Specifications Photovoltaic Installations

Vario green energy Concept GmbH develops solar parks in Germany, both rooftop (up until 750 kWp) and ground mounted (up until 10 MWp).

In order to build those installations, we are looking for strong partners that provide the following works:

1) **Organization & Documentation**
   - Binding installation schedule containing all timelines including the commissioning date (both, EEG commissioning as well as grid connection)
   - Weekly status updates and documentation including visual documentation of the progress
   - Management, coordination and supervision of those works that the contractor is solely responsible for as per the contract.
   - Protection of the works and the items provided on the installation site against theft and damage according to the requirements of the contract works insurance (Bauwesenversicherung) and up until the final inspection and approval of the installation is completed.

2) **Installation site set up**
   - Installation site set up in consultation with the solar park operator
   - Provision and professional set up of required scaffolding
   - Compliance with legal duties to maintain safety: The general site set up as well as the supply and installation of possible safety scaffolding, ladders, supply of miscellaneous protective gear and set up measures based on the regulations for the prevention of industrial accidents (Unfallverhütungsvorschriften)
   - Adherence to an orderly installation set up, particularly the immediate disposal of trash, construction waste and refuse.

3) **Rooftop restoration**
   - Deconstruction of existing asbestos-containing rooftop including the professional disposal within 10 days of deconstruction
   - Professional structural strengthening of the roof based on static requirements
   - Professional installation of new roof top from profiled steel sheeting (0.63mm), mounting of cladding for truss and rafter and replacement of rainwater gutters based on the agreed requirements

4) **DC installation**
   - Offload of the solar panels and inverters provided by Vario and professional check of all components for obvious defects. If necessary, provide written notice of defects.
   - Transfer of solar panels and inverters to the place of installation
   - Supply of the substructure (supplier to be agreed mutually between Vario and contractor) and provision of proven system analysis documenting the load capacity for the solar panels.
   - Installation of the substructure according to the static requirements and adherence to general technical rules
   - Supply of required DC cables, connectors and consumables
   - Installation and wiring of the solar panels including connectors and consumables
   - DC wiring of the panel strings to the inverters, dimensioning based on an energy loss of 1,0% at most.
• Only connectors from the same manufacturer and of the same type can be used for the wiring of the panels. Furthermore, the laying of the DC cables needs to be low on induction and the cables need to be laid according to DIN VDE 0100 part 712 section 52.
• Installation and wiring of the inverters including the dimensioning of the cables with protocol
• Installation of the inverter sub-distribution
• Embed photovoltaic installation in case of an existing lightning protection. Protect photovoltaic installation against surges following the general technical rules if no lightning protection exists.

5) AC installation
• Planning, documentation and realization of AC cabling including excavation/ underground work, professional AC wiring to the inverters and professional closing of the underground work
• Execution of foundational work, placing and connecting of transformer and transmission station
• Supply and installation of fencing and monitoring systems in case of ground-mounted solar parks

6) Inverter configuration and telemonitoring system
• Updating inverters to the latest firmware version including documentation of the start of operations
• Supply, set up and configuration of a MeteoControl telemonitoring system including string monitoring.
• Permanent labeling of the inverters, distributors and strings in accordance with the telemonitoring and provided plans.
• Documentation and mapping the inverter serial numbers to the string plan
• Planning, supply, installation and operational start of all components responsible for the plant control system based on the grid management requirements of the appropriate utility company, particularly ripple control receiver (Rundsteuerempfänger) and/ or remote control device (Fernwirkeinrichtung) in compliance with the regulations of the grid operator.
• Grid connection and start of operations of the solar park in collaboration with the grid operator

7) Grid connection and certification
• Complete documentation of all executed works for the start of operations in collaboration with the grid operator
• Scheduling of the operational start date (as early as possible) with the grid operator and required service providers.
• Provision of all required documents for the certification of the photovoltaic installation

8) Inspection and approval
• Preparation of the documentation for the installation according to DIN EN 62446, both paper-based as well as digitally and as per the requirement of the evaluation consultant.
• Inspection and approval of the entire installation in collaboration with the evaluation consultant.