, Spanish, Portuguese</td>
<td>Cleantech, Renewable Energies</td>
<td>17 years in senior management positions and 13 years of experience in Cleantech Venture Capital</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MSc Mech. Engineering, Venture Capital, Good Energies, Emerald, NexTech</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vast Board Experience, CEO Zurich Electric Utility</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VP, ABB Power Generation</td>
</tr>
</tbody>
</table>

**Mathias G. Kothe**
- MSc Engineering, MBA MIT Sloan School
- Founder/CEO of Grenada Solar, Solar Arabia
- VP, Siemens Solar GmbH
- Department Head, BMW
- Senior VP, Deutsche Flugsicherung

**Christoph Biedermann**
- MSc Engineering, MBA INSEAD
- Turn-Around Management as CEO and in interim CEO position
- Global head and member of the EC, ABB Group
- Senior VP and member of the EC, Ciba

**Dr. Guido Agostinelli**
- MSc Physics, PhD Engineering, EMBA Bocconi
- Co-founder, RERA Solutions
- Venture Capital, Good Energies
- Team Leader, IMEC
- Freelance, AMS Ingenieurbüro

**Tobias Preuss**
- Dipl.-Ing. Power Engineering, Certification Expert for PV Systems TÜV Rheinland
- Commercial/Industrial PV rooftop systems
- Supervision and Quality Management of 50+MWp ground mounted solar parks

**Gianni Operto**
- MSc Mechanical Engineering
- Venture Capital, Good Energies, Emerald, NexTech
- Vast Board Experience
- CEO Zurich Electric Utility
- VP, ABB Power Generation
MATEC / Syntegra Solar partners are previous industry executives, entrepreneurs and Investors with a long-standing, direct experience in the clean tech industry

Seasoned PV Experts and Entrepreneurs, with decades of proven track record

Dr. Guenter Matschuck
Age 72
Five children
German, English, French
Power Plant Engineering
Thermal, Hydro, Solar PV

45+ years experience in Eng. & Marketing Power Generation (Fossil & RE), 35 years in Philippines
• Ph.D./Ass. Prof. Engineering, Tech. Univ. Aachen
• Member of the Mgmt. Board, Krupp Iran
• CEO/Partner, Maschinen & Technik (MATEC)
• Co-Founder/President German-Phil. Chamber of Commerce & Industry, Phil. Solar Power Alliance

Jose S. Tadlas
Age: 48
Four children
English
PV Power Systems
PV Power Plants Interconnection

23 + years experience in Electrical Utility Systems & Designs. Career Civil Service professional
• Assistant Electrical Engineer license holder
• Master Electrical Engineer – Western Institute of Technology
• Bachelor of Law at University of St. La Salle
• Planning & Design, Analysis of utility grid
• Engineering service of utility from generation, transmission, distribution & utilization of electric power
• Evaluation of economic of major capital expenditure projects

Caldwell S. Hoey
Age 30
English
PV Power Systems
PV Design for on grid and off-grid

4 + years experience in Marketing of Renewable Energy projects, feasibility studies
• Bachelor of Science in Business Administration & Economics – University of Nevada, USA
• Financial Analysts, Merrill Lynch, UNLV Financial Management Association
• Procurement of electrical & PV components
• Five years in Jr. Management position

Neil E. Capistrano
Age: 25
English
PV Power Systems

3 + years experience in Design of PV system and implementation
• Bachelor of Science in Electrical Engineering – Technological Institute of the Philippines
• Registered Electrical Engineer with the Philippine Regulation Commission
• Member of Institute of Integrated of Electrical Engineer
• Supervision & Installation of various PV rooftop installation
• Design, supervision of PV rooftop for on-grid and off-grid
35 Years Experience in Philippine Energy Sector

Maschinen & Technik, Inc.  
(Since 1979) 
Tech Center, Buencamino St., Alabang, Muntinlupa City 1770, PHILIPPINES 
Tel.: +632 850 6450 | Fax: +632 850 3631 
Syntegra Solar Intl. AG

Rumpenheimer Schloss 15, 63075 Offenbach am Main, GERMANY
Tel.: +49 (69) 8999 4196 | Mobil: +49 (173) 653 4196 | Fax: +49 (69) 8999 4198