



Letter of Intent



Solar Power Project

LETTER OF INTENT

Dear Sirs/ Madams,

The Consortium of Applied Technical Systems Joint Stock Company (ATS) and Vietnam Power Resource Partners Corporation (PRP) would like to take this opportunity to introduce ourselves for your consideration as a potential consultant/contractor. We have the capabilities and experiences that can best fit us for the position of EPC contractor in your upcoming Solar Power Project.

ATS and PRP were founded in 1998 and 2006 respectively, and since then have gathered an extensive track record of experience that allows for completion of comprehensive EPC contracts. We believe our tailor-made solutions and professional services shall be able to meet with your company's demanding expectation for project execution in terms of time, budget and performance.

This letter of intent shall provide you with the following preliminary information in summary:

▶ **Company Overview**

ATS is currently the leading provider of substation automation solution and SCADA systems in Vietnam, accounting for 40% of the substation automation system market share of the country. Our work scope in the power sector encompasses complete EPC service package including Engineering, Procurement, Installation, and Commissioning.

PRP has been active since 2006 as a consulting service provider for various power system engineering projects with in-depth insight on Vietnam power industry operation.

▶ **Service Proposal**

We offer to provide your project with comprehensive consulting services and EPC works for all aspects of solar power plant (namely Solar Farm, BOS and Grid Connection), including COD-related services. Our offer also covers the acquisition of necessary regulatory approvals and assurance that all technical aspects are in line with the complex regulatory standards of Vietnam power market.

Should you be interested, please contact us at your earliest convenience for further discussion. We look forwards to hearing from you.

Yours Sincerely,



Thai TRAN
ATS Vice General Director
PRP General Director



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A. Company Overview

OUR FEATURES

- ◆ Rich experience and Accredited qualification
- ◆ High quality products and Professional services
- ◆ Local understandings and Industry networking

1. Introduction

▶ Leading vendors of high credentials in Power sector

Applied Technical Systems Joint Stock Company (ATS) was established in 1998 and since then has become the leading provider of substation automation solutions and SCADA systems in Vietnam. Our scope of works encompasses a comprehensive range from Engineering, Procurement, Construction, Installation, Commissioning and long-term O&M services.

ATS has completed hundreds of contracts on providing 110kV-220kV-500kV substation automation system (SAS) and Distributed Control System (DCS) for grid substations and power plants, which accounts for about 40% market share in Vietnam.

Vietnam Power Resource Partners Corporation (PRP) was found in 2006 by Mr. Thai Tran and has been offering consulting and engineering services to various power projects since then. The company's unique assets include the richest and most comprehensive Vietnam Power System database and a team of Engineers with deep understanding of and experience with Vietnam power sector through its vast networking.

OUR SERVICES

- ◆ EPC Contractor for Grid Stations and Power Plants
- ◆ Contractor for SAS/DCS System
- ◆ Contractor for SCADA/EMS/DMS/GIS and Enterprise Operation Control Systems
- ◆ O&M Contractor

OUR SERVICES

- ◆ Power system study
- ◆ Project preparation, including FS, detail design and engineering on Power Plant, Transmission and Distribution system
- ◆ Project consulting and engineering services for transmission lines, substations and power plants

▶ Unparalleled knowledge of domestic power market

The extensive track record of both ATS and PRP affords us with in-depth knowledge of the operation of power section. In addition, our visionary management team is well versed with industry know-hows and networks.

ATS General Director - Mr. Thai Tran - is a power system engineer with more than 30 years of experience in the field, 20 years of which has been with EVN in various critical positions. His last position with EVN was Director of the National Load Dispatch Center. Mr. Tran's profound knowledge and experience in the field gives him deep insight of the structure and operation of Vietnam power system as well as the hold of a strong networking in the industry.

▶ Capable local team to deliver international-grade projects on-time and reliably

ATS/PRP consists of over 100 skillful professionals including power system and software engineers. Our local engineers have great innovative capabilities plus unique insights of the Vietnam power system, which have allowed them to implement hundreds of projects on time and reliably thus far.

With extensive knowledge and experience in the field acquired from years of activity at the forefront of power system development, our local team can implement projects at optimal costs with satisfactory after-sales services.

2. Accredited Certification

We are fully qualified to perform our offered services and certified/licensed to the followings:

- ◆ License for engineering services for power systems of up to 500kV issued by ERAV
- ◆ License for power system design
- ◆ IEC 61850 Certificate Level A issued by KEMA DNV-GL
- ◆ IEC 60870-5-101 Master/Slave Certificate Level A issued by KEMA DNV-GL
- ◆ IEC 60870-5-104 Master/Slave Certificate Level A issued by KEMA DNV-GL

OUR CERTIFICATIONS

3. Partners and Clients

We closely collaborate with our international partners to ensure the highest quality of our offered solutions.



