



SIEMENS

Utility-scale photovoltaic power plants

Turnkey solutions from a single source

www.siemens.com/pv

Answers for energy.

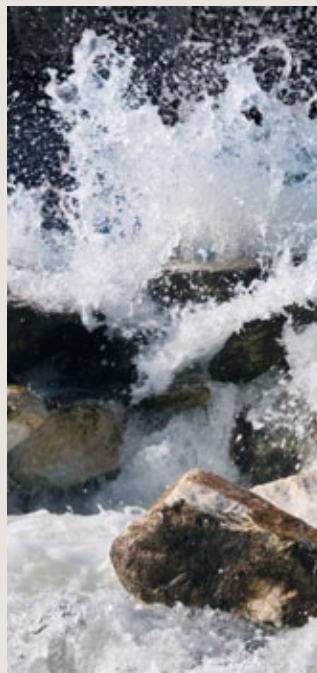
We renew energy

Imagine the world without energy. The world's natural resources are constantly diminishing, the demand for energy is rapidly increasing and the impacts of climate change require re-thinking of our habits. There is no question that we need to find sustainable alternatives that lead us into a new energy age. To ensure sustainable growth in the future, renewable energy needs to play an increasingly significant role in the global energy mix. Wind, sun, and water are three infinite resources of pure energy that are ready to be harvested to meet the demand for clean power. But Mother Nature alone is not enough.

In order to make renewables the dominant energy source all over the world, we aim to make them as affordable as conventional sources of energy. By combining innovations in renewable power generation with our smart grid and high voltage transmission technology, we are able to be even more cost as well as energy efficient. Continually striving for pioneering answers is what makes Siemens one of the world's leading suppliers for Onshore and Offshore Wind Power solutions, Photovoltaics, Concentrated Solar, and Hydro Power. We are able to draw on over 160 years of experience to help create a cleaner future. Answers from Siemens today power the new energy age of tomorrow.



Wind



Hydro



Concentrated Solar



Photovoltaics



Let's shape the new energy age together

The sun is the world's most powerful resource – in less than 6 hours, our deserts receive as much energy as the whole world's population uses in one year. Be a pioneer. Put this endless source of energy to good use – invest in photovoltaic innovations from Siemens.

We specialize in utility-scale PV power plants that are capable of supplying thousands of households with green power.



Build your investment on a solid foundation

Tailor-made utility-scale PV plants at competitive LCoE*

In today's market, solar power generation has enormous economic potential. Siemens is a global energy supplier with decades of experience in designing and building top-quality turnkey power plants. Over 160 MW of installed PV power and 1,200 MW of installed component capacity (e.g. inverter) demonstrate our expertise in photovoltaics.

With Siemens' turnkey solar solutions, you can reap the benefits of financial, technical, and operational security. Siemens specializes in utility-scale PV engineering, procurement, and commissioning (EPC): We draw upon all of our technical experience, global connections, and financing capabilities for your customized plant solutions.

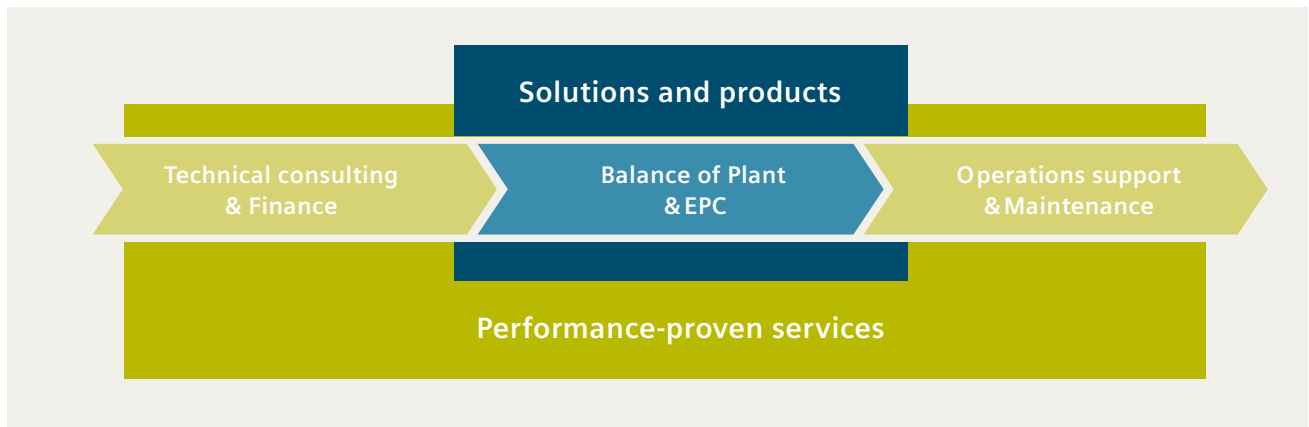
Along the entire energy value chain – from technical consulting and financing, to products, and all the way to BoP solutions, including grid connection and service contracting – we work to maximize your long-term profits.

