

File No. ENE51-SLDC0REWE(MISC)4/2020-CE-01-KRS

**TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED  
VIDYUT SOUDHA: VIJAYAWADA**

Sub: SLDC – Forms for synchronization of power plants -Orders issued.

T.O.O(CE-SLDC) Ms.No.1726

Dt: 03.07.2020

Ref: T.O.O: (ED/HRD &PIg /APTRANSCO) Ms No: 406 dated 06.03.2017

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**ORDER**

1. In supersession of orders in the reference (1) cited, after careful examination APTRANSCO accorded approval for the following process flow for synchronization of power plants. (appended to these orders).

<b>Action</b>	<b>Action by</b>	<b>Form</b>
Submit application for SCADA.	Generator/Developer	<b>Form S1</b> Application for synchronization permit Part 1 (SCADA)
Check application.	Chief Engineer, SLDC	<b>Form S2</b> Check list for synchronization permit Part 1 (SCADA)
Issue permit for SCADA.	Chief Engineer, SLDC	<b>Form S3</b> Permit form for synchronization permit Part 1 (SCADA)
Submit application for synchronization.	Generator/Developer	<b>Form S4</b> Application for synchronization permit Part 2
Pre synchronization inspection of power plant.	DISCOMS / TRANSCO	<b>Form S5</b> Pre synchronization inspection form Part 2
Check application and inspection report submitted by DISCOM.	Chief Engineer, SLDC	<b>Form S6</b> Check list for synchronization permit Part 2
Issue permit for synchronization.	Chief Engineer, SLDC	<b>Form S7</b> Permit form for synchronization permit Part 2

2. Generators / developers seeking synchronization of power plants to grid shall apply in the above forms to Chief Engineer / SLDC. The Chief Engineer/ SLDC shall issue synchronization permit.

(Contd...2)

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3. These orders are available on APTRANSCO website and can be accessed at the address <http://www.aptransco.gov.in>.

(BY ORDER AND IN THE NAME OF CHAIRMAN AND MANAGING DIRECTOR APTRANSCO)

Dr. SRIKANTH NAGULAPALLI  
CHAIRMAN and MANAGING DIRECTOR, APTRANSCO

To

All Functional heads /APTransco/ Vidyut Soudha/ Vijayawada.  
The Chief Engineers/Zones/Kadapa/Vijayawada/ Visakhapatnam.  
The Chief General Manager/ EC, EA & Solar Energy/APEPDCL/ Visakhapatnam.  
The Chief General Manager/ PPA, RA/APEPDCL/ Visakhapatnam.  
The Chief General Manager/IPC/APSPDCL/ Tirupathi.  
The Chief General Manager/IPC/ APCPDCL/Vijayawada.  
All SEs in Kadapa, Vijayawada, Visakhapatnam Zones.

**Copy to:**

PS to Chairman & Managing Director/APTransco/VS/Vijayawada.  
PS to Chairman & Managing Director/APSPDCL/Tirupathi.  
PS to Chairman & Managing Director/APEPDCL/Visakhapatnam.  
PS to Chairman & Managing Director/APCPDCL/ Vijayawada.  
PS to Joint Managing Director(Vigilance & Security)/APTransco/V.S/Vijayawada.  
PS to Joint Managing Director (Comml, IPC, HRD & IT)/APTransco/V.S/Vijayawada.  
PS to Director/Finance/APTransco/V.S/Vijayawada.  
PS to Director (Grid Management & Transmission Management) /APTransco /V.S /Vijayawada.

//Forwarded by order//

Chief Engineer /SLDC &  
APTRANSCO / VIJAYAWADA

**FORM S1**

**APPLICATION FOR SYNCHRONIZATION PERMIT - PART 1 (SCADA)**  
(To be filled in by the Developer/Generator)

**(1) CONNECTIVITY PERMIT DETAILS**

Connectivity Permit No: \_\_\_\_\_ Issued by:  APTRANSCO  APSPDCL  APCPDCL  APEPDCL

**(2) SINGLE LINE DIAGRAM**

SLD Approval No: \_\_\_\_\_ Date: \_\_\_\_\_

**(3) DAS ARCHITECTURE PROPOSED BY DEVELOPER**

- Proposed DAS Architecture schematic diagram at Generator end enclosed  
 Descriptive Document enclosed

**(4) DOCUMENTS ATTACHED**

- Proposed DAS Architecture schematic diagram at Generator end enclosed  Approved SLD attached  Descriptive Document attached

\_\_\_\_\_  
Signature of the applicant:

Date: \_\_\_\_\_

**FORM S2**

**SYNCHRONIZATION PERMIT PART-1 (SCADA) CHECK LIST**

**(1) CONNECTIVITY PERMIT**

Connectivity permit issued

**(2) SINGLE LINE DIAGRAM**

Single Line Diagram approved

**(3) DAS ARCHITECHTURE**

DAS proposed at the Developer end in accordance with APTRANSCO standard Norms

DAS Scheme:  RTU     SAS with 1 Gateway     SAS with 2 Gateways    Protocol :     IEC 101     IEC 104  
Communication:  PLCC     OFC     MPLS

**(4) COMMUNICATION CHANNEL (TELECOM WING)**

OFC/OPGW     PLCC     MPLS    No. of Channels:     ONE     TWO

**(5) I/O LIST**

I/O list prepared and attached to SCADA Permit

**(6) SCADA PERMIT**

SCADA Permit No: \_\_\_\_\_ Date: \_\_\_\_\_  SCADA PERMIT APPROVED

Signature : DEE \_\_\_\_\_ EE: \_\_\_\_\_ SE: \_\_\_\_\_ CE/SLDC: \_\_\_\_\_

## FORM S3

# SYNCHRONIZATION PERMIT - PART 1 (SCADA) FORM

## (1) CONNECTIVITY PERMIT DETAILS

Connectivity Permit No: \_\_\_\_\_ Date: \_\_\_\_\_ Issued by:  APTRANSCO  APSPDCL  APCPDCL  APEPDCL

## (2) SINGLE LINE DIAGRAM

SLD Approval No: \_\_\_\_\_ Date: \_\_\_\_\_

Approved DAS scheme with Communication scheme and I/O List is attached

## (3) PERMIT CONDITIONS

The SCADA Scheme permit is issued subject to the following conditions:

- 1) The Generator & Developer shall abide by the admissible rules and regulations of APERC, CERC, CEA and IE ACT 2003, IEGC and subsequent amendments thereof.
- 2) The Generator/Developer shall transmit uninterrupted data to SLDC.
- 3) The configuration works for integration of Generator Data, procurement and installation of equipment is under the scope of Generator.
- 4) The implementation of the approved DAS and simulation of data to SLDC is mandatory before synchronization of Generator.

CHIEF ENGINEER/APSLDC/VIJAYAWADA

## FORM S4

# APPLICATION FOR SYNCHRONIZATION PERMIT - PART-2

(To be filled in by the Developer/ Generator)

Synchronization Application No: \_\_\_\_\_

### (1) CONNECTIVITY PERMIT DETAILS

Connectivity Permit No: \_\_\_\_\_ Issued by:  APTRANSCO  APSPDCL  APCPDCL  APEPDCL

### (2) PAYMENT FOR REGISTRATION WITH SLDC

Payment of SLDC Registration Charges:  Online transfer  Demand Draft Amount: Rs. \_\_\_\_\_

RTGS /DD No: \_\_\_\_\_ Date: \_\_\_\_\_ Bank Name : \_\_\_\_\_

### (3) SCADA & DEVIATION SETTLEMENT MECHANISM

SCADA installed

Appointed QCA in compliance of DSM Regulation Name of QCA: \_\_\_\_\_  QCA appointing letter enclosed.

### (4) DECLARATION

I, Mr. /Ms \_\_\_\_\_ Designation: \_\_\_\_\_, do hereby undertake

the following on behalf of M/s \_\_\_\_\_

:

1) Purpose of the power plant :

I, hereby, declare that the power generated in the subject power plant will be sold to the DISCOM through PPA and also declare that installed solar PV modules/ WTGs capacity is limited to the contracted AC capacity. If any excess capacity over and above the AC contracted capacity is found at any time the same will be removed electrically and physically immediately.

(or)

I hereby declare that the power generated in the power plant utilized through Open Access/Captive/Captive by wheeling/3rd part sale. I also undertake that, I will not inject any inadvertent power to grid and also I will not claim any amount for such inadvertent power injected in to grid.

2) I, hereby, agree to abide by all rules and regulations of APERC, CERC, CEA and IE ACT2003.

3) I, hereby, agree to abide by all the instructions of SLDC to inject /absorb reactive Power as per the grid conditions.

4) I, hereby, agree to abide by all the instructions of SLDC to curtail the Generation as per the grid conditions whenever directed.

5) I, hereby agree that the Deviation charges and other Charges if any as per the Regulations shall be paid on time.

6) I, hereby, declare that, the entries made by me in the Application Form are complete and true to the best of my knowledge and based on records.

7) I, further agree that, the Synchronization clearance may be cancelled, at any stage, if the information provided by me is found to be incorrect or if the applicant transfers asset without prior approval of STU.

8) I, shall keep the SLDC indemnified at all times and shall undertake to indemnify, defend and save the SLDC harmless from any and all damages, losses, claims and actions, including those relating to injury to or death of any person or damage to property, demands, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the SLDC Clearance for synchronization.