OUR PARTNERS



OUR CLIENTS



Vietnam Electricity

- ◆ National Power Transmission Corporation
 - Southern Power Project Management Board
 - Central Power Project Management Board
 - Northern Power Project Management Board
 - Power Transmission Company No. 1
 - Power Transmission Company No. 2
 - Power Transmission Company No. 3
 - Power Transmission Company No. 4
 - National Load Dispatch Center
- ◆ Power Companies
 - Northern Power Corporation
 - Central Power Corporation
 - Southern Power Corporation
 - Hanoi Power Corporation
 - Ho Chi Minh City Power Corporation
- ◆ Power Generation Companies
 - Da Nhim – Ham Thuan – Da Mi Hydro Power JSC.
 - Petro Vietnam Power Corporation
 - EVN TPC Nghi Son 1

International Clients

- Siemens
- GE
- Doosan
- AES
- Sterling & Wilson
- Bouygues
- PowerChina Huadong
- SEPEC China
- InfraCo Asia
- The Blue Circle
- Sunseap Group

OUR EXPERIENCES

We have built a reputable records of successful power project execution from our long years working in the field.

4. Project Highlights

▶ **More than 100 substations up to 500kV**

- 500kV Substations: Cau Bong, Tan Dinh, O Mon, Son La, etc.
- 220kV Substations: Vinh Long, Thanh My, GIS Tay Ho, etc.
- 110kV Substations: Intel. Binh Tan, Long My, etc

▶ **Renewable Power Plants**

- 168MWp CMX Re. Sunseap Solar Power
- 250MWp BIM 2 Solar Power
- 58MWp Ninh Phuoc 6.1&6.2 Solar Power
- 50MWp Son My 3.1 Solar Power
- 120MWp Gaia Solar Power
- 65MWp Phuoc Huu Solar Power

▶ **Hydro Power Plants**

- 400MW Lower Se San 2 Hydropower
- 30MW Coc San Hydropower
- 42MW Song Bac Hydropower
- 72MW Ngoi Phat Hydropower
- 20MW Nam Gion Hydropower, etc.

▶ **Thermal Power Plants**

- 1200MW Mong Duong 2 Coal-Fire Thermal Power
- 750MW Nhon Trach 2 Gas Turbine Power
- 600MW Thang Long Coal-Fire Thermal Power
- 600MW Nghi Son 1 Thermal Power, etc.

▶ **Various SCADA/EMS/DMS/GIS projects and Operation Control Centers**

- National Load Dispatch Center (NLDC)
- Central Power Corporation (EVN CPC)
- Ho Chi Minh City Power Corporation (EVN HCMC)
- National Power Transmission Corporation (EVN NPT)
- Power Transmission Company No. 4
- Other power companies

▶ **Enterprise Operation Control Center for Da Nhim-Ham Thuan-Da Mi Hydropower Company**

- Enterprise Operation Control Center
- 04 hydropower plants
- 13 generation units with total installed capacity of 642.5MW
- Approximately 2.6 Billion kWh generated per year



Ⓐ OUR OFFER

ATS/PRP provide a comprehensive range of services covering all phases of your Solar Power project for all aspects of your plant, including but not limited to Solar Farm, BOS, and Grid Connection.