Working in close cooperation with you, we develop solid and innovative concepts specific to your business objectives.

* LCoE: Levelized Costs of Electricity



Siemens Photovoltaics covers the entire value chain



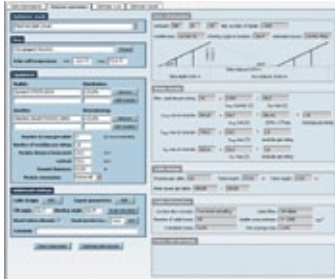
Comprehensive portfolio for customer benefits

Solutions and products	Performance-proven services
<p>... designed for large-scale photovoltaic plants:</p> <ul style="list-style-type: none"> ■ Customized Balance of Plant (BoP) concepts for individualized solutions ■ Proven engineering knowledge with unique layout system for optimized Levelized Costs of Electricity (LCoE) ■ Qualified and reliable in-house industry products to meet local requirements 	<p>... along the entire value chain:</p> <ul style="list-style-type: none"> ■ Secured financing with equity and debt contribution for maximized IRR ■ Guaranteed performance contracting for sustainable business success ■ Full-scope service contracting from a single source

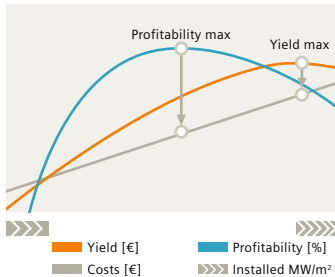


Strong products embedded in optimized concepts

Unique photovoltaic layout system



Optimized plant profitability



Best in class BoP efficiency with an intelligent layout system

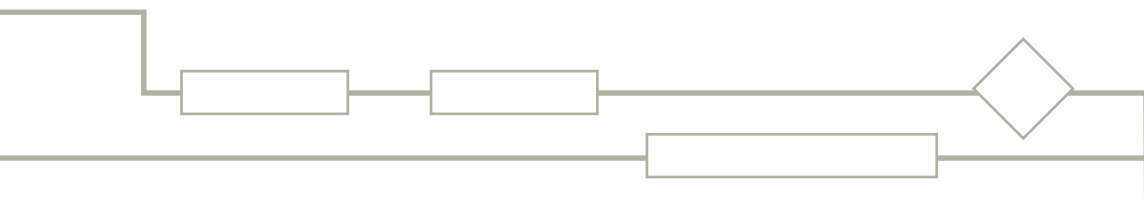
Siemens has developed a unique PV planning system for tailoring utility-scale PV power plants: It combines your specific plant requirements with our mature knowledge of reliable design layouts and LCoE-optimized concepts, in order to deliver reliable, high-efficiency systems. Our experienced engineers utilize Siemens' intelligent planning system based on algorithms designed to optimize yield and minimize cost.

Calculation routines are implemented and established upon proven design guidelines that automatically reflect local conditions and technical requirements. Layout suggestions for the location of tables, inverters, and service-ways are only a few of the integrated

processes designed to support our experts in designing a plant optimally tailored to your needs. This solid groundwork – available before detailed planning even begins – compares a variety of different scenarios and parameter settings in order to provide planning suggestions, which are then manually adapted and optimized by our top-tier engineers.

The process is always transparent, yielding flexible and reproducible illustrations from several perspectives in a short period of time. Our unique planning and layout system provides the groundwork for a technically sophisticated PV solution that supplies the yield you expect or even more.

Rely on our experience for your optimal Balance-of-Plant concept.





Get the best value for your money!

