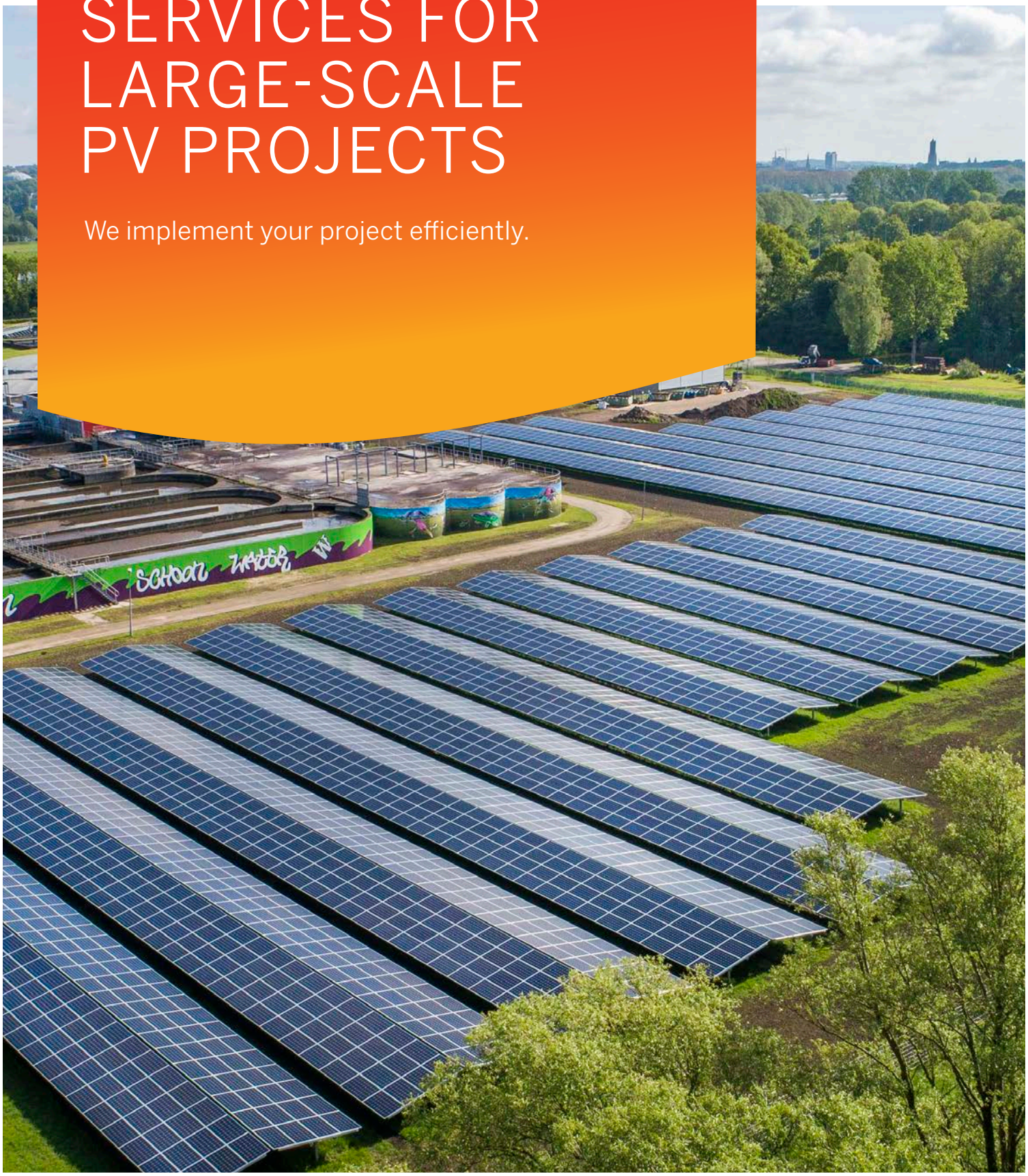
TECHNICAL ENGINEERING SERVICES FOR LARGE-SCALE PV PROJECTS

We implement your project efficiently.