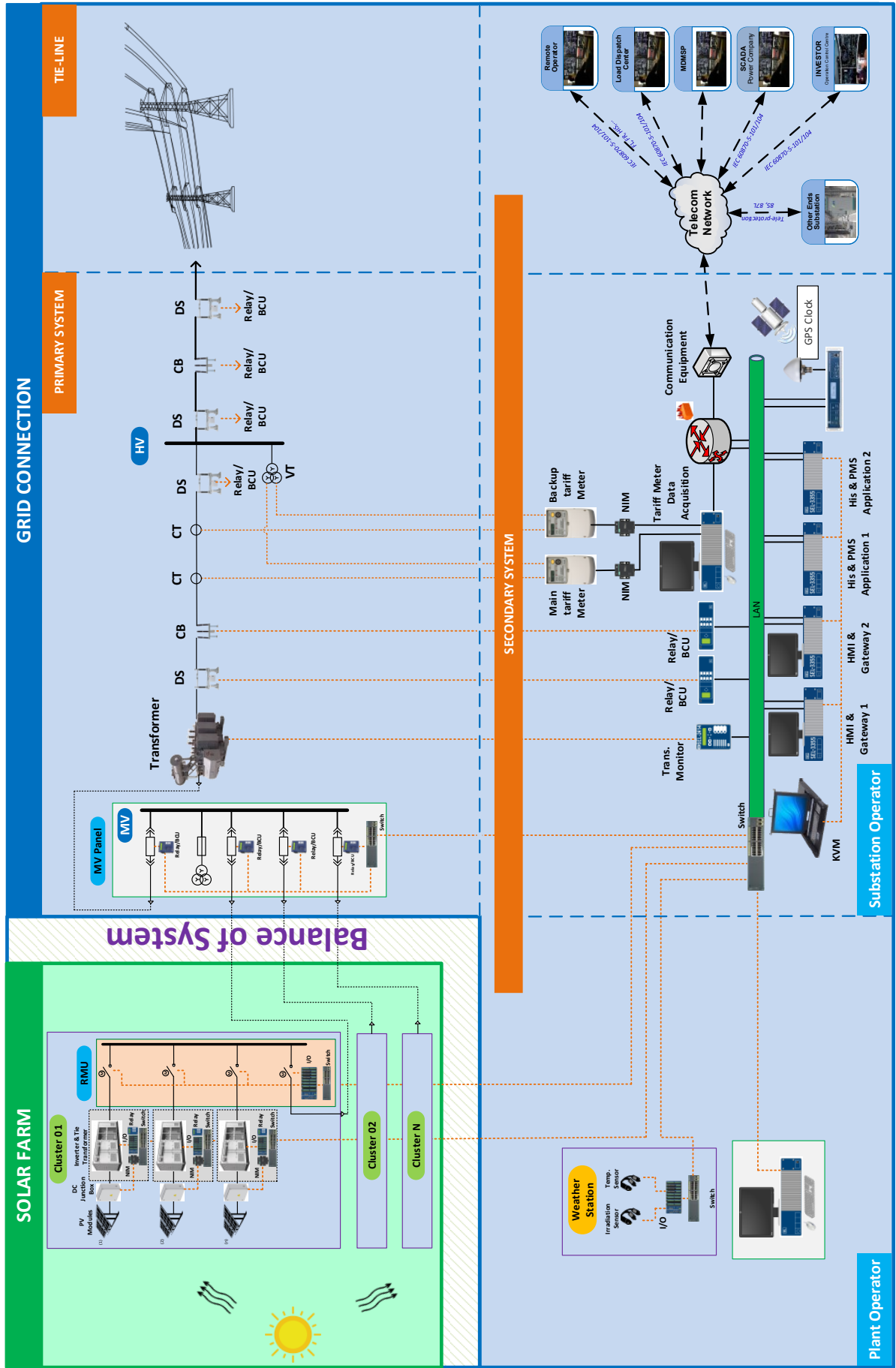
We offer an end-to-end service package encompassing consulting, engineering, EPC contract execution, operation and maintenance as well as offering professional support to our client in dealing and negotiation with relevant Government authorities and Vietnam Electricity (EVN).

OUR OFFERED SERVICES		
Phases	Description	Scope of Offer
1. Preparation	<p>Involves necessary preparation for the initiation of the project, including:</p> <ul style="list-style-type: none"> • Pre-Feasibility Study • Application for inclusion of project in Government Power Development Master Plan • Investment Registration certification 	<p style="text-align: center;">✓</p> <p>Project Consulting Services*</p>
2. Development	<p>Involves acquiring necessary authorization and agreements for the deployment of project, including:</p> <ul style="list-style-type: none"> • Feasibility Study and related technical reports • PPA contract agreement 	
3. Execution	<p>Covers all aspect of Engineering, Procurement and Construction for the project. Services can include Testing, Commissioning and COD-ready tasks .</p>	<p style="text-align: center;">✓</p> <p>Project EPC Execution Services*</p>
4. Operation & Maintenance	<p>Involves tasks necessary for the ongoing operations and maintenance, including repair and replacement</p>	<p style="text-align: center;">✓</p> <p>Project O&M Services*</p>

