



Best-in-class for utility-scale PV power plants



Agenda

1

Technology and Financials

2

ROI Comparison Global Service and Quality

3

SMA Service Protecting your Investment

Financials of a PV power plant



Translating technological leadership into financial benefits

- > The inverter is the „brain of a power plant“ with strong influence on performance and stability of cash flow
- > In large scale PV investment price per kWp alone can be a misleading evaluation criteria



▶ Integrating technological leadership with a coherent business approach generates maximum yields

Increasing project bankability by choosing the right company

- > More than 30 years of experience
- > More than 22 GW installed SMA inverter capacity worldwide
- > Over € 500 million net cash¹⁾
- > Fitch Investment Grade - BBB or higher
- > Low financial gearing
- > Global footprint: global flexible manufacturing, global sales and service
- > Fast service reaction times due to tight global service network and local subsidiary
- > Strong brand with premium quality brand image and good company reputation
- > Strong financial balance sheet

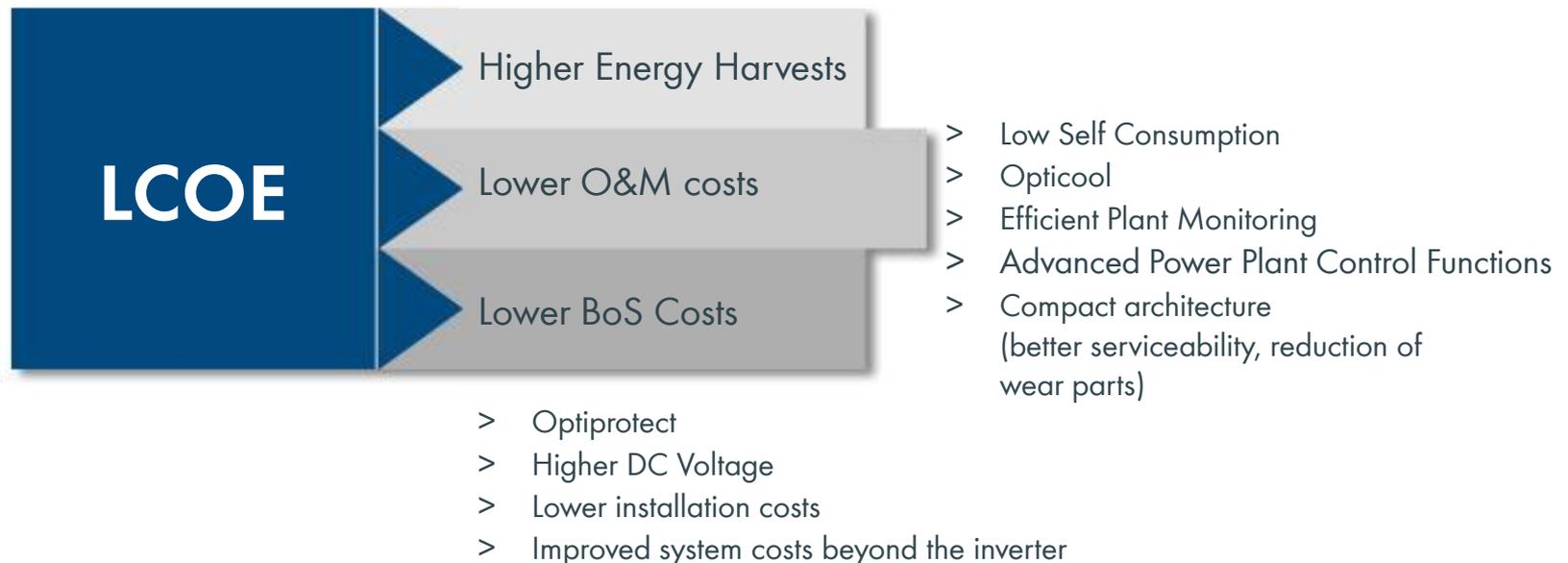


More energy out at a lower cost

How superior technology can positively influence the project LCOE*

- > Inverter Efficiency
- > Additional Power Capacity
- > Higher DC/AC Ratios
- > Amorph Transformers
- > Harsh Environment Operation

*LCOE = Levelized cost of electricity



▶▶ The cost per unit (kWh) of generated electricity is the most critical metric for a PV investment

▶▶ SMA is the financial performance leader in this metric over the plants' lifetime

Managing the high stakes of utility-scale power generation

MAXIMIZING ENERGY HARVESTS

- ✓ SMA inverters generate the highest yield
- ✓ Technology geared towards large scale PV
- ✓ Fit for harsh conditions in the sunbelt regions

REDUCING OVERALL COSTS

- ✓ System-oriented design
- ✓ Adaptability to changing regulations
- ✓ Cost leader on levelized costs of electricity
- ✓ Strategic cost reduction roadmap