- Tailor-made utility-scale solutions, in accordance with local requirements
- Proven engineering expertise and unique plant layout system for LCoE optimized Balance-of-Plant concepts and rapid realization time
- Qualified global supply chain network with industry-proven products for reliable performance and smooth market entry

Qualified products for local requirements

A system is only as strong as its weakest link: An optimized plant design is also dependent upon the quality of the installed products. This forms the foundation for your plant's reliability and availability. Siemens offers a comprehensive in-house portfolio of industrially proven components, designed and evaluated by engineers with countless years of experience in the energy industry.

We also apply our certified accreditation process to all suppliers and partners, giving you the peace of mind that you can rely on the quality and performance of your installed products. Extensive testing procedures, jointly prepared and executed with independent institutes, support our

assurance of long-term performance.

We take into account both the precise local technical regulations for grid compliance and the strong acceptance criteria for the delivery of large component batches.

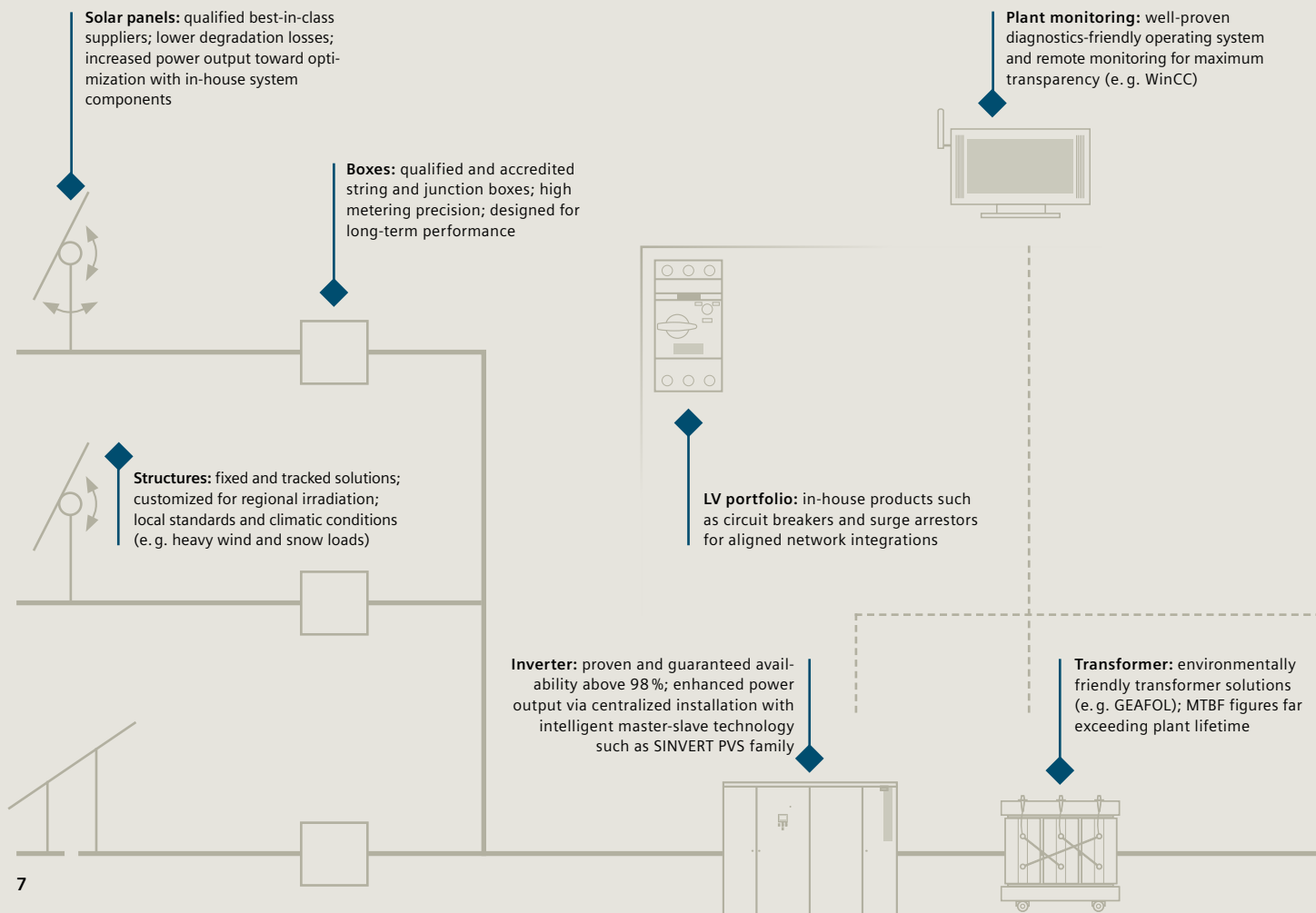
Component installation as well as spare parts supply are backed by our state of the art logistics concepts: Our global network supports the exchange of information for technical and logistics improvements to facilitate your local market access.