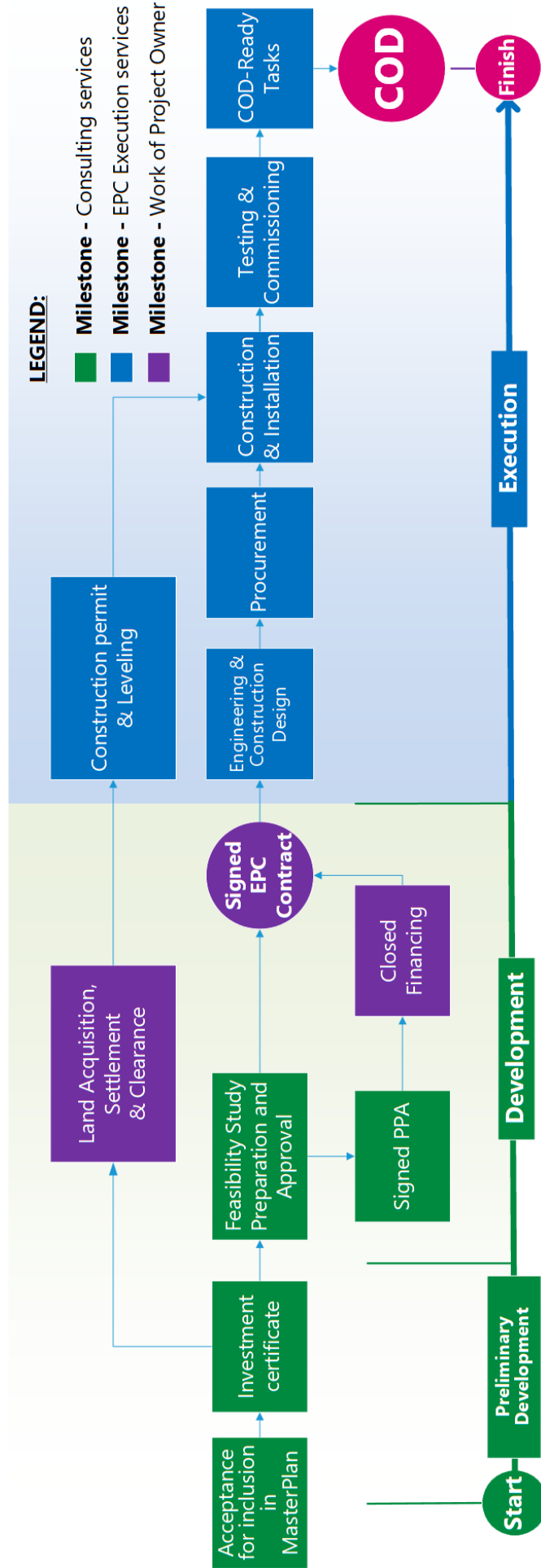
* Detailed scopes are described further in subsequent sections.

B. Proposed Scope of Works

Overall Architecture of Solar Power Plant



Overall Flow of Project Consulting and Project Execution Services



B. Proposed Scope of Works

Highlights of Regulatory Requirements and Technical Standards

Regulatory Requirements				
No.	Document	Type	Date	Issuer
Governmental Requirements				
1	24/2012/QH13: Electricity Law	Law	20-Nov-12	National Assembly
2	50/2014/QH13: Construction Law	Law	18-Jun-14	National Assembly
3	67/2014/QH13: Investment Law	Law	26-Nov-14	National Assembly
4	137/2013/ND-CP: detailing the implementation of as well as amending and supplementing some articles of Electricity Law	Decree	21-Oct-13	Government
5	46/2015/ND-CP: quality management and maintenance of construction facility	Decree	12-May-15	Government
6	59/2015/ND-CP: management of construction investment projects	Decree	18-Jun-15	Government
7	40/2014/TT-BCT: regulating the procedure for dispatching power system	Circular	05-Nov-14	MOIT
8	44/2014/TT-BCT: regulating the procedure for operating power system	Circular	28-Nov-14	MOIT
9	39/2015/TT-BCT: regulating the technical code of distribution grid	Circular	18-Nov-15	MOIT
10	42/2015/TT-BCT: regulating power tariff metering in power system	Circular	01-Dec-15	MOIT
11	25/2016/TT-BCT: regulating technical code of transmission grid	Circular	30-Nov-16	MOIT
12	16/2017/TT-BCT: project development and sample of Power Purchase Agreement for solar power projects	Circular	12-Sep-17	MOIT
13	428/QD-TTg: approving the adjustment of the National Electricity Master Plan for 2011-2020 with vision to 2030	Decision	18-Mar-16	Prime Minister
14	11/2017/QD-TTg: mechanisms to encourage the development of solar power projects in Vietnam	Decision	11-Apr-17	Prime Minister
15	55/QD-DTDL: regulating the technical requirements and operation management of SCADA system	Decision	22-Aug-17	ERAV
Vietnam Electricity (EVN) Requirements				
1	2896/QD-EVN: regulating on integrated control system and protection system	Decision	10-Oct-03	EVN
2	1656/QD-EVN: procedures for energizing power facility	Decision	09-Dec-06	EVN
3	513/QD-EVN: regulating on testing of substation integrated control system	Decision	26-Mar-08	EVN
4	4613/EVN-KTSX: effective use of DCS system in 110-500kV substations	Letter	17-Nov-14	EVN
5	176/QD-EVN: additional regulation on integrated control system and protection system	Decision	04-Mar-16	EVN