UNIQUE WORLDWIDE PROJECT SERVICES FROM IBC SOLAR.

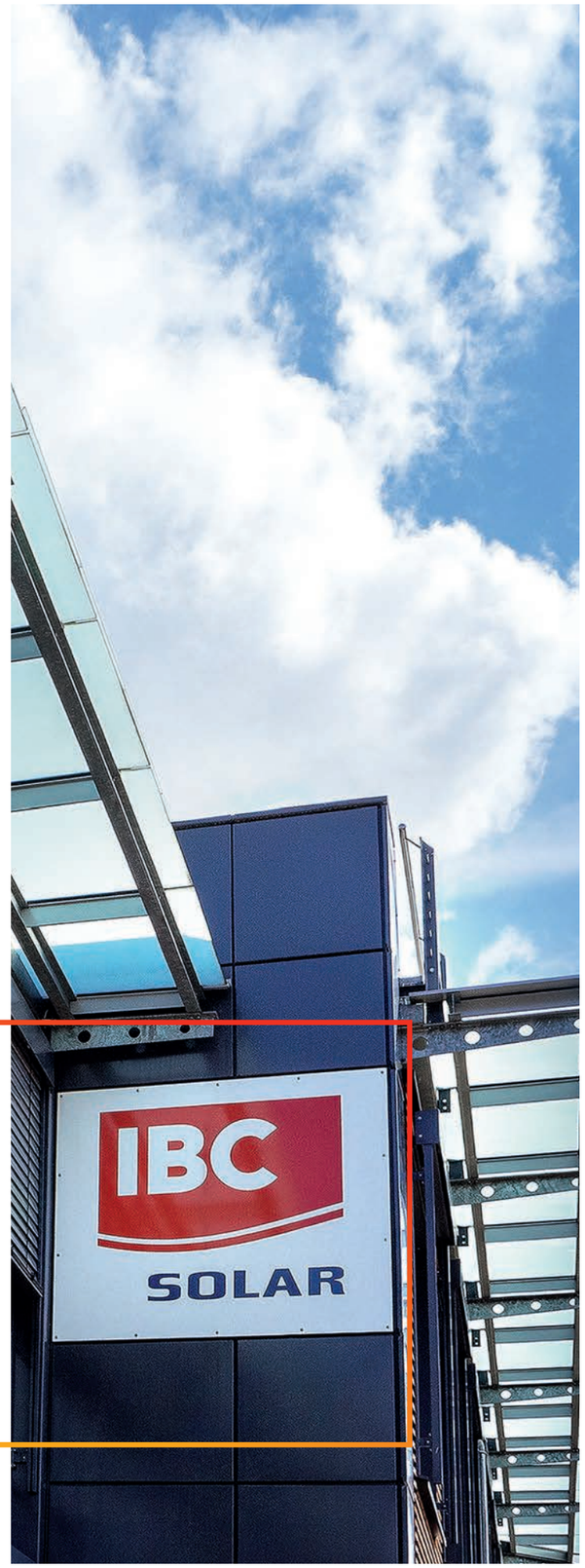
IBC SOLAR is a leading global provider of photovoltaic and energy storage solutions and services. The company offers complete systems and covers the entire product range from planning up to and including the turnkey handover of photovoltaic systems.

The family owned and operated company is your trustworthy and reliable partner. Internationally renowned rating agencies approve our economic strength, financial independence, and long-term stability. Our technical services for large-scale PV projects allow you to develop and implement both systems for commercial customers and large solar parks that deliver above-average yields.

We support you with conceiving, planning and implementing your PV projects without the need for additional employees. We guarantee high quality standards in all project phases while adhering to the time schedule and accompany you until the final perfectly producing PV system.