Take advantage of our in-house expertise; it will help you satisfy your local requirements globally.



From sun to grid: proven components along the entire value chain

Developed and supplied by Siemens



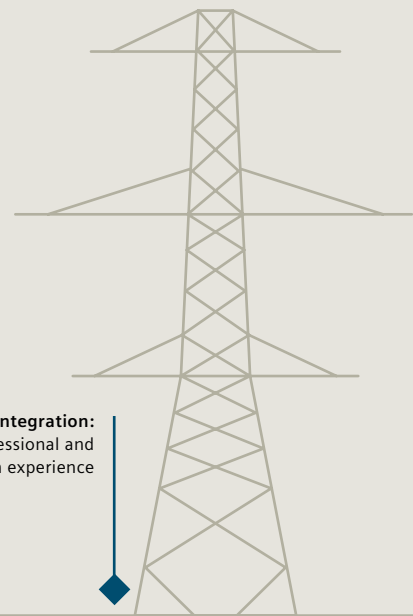


Security system: qualified fire detection and camera systems (CCTV) for continuous 24-hour monitoring

Automation: exact tracking and efficient software control of inverter, sophisticated PLC components by SIMATIC

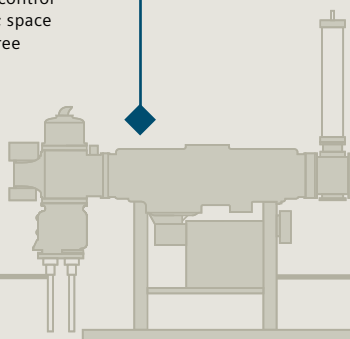


Container: factory pre-assembled and type-tested e-houses for non-failure installation on-site



MV switchgear: air- and gas-isolated switching functions by e.g. SIMOSEC, components for power quality control such as SIMEAS product family; space saving; lifetime maintenance-free

HV substations: utility-approved technology

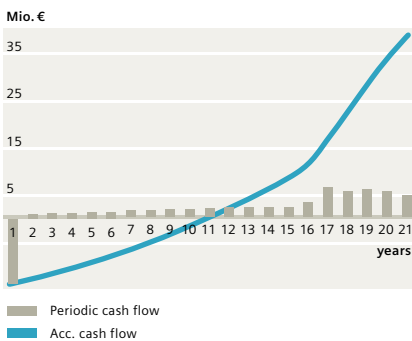


Grid integration: professional and proven experience

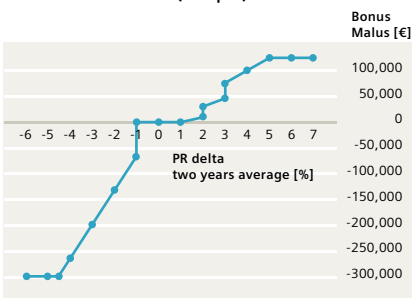


Performance-proven services for the entire plant lifetime

Business case with outstanding IRR (sample)



Performance ratio bonus-malus for secured investment (sample)



Secured investment due to risk mitigation

From conception, through project management, and all the way to the end of a plant’s lifetime, a complete and secure financial concept is vital. We take a comprehensive view of your specific plant development, and assist you accordingly with project financing – with independent consulting, and individualized financing models. Our global financial and due-diligence experience support customized business cases that provide several options for individualization.

Siemens offers a strong investment-grade financial rating and our in-house bank, which allows equity and debt contribution. Siemens Financial Services works hand in hand with our engineers to create feasible solutions for solid financing. And thanks to this, Siemens helps you achieve the highest possible IRR by investing in Siemens’ turnkey solutions.