Highlights of Regulatory Requirements and Technical Standards

Technical Standards	
No.	Document
Vietnam Standards	
1	19/2006/QD-BCN : Electrical equipment rules
2	54/2008/QD-BCT : National technical standard on electric safety
3	12/2008/QD-BCT : National technical standard on technicality of electricity
International Standards: PV Panel and Inverter	
1	IEC 61727 : Photovoltaic (PV) systems; characteristics of the utility interface
2	IEC 61683 : Photovoltaic System-Power Conditioners - Procedure for Measuring Efficiency
3	IEC 62093 : Balance-of-system components for photovoltaic systems - Design qualification natural environments
4	IEC 62116 : Test procedure of islanding prevention measures for utility-interconnected photovoltaic inverters
5	IEC 62446 : Photovoltaic (PV) systems - Requirements for testing, documentation and maintenance
6	IEC 61215 : Terrestrial photovoltaic (PV) modules - Design qualification and type approval
7	IEC 61730-1&2 : Photovoltaic (PV) module safety qualification - Part 1: Requirement for construction; Part 2: Requirement for testing
8	IEC 61701 : Salt mist corrosion testing of photovoltaic (PV) modules
9	UL 1741 : Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources
10	IEEE 1547 : Standard for Interconnecting Distributed Resources with Electric Power Systems
International Standards: HV Substation Equipment	
1	IEC 61724 : Photovoltaic system performance
2	IEC 61850-7 : Communication networks and systems for power utility automation
3	IEC 61850 : Substation communication architectures
4	IEC 60870-5 : SCADA communication protocols
5	IEC 60255 : Electrical Relay testing
6	IEC 60076 : Power transformers
7	IEC 62053 : Measuring Instruments
8	IEC 612271-102 : Altering current disconnectors and earthing switches
9	IEC 612271-100 : High voltage alternating current circuit breaker
10	IEC 62271-200 : LV Distribution Switchgear ControlGear
11	IEC 61869-2 : Current Transformers
12	IEC 61869-3 : Voltage Transformers

B. Proposed Scope of Works

OUR SCOPE

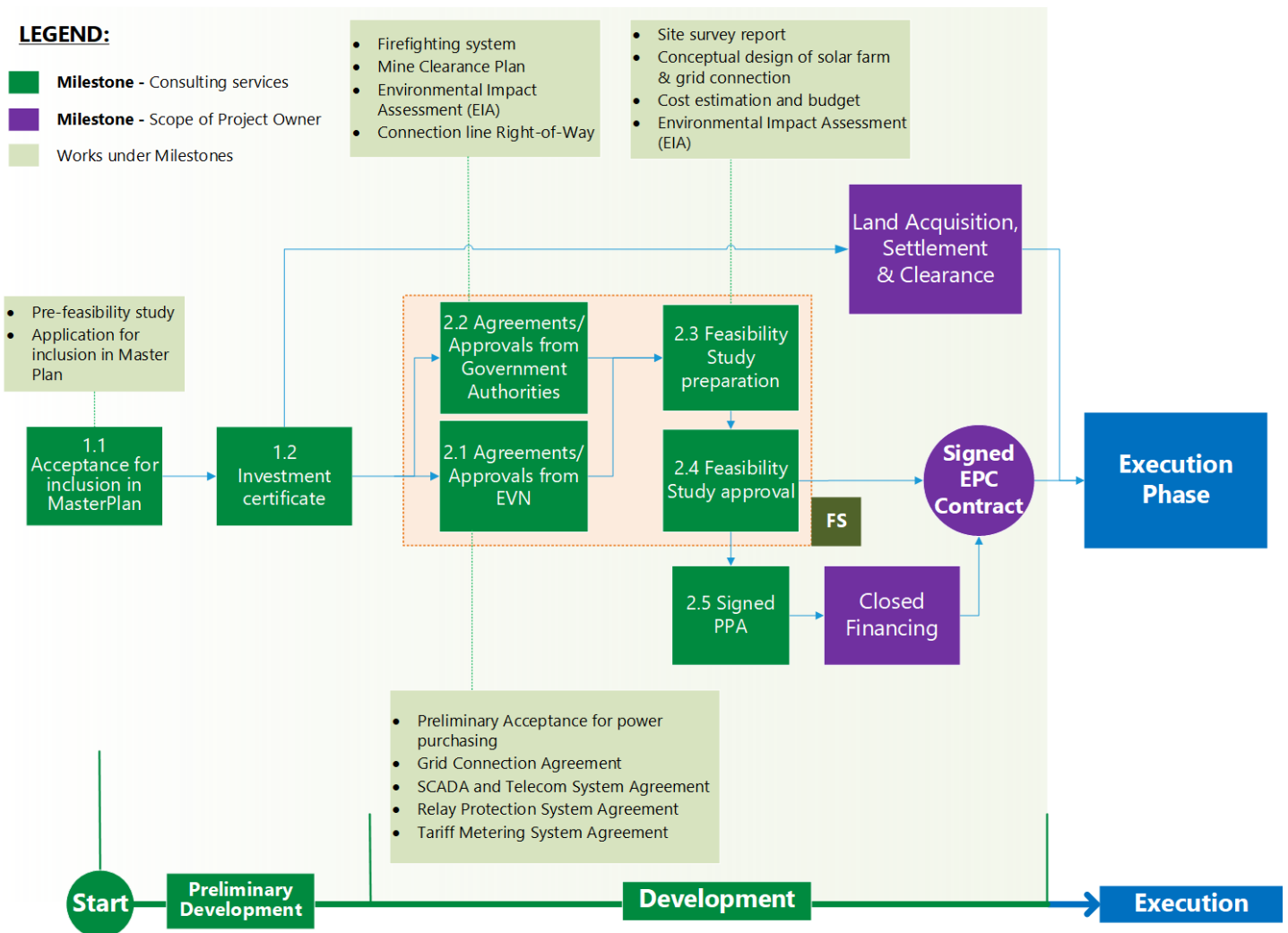


Our consulting services covers all necessary works for the successful deployment of your project.