MINIMIZING TECHNOLOGY RISK

- ✓ Proven technology with long track-record
- ✓ Advanced quality testing
- ✓ R&D focus on harsh environments, system-oriented design, plant control
- ✓ Predictable cash flows (service contracts)
- ✓ Knowledge of local grid regulations

EXPERIENCED AND RELIABLE PARTNER

- ✓ Large installed project base
- ✓ Experience with very large projects (> 250 MW)
- ✓ Focused organization with dedicated project support
- ✓ Financially solid partner
- ✓ Longterm strategic partner: 30 years in PV

We help our partners achieve their goals for a safe and profitable PV investment

1. MORE REVENUE



2. LOWER COSTS



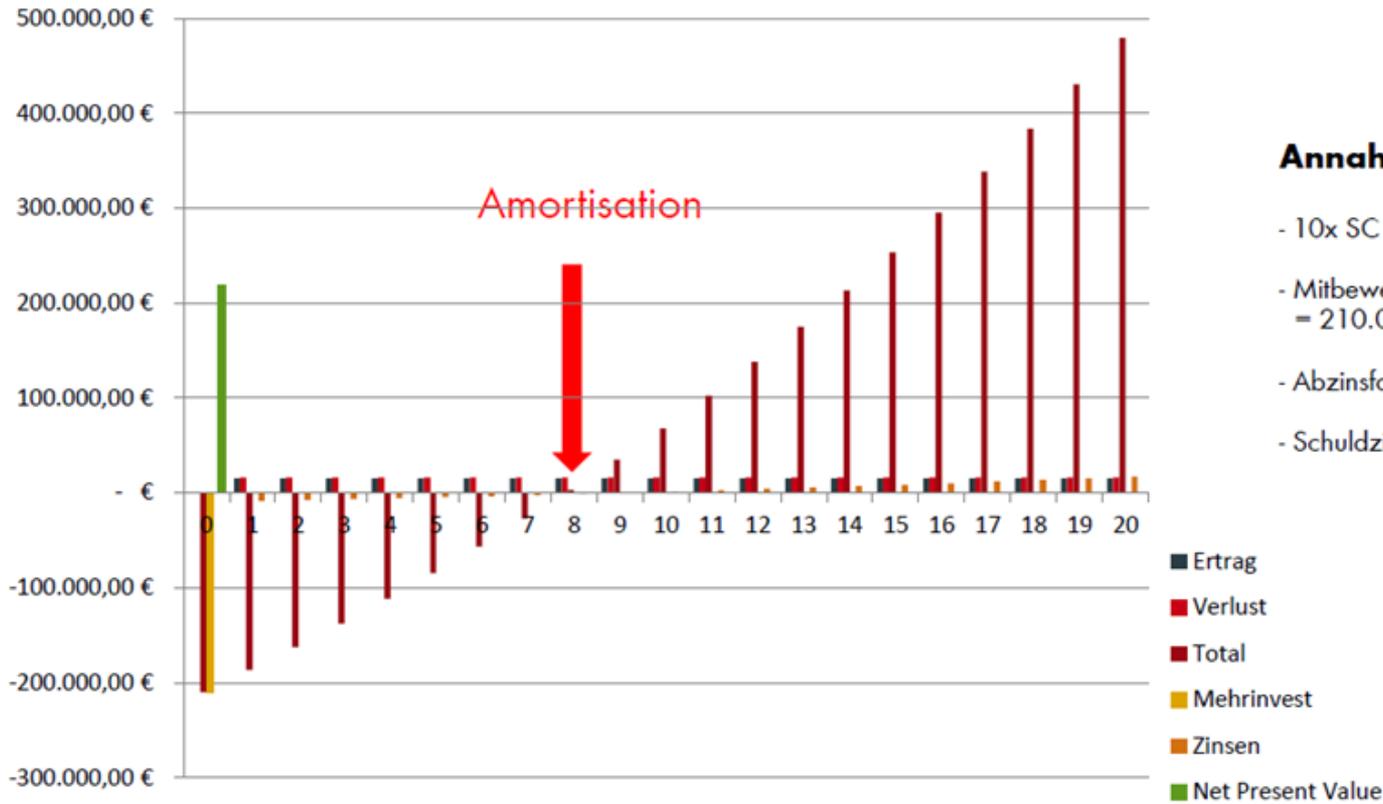
3. LOWER RISK



- ▶▶ Optimized cash flows generate better debt service coverage
- ▶▶ Projects get easier / faster financing at a lower cost of capital (lower risk premium)

SMA vs. Competition – real project

- higher efficiency & lower self consumption = higher profitability



Annahmen:

- 10x SC 700 CP (ca. 7 MW)
- Mitbewerberinvestition = 210.000,- € geringer
- Abzinsfaktor = 4 %
- Schuldzinsen für Mehrinvest = 4%