Benefit from a sustainable investment with fixed returns that can assist in providing business security for the long-term.

Guaranteed performance for financial stability

High lifetime plant efficiency does not happen on its own – sustainable business success requires dedicated planning and extensive knowledge. Even before installation, we extend serviceability requirements along the PV value chain.

Low failure rates, maintenance friendly products, best matching solutions, as well as improved diagnosis information help minimize plant down times. Siemens’ sharp calculation of plant performance takes into account both, non-correctable losses due to spectral and temperature impact, and directly manipulable technical losses from cables, inverters, and shading. Our comprehensive performance calculation considers local environmental conditions, along with your customized plant specifications in order to achieve guaranteed high plant availability and outstanding plant performance figures.

The contractually guaranteed performance ratio helps you to seek a secure return on your investment.



Safe investment with guaranteed performance

- Secured financing by an investment-grade company with an in-house bank for secured and outstanding IRR
- Unique performance ratio contracting for limited risk and guaranteed long-life efficiency
- Pre-defined service packages backed by global experts for fast and effective support from a single source

Full scope services for maximum plant availability

After installation, your plant should generate power without disruptions. To minimize maintenance efforts, Siemens provides a worldwide network of certified service experts to support you with original spare parts delivery, maintenance, repairs, and updates. In addition to the purely technical aspects of preventive and corrective maintenance, we handle yield optimization, security management, and professional cleaning of panels, thus benefiting your plant's performance – all from one source.

We also integrate the complete system functionality into an overall measurement and monitoring system, with remote diagnostics and global access. This allows for 24/7 transparency of your plant conditions – and with our global network, you can count on a prompt and effective response.

We prepare service concepts tailored to your specific needs that allow you to benefit from minimum down time and continual high plant availability.

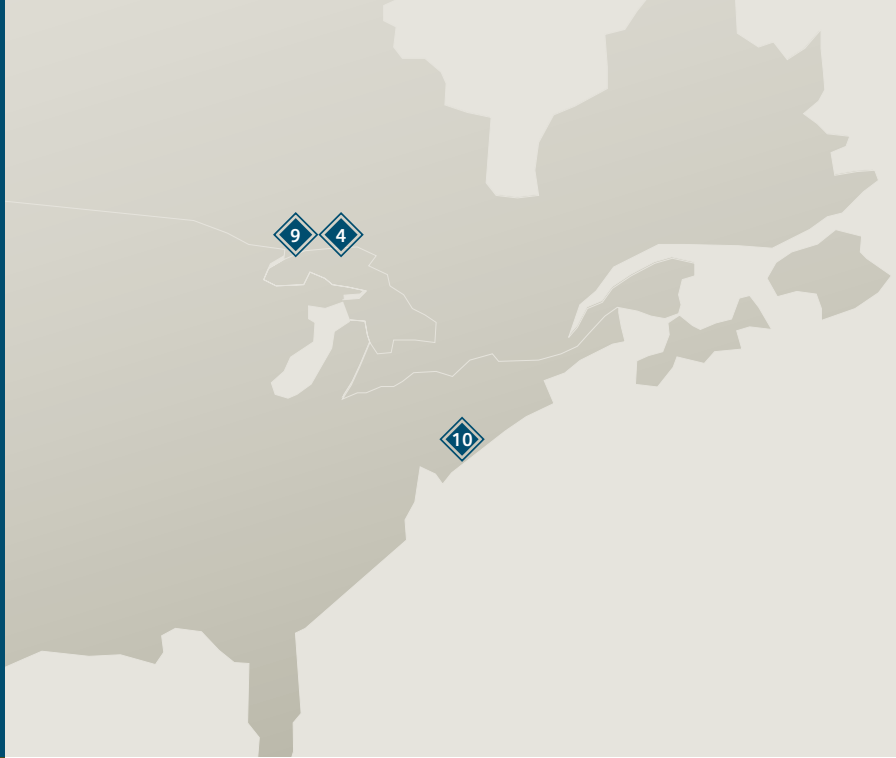
Pre-defined service packages for individual adaption

Service Packages	PMP	FSM*	OS&M*
Performance monitoring	◆	◆	◆
Remote diagnosis	◆	◆	◆
Preventive maintenance	◆	◆	◆
Spare parts logistic		◆	◆
Repair services		◆	◆
Facility management			◆
Security management			◆
Module cleaning			◆