We can also assist our clients in the dealing, negotiation and acquirement of necessary approvals/agreements from relevant state authorities.

1. Project Consulting Services

Overall Flow of Project Consulting Services





Project Consulting Service Scope		
No.	Task Description	Our Scope
Phase 1. Preparation		
1.1	Application for inclusion of project into Government Power Plant Master Plan <ul style="list-style-type: none"> ◆ Pre-Feasibility Study report ◆ Application for inclusion in Master Plan 	✓
1.2	Investment Registration Certification	✓
Phase 2. Development		
2.1	Agreements/Approvals from EVN for FS approval and PPA signing <ul style="list-style-type: none"> ◆ Preliminary Acceptance for power purchasing ◆ Agreement on Grid Connection ◆ Agreement on Tariff Metering System ◆ Agreement on Relay Protection and Automation System ◆ Agreement on SCADA & Telecommunication System 	✓
2.2	Agreements/Approvals from Government Authorities for FS approval <ul style="list-style-type: none"> ◆ Agreement on Firefighting System ◆ Agreement on Mine Clearance Plan ◆ Agreement on Grid Connection Line Right-of-Way ◆ Environmental Impact Assessment (EIA) ◆ Other necessary agreements 	✓
2.3	Feasibility Study (FS) Preparation <ul style="list-style-type: none"> ◆ Site Survey Reports (Solar Farm, Transmission Substation & Grid Connection Line) ◆ Conceptual Design (Solar Farm, Transmission Substation & Grid Connection Line) ◆ Cost estimation and budgeting (Solar Farm, Transmission Substation & Grid Connection Line) ◆ Environmental Impact Assessment 	✓
2.4	Feasibility Study (FS) Approval <i>including independent review, submission and approval acquirement from MOIT</i>	✓
2.5	Power Purchase Agreement <i>including preparation, negotiation, and finalization of agreement between project owner and EVN</i>	✓

B. Proposed Scope of Works

OUR SCOPE

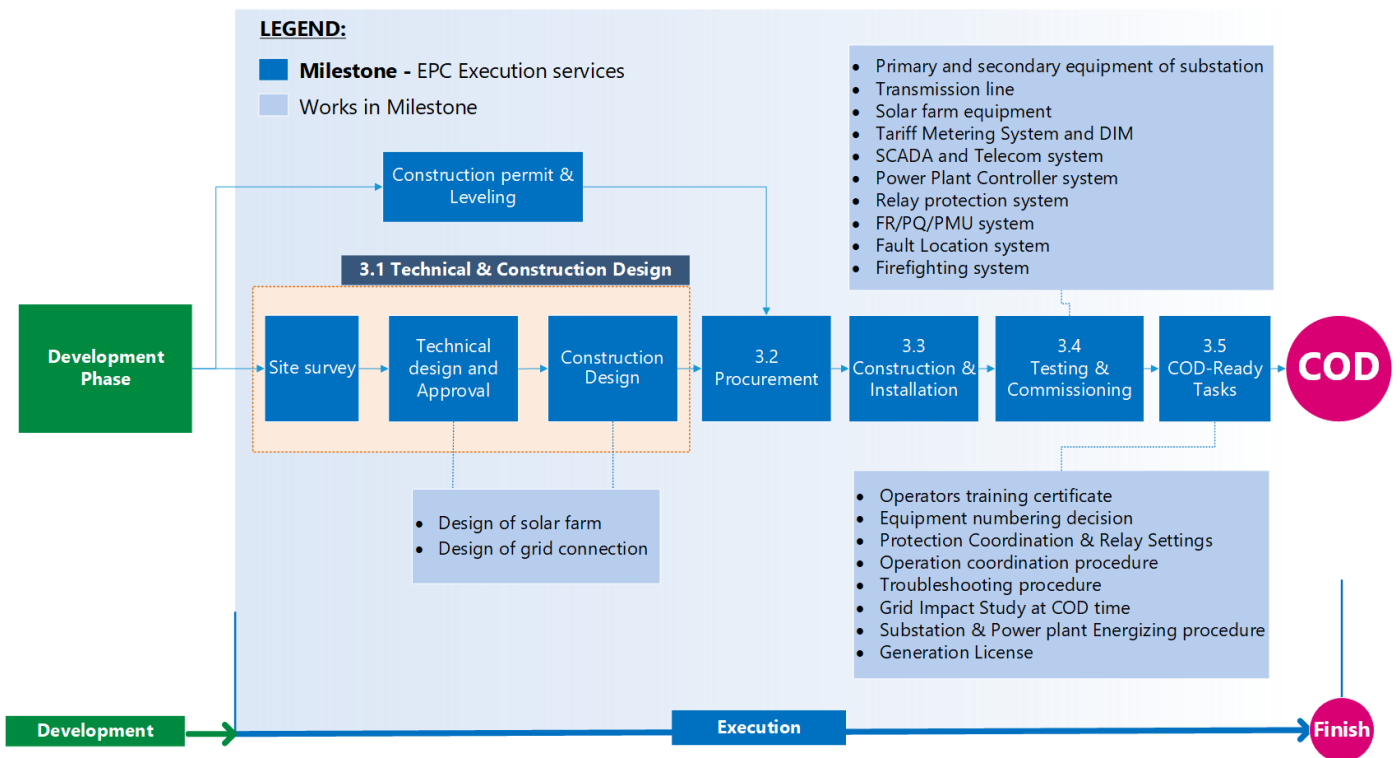
Our project execution services can cover the entire range of EPC-related works from concept to commissioning.