YOUR BENEFITS:

- High quality technical engineering services
- Many years of experience in the international PV industry
- German product warranties backed by financial collateral
- Long-term performance guarantees
- IBC SOLAR as financially solid project partner
- 4.7 GW installed capacity worldwide

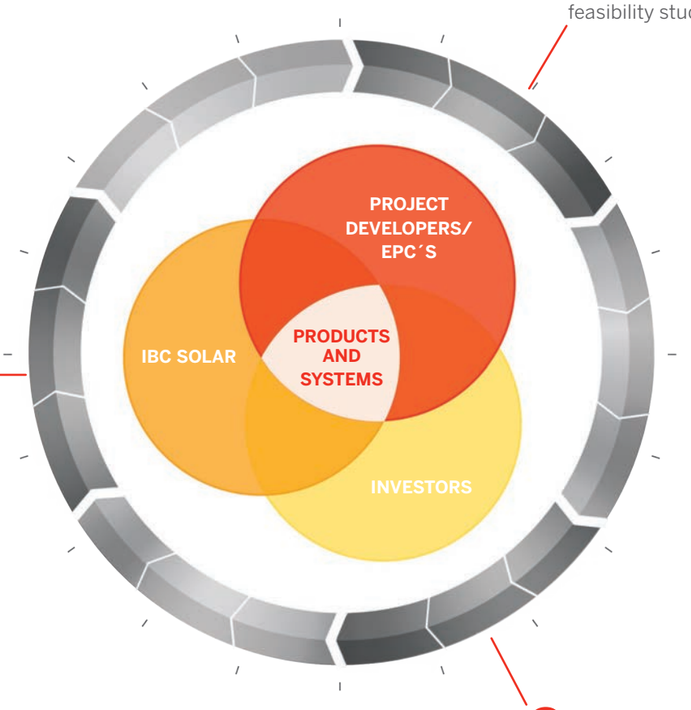


COVER PICTURE: Ground mounted system in Arnhem, the Netherlands with 2.2 MWp nominal power

OUR SERVICES IN 3 STEPS

The simplest way of project implementation.

1 FEASIBILITY STUDY
- Technical feasibility study
- Financial feasibility study



3 PROJECT REALISATION
- Project management
- Site management
- Commissioning

2 ENGINEERING
- DC Engineering
- AC Engineering
- Monitoring

FEASIBILITY STUDY

Before starting the project.

Before starting any project it is essential to determine whether your intended project is both technically and financially feasible. During the technical concept phase, experienced IBC SOLAR engineers create an area plan for you and use software to calculate how large the system can be. The financial concept then compares costs and revenue, taking into account all capital and operating expenditures (CAPEX and OPEX), to determine the electricity generation costs. The result of the feasibility study is a comprehensive project concept with a list of components (BOM) and a cost summary.

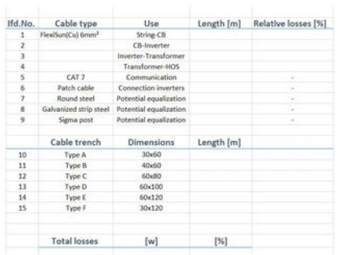
This allows you to evaluate whether it is worth investing in the project, and to what extent electricity generation using solar power is more economical than grid supply or diesel costs. What is more, it may also be worthwhile participating in tenders with your project.

TECHNICAL FEASIBILITY STUDY

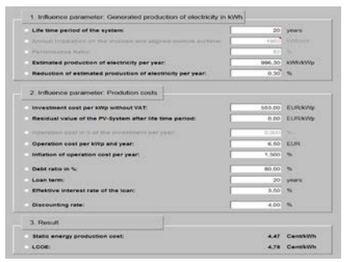
- Technical concept
- Estimated bill of materials (BOM)
- Expected workload

FINANCIAL FEASIBILITY STUDY

- Yield analysis
- Calculation of electricity production costs



lfd.No.	Cable type	Use	Length [m]	Relative losses [%]
1	FlexiSun(Cu) 6mm²	String-CB		
2		CB-Inverter		
3		Inverter-Transformer		
4		Transformer-HOS		
5	CAT 7	Communication		-
6	Patch cable	Connection inverters		-
7	Round steel	Potential equalization		-
8	Galvanized strip steel	Potential equalization		-
9	Sigma post	Potential equalization		-
	Cable trench	Dimensions	Length [m]	
10	Type A	30x50		
11	Type B	40x60		
12	Type C	60x80		
13	Type D	60x100		
14	Type E	60x120		
15	Type F	30x120		
	Total losses	[w]	[%]	