Jährlicher Mehrertrag SMA:	31.549,09 €
Barwert Mehrertrag über 20 Jahre:	428.762,44 €
abzüglich Initialinvest:	218.762,44 € (428.762,44 € - 210.000,- €)

net present value (NPV): **218.762,44 €** auf 20 Jahre

Installed projects with SMA technology worldwide



Large Scale Experience

- Agua Caliente & Topaz



Agua Caliente – 290MW - Arizona



Topaz – 550MW - California



Developer & Vendor

„ By driving down the cost of solar generation, First Solar continues to make new strides in meeting the worldwide demand for clean, renewable energy.“



Investor

Midamerican Energy



Why they chose SMA:

- Reliability (Technology & Company)
- Experience (over 20 GW installed capacity)
- Grid Management Capability (Grid Stability / Fault Ride through ...)
- **Financial Performance (SMA Inverters increase yield + reduce costs)**

]} = risk reduction

SMA Service – protecting your investment worldwide



Innovative service concepts can directly affect LCOE of PV plants

LCOE = Levelized Cost of Energy (electricity) in €/kWh

$$= \frac{\text{Total Lifetime Costs}}{\text{Total Energy Production}} \sim \frac{\text{NPV}^* \text{ (Costs) in } \text{€}}{\text{Energy in kWh}}$$

$$\text{NPV}^* = \frac{\left(\text{Module Cost} + \text{BoS Cost} + \text{Inverter Cost} + \text{Install Cost} + \text{Finance Cost} + \text{O\&M Cost}^* \right)}{\left(\text{Daily: Insulation} \times \text{Temp Coeff} \times \text{Perform Ratio} \times \text{Inverter Efficiency} \times \text{System Uptime}^* \right)}$$

Main O&M Levers

- > Spare parts security and guarantees
- > Predictive maintenance concept
- > Quality, warranty and replacement risks
- > Performance and yield optimization

Main System Uptime Levers

- > Availability guarantees
- > Diagnosis and prevention capabilities
- > Spare parts logistics
- > Mean time to repair / repair sustainability

Based on a modular standard service offering SMA delivers a wide range of valuable system-based services for PV power plants



Modular Standard Service Concept

Comparison Inverter replacement vs. Maintenance guarantee (20 years)

	with Inverter replacement	w/o Inverter replacement
	Value in €	Value in €
CAPEX		
Inverter Price	€90,000	€90,000
Replacment Inverter	€60,000	
Spare Parts Upfront payment	€20,000	
Total CAPEX	€170,000	€90,000
OPEX		
Commissioning cost	€2,000	
Management of spare parts / year (2% of value)	€600.00	
Management of spare parts (TOTAL)	€12,000	
Spare parts guarantee per year		€1,830
Diagnose & Repair guarantee per year		€2,481
Availability guarantee per year (99%)		€3,198
Spare parts guarantee year 6- 20		€27,450
Diagnose & Repair 6- 20		€37,215
Availability guarantee 1 - 20		
Total OPEX	€14,000	€64,665
Total cost over the period of 20 years	€184,000	€154,665
Difference between Scenario 1 and 2		€29,335.00

Difference between inverter replacement and non inverter replacement is **€29K**, means approx. **17% of CAPEX** invest.

Spare Parts, Dianose & Repair guarantee enables long term security and risk reduction and saves at least CAPEX.

Also during 20 years period services are necessary to keep the system running. This generates cost for year 6 - 20. (outside standard factory wty) and in addition to figures represented.

Critical issues to be reconsidered seriously in PV Plant Services procurements

Recommendation

Spare parts procured upfront with PV plant ?

No. Spare parts bought upfront are very often unmanaged, with firmware not up-to-date. Aging process often not considered

Consider decreasing value (depreciation), and spare parts management costs

Inverter replacement needs ?

No. Inverters managed within a 20 years service contract normally do not need a replacement after 12 -15 years.

Change approach to Service guarantee

Inverter expert knowledge needed ?

Absolutely. Diagnosis, repairs, monitoring and controlling of the inverter is often done by un-trained staff. Inverters lifetime, uptime and performance is highly influenced.

Inverter diagnosis and repairs only by qualified experts

SMA Plant Operation & Maintenance services focuses on owners' & investors' needs

- > Reduced equipment replacements risk
- > No spare parts adding risks
- > Risk sharing partnership
- > Quality spares with long term guarantees

REDUCE RISKS

INCREASE ENERGY
YIELD

- > Spare parts supply & management end-to-end
- > Performance optimization expertise
- > Energy Management Audit and Yield Optimization

SMA Services – Best-in-Class Service Partner

> **High Bankability**

- > solid financials and high cash reserves
- > largest installed base – high quality products – technology leader

> **Service Excellence**

- > Worldwide own service network
- > High value approach

> **Optimization of levelized cost of energy (LCOE)**

- > Delivers alternatives to antiquated equipment and maintenance concepts during inverter lifetime
- > Risk sharing partner



THANK YOU – Questions?