Our service quality is guaranteed by various key factors brought to our client projects:

- ◆ Experience and good relationship in power sector
- ◆ Strong technology and finance
- ◆ Local engineers of high level in power sector
- ◆ Project management experts
- ◆ Site and geographical knowledge

2. Project EPC Execution Services

Overall Flow of Project EPC Execution Services



The timeline for EPC Execution Services is generally 6 months from contract effective date, subject to actual work scope and other



Project Execution Service Scope		
No.	Task Description	Our Scope
Phase 3. EPC Execution		
3.1	Technical & Construction Design <ul style="list-style-type: none"> ◆ Grid Connection (Power Transformer, Primary System, Secondary System, Tie Line) ¹ ◆ Civil & General Works ² 	✓
3.2	Procurement <ul style="list-style-type: none"> ◆ Grid Connection (Power Transformer, Primary System, Secondary System, Tie Line) ¹ ◆ Civil & General Works ² 	✓
3.3	Construction & Installation <ul style="list-style-type: none"> ◆ Grid Connection (Power Transformer, Primary System, Secondary System, Tie Line) ¹ ◆ Civil & General Works ² 	✓
3.4	Testing & Commissioning <ul style="list-style-type: none"> ◆ Grid Connection (Power Transformer, Primary System, Secondary System, Tie Line) ¹ ◆ Civil & General Works ² 	✓
3.5	COD - Ready Tasks & Documents <ul style="list-style-type: none"> ◆ Operators training certificate ◆ Decision of EVN Control Center (EVN-CC) for Solar Plant Equipment Numbering ◆ Approval for Protection Coordination Study and Relay Settings issued by EVN-CC ◆ Update of Grid Impact Study for the first energization (if required by EVN-CC) ◆ Operation coordination procedures between power plant and related Control Centers ◆ Troubleshooting procedure from related Control Centers ◆ Substation & Power plant Energizing procedure ◆ Approval for Firefighting system and procedure by local fire department ◆ Testing & commissioning certification of Control, Protection, SCADA, Metering System and other related systems ◆ Electricity Generation License 	✓

^{1,2} Detailed scopes under Grid Connection and Civil & General Works are shown in next page

B. Proposed Scope of Works

¹ Grid Connection Scope	
No.	Description
1. Power Transformer	
1.1	Power transformer
2. Primary System	
2.1	HV Primary Equipment (Circuit Breakers, Disconnecting Switches & Earthing Switches, CT/VT, Surge arresters, and Accessories)
2.2	MV Primary Equipment (Switchgear Cubicles, Auxiliary Transformer, Busbar, MV Cable, Surge arresters, and Accessories)
2.3	Other Materials and Accessories (HV Post Insulators, MV Post Insulators, HV string insulators, HV busbar materials, etc.)
3. Secondary System	
3.1	Power Auxiliary Supply
3.2	Control and Protection System
3.3	Integrated Computerized System for Plant Management System, HV Substation and Data Gateways
3.4	Energy Metering System
3.5	Auxiliary Power and Control Cables
3.6	Telecommunication & SCADA Systems
3.7	Supervisory Camera System (CCTV System)
3.8	Firefighting System
3.9	Other Materials and Accessories
4. Tie Line	
4.1	Conductors
4.2	Insulations
4.3	Utility Poles
4.4	Accessories