1. Influence parameter: Generated production of electricity in kWh

Life time period of the system:	20	years
Annual reduction of the module and aligned-module surface:	100%	kWh/year
Performance Ratio:	82	%
Estimated production of electricity per year:	996.50	kWh/kWp
Reduction of estimated production of electricity per year:	0.50	%

2. Influence parameter: Prodution costs

Investment cost per kWp without VAT:	565.00	EUR/kWp
Residual value of the PV-System after life time period:	0.00	EUR/kWp
Operation cost in % of the investment per year:	0.000	%
Operation cost per kWp and year:	6.50	EUR
Inflation of operation cost per year:	1.500	%
Debt ratio in %:	80.00	%
Loan term:	20	years
Effektive interest rate of the loan:	3.50	%
Discounting rate:	4.00	%

3. Result

Static energy production cost:	4.47	Cent/kWh
LCOE:	4.78	Cent/kWh

A comprehensive PVSyst analysis is included in the project section FEASIBILITY for both technical and financial feasibility.

ENGINEERING

The project is starting to take shape.

After the feasibility study and taking the decision to proceed with the project follows the detailed engineering phase in which the project plan will be set up for the PV system construction. We will provide you with all necessary documents and technical drawings from single line diagrams to mechanical and civil construction plans.

Moreover, we set up a medium voltage design and, if required, we devise the system monitoring and take care of how to connect the system properly to the grid. So you can rely on maximum project safety and smooth system operation upon project completion. What is more, your investments and those of your customer are appropriately secured.

DC ENGINEERING

- DC Single Line Diagram
- (Electrical) string plan
- Mechanical plan (for mounting structure)
- Building site plan

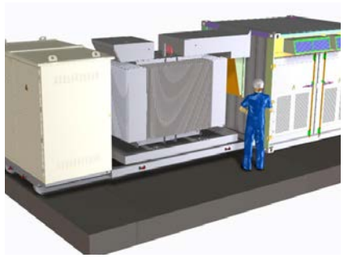
AC ENGINEERING

Clarification of connection point to the grid with the grid operator:

- AC Single Line Diagram
- Medium voltage design

MONITORING

- Monitoring Single Line Diagram
- Design of plant monitoring according to IEC 61724 for calculation of the performance ratio



PROJECT REALISATION

The project is becoming reality.

In the third and last stage of your project, the project realisation, you will get a project schedule including all milestones and plans for construction and logistics. TÜV certified engineers with extensive project experience from over 1000 projects take over the construction supervision on site and support you during commissioning of the system. This protects you against faulty installation, saves you additional working days and secures the yield and thus also profit. In addition, with a perfectly working PV system you can count on your customer's recommendation for future projects.

PROJECT MANAGEMENT

Precise and reliable planning from Germany.

- Project management plan including tasks, milestones, and deadlines
- Construction schedule: all steps from the very beginning to the commissioning, and recommendations on how to shorten the construction period.

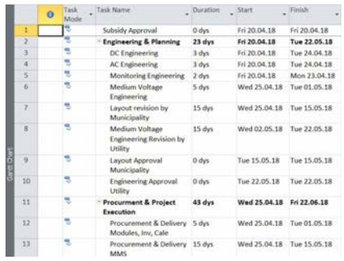
SITE MANAGEMENT

Securing the investment:

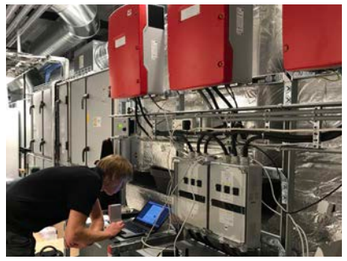
- TÜV certified site manager
- General recommendations for site management
- PV specific support of site management
- Site management manual