* Optional: Performance Ratio Guarantee
 PMP: Performance Monitoring & Preventive Maintenance
 FSM: Full Service Maintenance
 OS&M: Operations Support and Maintenance

Selected references

1. Beneixama, Spain, 2007, 20 MWp
2. San Donaci, Italy, 2010, 15 MWp
3. Ketura, Israel, 2011, 5 MWp
4. Fort Williams, Canada, 2011, 10.8 MWp
5. Les Mées, France, 2011, 31 MWp
6. Canosa, Italy, 2008, 1 MWp
7. Casale, Italy, 2009, 3.3 MWp
8. Dobre Polé, Czech Republic, 2010, 4 MWp
9. Thunderbay, Canada, 2011, 8.5 MWp
10. Sparta, U.S., 2011, 3.1 MWp



Successful projects around the world

Proven project management for planning certainty

Time, quality, and cost – the three pillars of sustainable project success: Around the globe, internationally experienced project managers manage the full spectrum of planning and construction activities, while coordinating all tasks and handling hundreds of interfaces.

Only certified project managers are permitted to take care of your plant, whereby project milestones during the execution phase act from the early beginning as dedicated quality gates – step by step for a secured plant upgrowth.

Siemens' international network of project managers supports the knowledge sharing across countries for steady improvements by continually learning and growing from each global project. This enables the basis for smooth, rapid, and effective project completion, as well as allows us to understand and prepare for all of the local conditions that impact your needs.

Trust our proven project management expertise to achieve successful plant completion at the quoted price, based upon strong evaluation criteria, with outstanding quality – as quickly as possible.



Project details	1. Beneixama (Spain)	2. San Donaci (Italy)	3. Ketura (Israel)	4. Fort Williams (Canada)	5. Les Mées (France)
Customer	Gesfesa Energy	Ital Green Energy	ARAVA Power	Canadian Solar	EDD Delta Solar
Year of installation	2007	2010	2011	2011	2011
Project size (MWp)	20 MWp	15 MWp	5 MWp	10.8 MWp	31 MWp
Requirements and challenges	<ul style="list-style-type: none"> Expected annual yield > 30,000 MWh Largest solar power plant worldwide upon completion 	<ul style="list-style-type: none"> Expected annual yield > 22,000 MWh Electricity supply for 5,500 households 	<ul style="list-style-type: none"> Expected annual yield > 8,000 MWh Negev desert conditions 	<ul style="list-style-type: none"> Expected annual yield > 14,000 MWh Severe winter and environmental conditions 	<ul style="list-style-type: none"> Electricity supply for 12,000 households Hilly and complex 66 ha landscape Plant PAC before announced FIT reductions
Siemens' answer and highlights	<ul style="list-style-type: none"> E-EPC Plant realization in 12 months CO₂ reduction ~ 30,000 tons per year 	<ul style="list-style-type: none"> Turnkey EPC Close cooperation with local companies 	<ul style="list-style-type: none"> Turnkey EPC Utility agreement for implementation of new SINVERT inverter family 	<ul style="list-style-type: none"> Turnkey EPC BoP optimized plant concept with modules from Canadian Solar 	<ul style="list-style-type: none"> Turnkey EPC 112,000 installed PV panels Installation time within 10 months Long-term OS&M agreement with performance ratio contracting

Published by and copyright © 2012:
Siemens AG
Energy Sector
Solar & Hydro Division
Otto-Hahn-Ring 6
81739 Munich, Germany

For more information, please contact our
Customer Support Center
Phone: +49 180 524 70 00
Fax: +49 180 524 24 71
(Charges depending on provider)
E-mail: support.energy@siemens.com

Solar & Hydro Division
Order No. E50001-W320-A118-V1-4A00
Printed in Germany
Dispo 34807, c4bs No. 7827
HL 1201668 441107 WS 01121.5

Printed on elementary chlorine-free bleached paper.

All rights reserved.

Trademarks mentioned in this document are the property
of Siemens AG, its affiliates, or their respective owners.

Subject to change without prior notice.

The information in this document contains general
descriptions of the technical options available, which
may not apply in all cases. The required technical
options should therefore be specified in the contract.