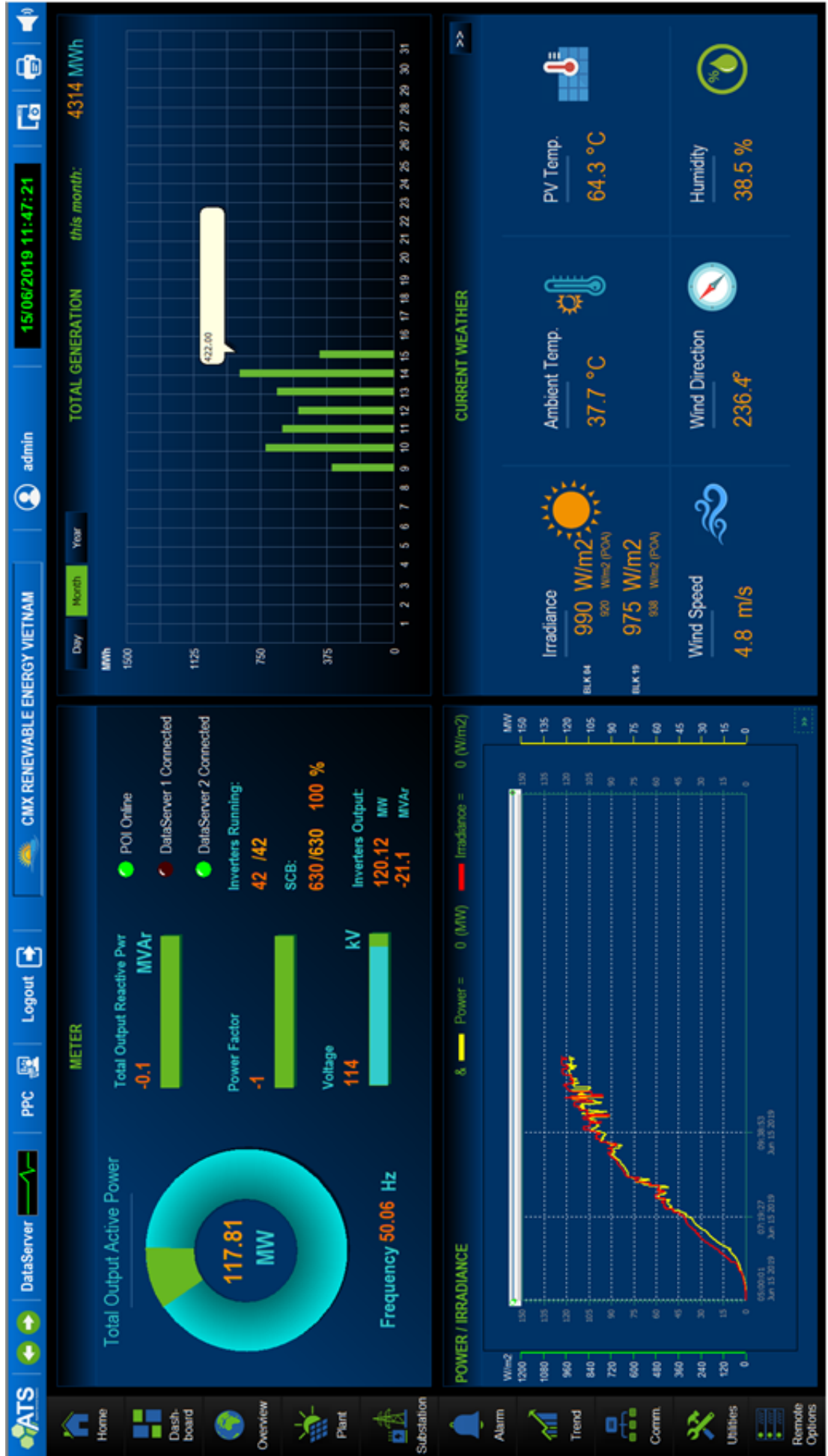
² Civil & General Work Scope	
No.	Description
1. Civil Works	
1.1	Substation access road, fencing, Cable trenching etc.
1.2	Control room & MV Switchgear room
1.3	Office building
1.4	Water supply and sewage system
1.5	Other works required for substation construction
2. General Works	
2.1	Auxiliary transformer / Gen set
2.2	MV transmission line from local grid
2.3	Substation indoor/outdoor lighting system
2.4	Fire alarm system, Firefighting system, Anti-lightning system, Earthing system, HVAC system, Security system, etc.

110kV Substation System Layout



B. Proposed Scope of Works

Monitor Screen for a Solar Power Plant



3. O&M Services

Phase 4. Operation & Maintenance

Operation and maintenance may be included as a part of our service package, which can cover repair and replacement. The related works included are:

- ◆ Monitoring facility performance
- ◆ Optimizing operation and maintenance schedule
- ◆ Routine testing and maintenance
- ◆ Investigation of failure events and follow-up actions
- ◆ Owner's Operational Reports

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