COMMISSIONING

- On-site engineering support by IBC SOLAR engineers
- Commissioning in accordance with IEC 62446
- Commissioning of the inverters and monitoring



	Task Mode	Task Name	Duration	Start	Finish
1		Subsidy Approval	0 dys	Fri 20.04.18	Fri 20.04.18
2		**Engineering & Planning**	**23 dys**	**Fri 20.04.18**	**Tue 22.05.18**
3		DC Engineering	3 dys	Fri 20.04.18	Tue 24.04.18
4		AC Engineering	3 dys	Fri 20.04.18	Tue 24.04.18
5		Monitoring Engineering	2 dys	Fri 20.04.18	Mon 23.04.18
6		Medium Voltage Engineering	5 dys	Wed 25.04.18	Tue 01.05.18
7		Layout revision by Municipality	15 dys	Wed 25.04.18	Tue 15.05.18
8		Medium Voltage Engineering Revision by Utility	15 dys	Wed 02.05.18	Tue 22.05.18
9		Layout Approval Municipality	0 dys	Tue 15.05.18	Tue 15.05.18
10		Engineering Approval Utility	0 dys	Tue 22.05.18	Tue 22.05.18
11		**Procurment & Project Execution**	**43 dys**	**Wed 25.04.18**	**Fri 22.06.18**
12		Procurement & Delivery Modules, Inv, Cale	5 dys	Wed 25.04.18	Tue 01.05.18
13		Procurement & Delivery MMS	15 dys	Wed 25.04.18	Tue 15.05.18



OUR EXPERTS

Extensive engineering competence for your project.

A team of experienced engineers will plan your PV system and are available to answer all your questions. So you always have an expert on hand and you won't require any additional staff.

DIETER MIENER

Team leader
Technical Application Engineer

TÜV certified surveyor for PV systems
Energy Efficiency Representative (TÜV)

FABIAN BAHMANN

Technical Application Engineer

Business Engineering Graduate

AHMAD ALNAJDAWI

Technical Application Engineer

Bachelor of (Renewable) Energy Engineering

THEODOR REKLIN

Technical Application Engineer

Bachelor of Applied Engineering Science

JOSÉ LUIS GÓMEZ

Technical Application Engineer

Graduate of Industrial Engineering, specialized in Electronics and Automation

REFERENCE PROJECTS

ROOF MOUNTED SYSTEMS

SWITZERLAND
Rothenburg (LU)
Nominal power: **1.5 MWp**

SWEDEN
Morgongåva
Nominal power: **1.5 MWp**

JAMAICA
Hanover
Nominal power: **1.6 MWp**

GERMANY
Pasing (Munich)
Nominal power: **1.2 MWp**

LEBANON
Halat
Nominal power: **75 kWp**

REFERENCE PROJECTS
GROUND MOUNTED SYSTEMS

TURKEY
Mersin
Nominal power: **11.4 MWp**

JAPAN
Saitama and Ibaraki
Nominal power: **3.5 MWp**

MOROCCO
Aftissat
Nominal power: **126 kWp**

ITALY
Maniago
Nominal power: **5 MWp**

COLOMBIA
Sabanalarga, Atlántico
Nominal power: **327 kWp**

THE WAY TO A SUCCESSFUL PV PROJECT

Straightforward, fast, professional.

1 **ARE YOU LOOKING FOR PROFESSIONAL PROJECT IMPLEMENTATION?**
We offer you a tailor-made solution.

2 **SELECT YOUR REQUIRED SERVICES.**
You can find a detailed overview with service costs in the international IBC SOLAR customer portal at **https://portal.ibc-solar.com**.
We are also happy to send you this overview by e-mail upon request.

3 **DO YOU NEED ANY FURTHER INFORMATION?**
Do not hesitate to contact us by phone **+49 9573 9224 - 487**
or by e-mail at **Get-Technical-Support@ibc-solar.com**.

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