Signature of the applicant: \_\_\_\_\_

Date: \_\_\_\_\_

**FORM S5**

**PRE-SYNCHRONIZATION INSPECTION FORM - PART-2**  
(BY DISCOM)

**(1) INSPECTING OFFICERS**

Organisation	Name	Designation	Mobile No	Email ID
APTRANSCO				
DISCOM				

**(2) CONNECTIVITY PERMIT DETAILS**

Connectivity Permit No: \_\_\_\_\_ Issued by:  APTRANSCO  APSPDCL  APCPDCL  APEPDCL

**(3) WIND**

**(3.1) WIND TURBINE TECHNICAL DATA**

(Furnish Technical data for each Model )

Wind Turbine Model: \_\_\_\_\_ Make: \_\_\_\_\_ Type: \_\_\_\_\_ Capacity of WTG in MW: \_\_\_\_\_

Stall/Pitch control: \_\_\_\_\_ Generator Type: \_\_\_\_\_ Rated Gen. Voltage: \_\_\_\_\_ V Hub height in m: \_\_\_\_\_

Rotor diameter in m: \_\_\_\_\_ Twist angle: \_\_\_\_\_ Noise power level (db): \_\_\_\_\_ Number of blades: \_\_\_\_\_

Blade Length in m: \_\_\_\_\_ Swept Area of blades: \_\_\_\_\_ Sq m Rated wind speed m/s: \_\_\_\_\_ Cut in speed m/s: \_\_\_\_\_

Cut out Speed m/s: \_\_\_\_\_ Survival speed (Max wind speed) m/s: \_\_\_\_\_ Survival temperature (°C): \_\_\_\_\_

Ambient temperature for in operation (°C): \_\_\_\_\_ Ambient temperature for out of operation (°C): \_\_\_\_\_

Attached LVRT & HVRT setting Curve of WTG  Attached Power Curve  WTG data attached in Annexure-I

**(3.2) PLANT CAPACITY DETAILS & CEIG PERMIT**

Capacity	No. of WTGs	Capacity of each WTG (MW)	Total Capacity(MW)	WTG Loc No
Total capacity Allocated				
Capacity synchronized				
Capacity Now Proposed to Synchronize				
CEIG Permit				

CEIG Approval for Energization: \_\_\_\_\_ Date: \_\_\_\_\_

CEIG Approval attached

## (4) SOLAR

### (4.1) INVERTER TECHNICAL DATA

INVERTER Model : \_\_\_\_\_ Make: \_\_\_\_\_ Type: \_\_\_\_\_

#### INPUT (DC)

Recommended Max power : \_\_\_\_\_ KW

Nominal DC power: \_\_\_\_\_ KW

DC voltage range, mpp: \_\_\_\_\_ to \_\_\_\_\_ V

Maximum DC voltage: \_\_\_\_\_ V

Maximum DC current: \_\_\_\_\_ A

Voltage ripple, PV voltage: \_\_\_\_\_ %

Number of MPPT trackers: \_\_\_\_\_ Nos

#### OUTPUT (AC)

Nominal AC output power : \_\_\_\_\_ KW

Nominal AC current : \_\_\_\_\_ A

Nominal output voltage: \_\_\_\_\_ KV

Output frequency: \_\_\_\_\_ HZ

Harmonic distortion: \_\_\_\_\_ %

Power factor compensation:  Yes  No

LVRT & HVRT CURVE attached.

### (4.2) SOLAR PV MODULES TECHNICAL DATA

Make: \_\_\_\_\_ Model: \_\_\_\_\_ Cell type: \_\_\_\_\_

Number of cells in Module: \_\_\_\_\_ Nos Maximum power rating (Pmax): \_\_\_\_\_ Wp Open circuit voltage (Voc): \_\_\_\_\_ V

Short circuit current (Isc): \_\_\_\_\_ A Maximum power voltage (Vmp): \_\_\_\_\_ V Maximum power current (Imp): \_\_\_\_\_ A

Module efficiency: \_\_\_\_\_ % Normal operating cell temperature (NOCT): \_\_\_\_\_ °C  Electrical performance Curve

Inverter & Module Details attached in Annexure-II

### (4.3) PLANT CAPACITY DETAILS & CEIG PERMIT

Capacity	DC Capacity			AC Capacity			
	No. of Solar PV Modules	Capacity of each Module (MW <sub>p</sub> )	Total Capacity (MW <sub>p</sub> )	No of Inverters	Capacity of each inverter (MW)	Total Capacity (MW)	Inverter Loc No
Capacity Allocated							
Capacity synchronized							
Capacity Now Proposed to Synchronize							
CEIG Permit							

CEIG Approval for Energization: \_\_\_\_\_ Date: \_\_\_\_\_

CEIG Approval attached



## (5) ICT & EVACUATION LINES IN GRID SS

ICT capacities at Interconnecting Grid SS:

ICT No	Capacity of each ICT (MVA)	Cumulative Capacity (MVA)

Evacuation Lines:

Voltage (KV)	Name of Evacuation Line	No of Ckts

- ICT capacity at Interconnecting Grid SS is adequate to evacuate the generation from the proposed Plant
- Inter connecting lines are sufficient to evacuate the generation from the proposed power plant
- PLANT DETAILS ACCEPTED

## (6) TEST CERTIFICATES

Received Test certificates:  WTG  Solar PV Modules  Inverters

- Weather monitoring System available  Equipment is LVRT& HVRT compatible
- Generator is capable of operating in the frequency range of 47 Hz to 52HZ and shall be able to deliver rated output in the range of 49.5 HZ to 50.05 HZ
- Generator is capable of supplying dynamically varying Reactive Power support in order to maintain PF within limits (0.95 lag to 0.95 lead)

## (7) SCADA

Synchronization Permit Part-1 approval No: \_\_\_\_\_ Date: \_\_\_\_\_

- SCADA installed as per approved Scheme  All data flowing in real time

DAS Scheme with:  RTU  SAS with 1 Gateway  SAS with 2 Gateways Protocol :  IEC 101  IEC 104

Communication:  PLCC  OFC  MPLS No. of Channels:  ONE  TWO

## (8) ENERGY METERS & SYSTEM PROTECTION

DISCOM approved Energy Meter scheme permit No: \_\_\_\_\_ Date: \_\_\_\_\_

- Energy Meters installed as per the approved Scheme  Energy meters are Calibrated & tested
- Energy meters make and Models are compatible with EBC software  Verified Test certificates.

Location of Billing Energy Meter	Serial Number of Energy Meters		
	Main Meter	Check meter	Stand By Meter

- Approved System Protection is adopted, commissioned and tested and found normal

## (9) ENERGY UTILIZATION

- PPA with DISCOM  Open Access  3<sup>rd</sup> Party Sale  Captive  Captive through wheeling
- Consent for the PPA received from APERC

## (10) FINAL REMARKS OF INSPECTION OFFICERS

- Recommended for Synchronization to Grid  Not Recommended for Synchronization to Grid

Signatures of Inspection Officers: \_\_\_\_\_  
Name :

Designation:

## (11) REMARKS OF CMD / DISCOM

- Approved for Synchronization to Grid

Signature of Chairman & Managing Director/AP DISCOM





**FORM S6**

**CHECK LIST FOR SYNCHRONIZATION PERMIT - PART 2**

**(1)CONNECTIVITY PERMIT**

Connectivity permit issued

**(2) PAYMENT FOR REGISTRATION WITH SLDC**

Received Payment for Registration with SLDC

Confirmation e-mail received from SAO/SLDC

**(3) SCADA TO SLDC**

Following data transfer to SLDC verified.

Turbine/Inverter level data

PSS level data

Energy meter data

AGC Control

**(4) DSM & COMPATABILITY OF ENERGY METERS**

Registration of Generator is completed in DSM portal

Appointed QCA

QCA Registration is completed

QCA registration fee paid

Confirmation e-mail received from SAO/SLDC

Energy Meters are compatible with EBC software

**(5) PRE- SYNCHRONIZATION INSPECTION OF PLANT**

CMD/ DISCOM accorded approval for synchronization of Plant

Sign of Scrutinising Authority : \_\_\_\_\_

**FORM S7**

**SYNCHRONIZATION PERMIT - PART -2**

Synchronization Permit No: \_\_\_\_\_ Date: \_\_\_\_\_

**(1) CONNECTIVITY , SCADA PERMIT DETAILS**

Connectivity Permit No: \_\_\_\_\_ Date: \_\_\_\_\_ SCADA Permit No: \_\_\_\_\_ Date: \_\_\_\_\_

Connected Grid Sub-station: \_\_\_\_\_ Connected Pooling Station: \_\_\_\_\_

Synchronization Application No: \_\_\_\_\_ Date: \_\_\_\_\_ Pre-Synchronization Report No: \_\_\_\_\_ Date: \_\_\_\_\_

**(2) CAPACITY NOW APPROVED FOR SYNCHRONIZATION**

Connected LT Feeder name	WTG/ Inverter location Numbers	Number of WTGs/Inverters	Capacity of each WTG/Inverter (MW)	Total capacity (MW)

**(3) PERMIT CONDITIONS**

This SLDC Permit is purely technical and subject to the following conditions:

1) Purpose of the power plant:

PPA with DISCOM

In case of Generator / Developer having PPA with Discom, the Excess solar PV Modules/ WTGs over and above the approved contracted AC capacity shall not be allowed for synchronization. If any excess capacity over and above the contracted AC capacity is found at any time, the DISCOM authorities shall arrange for removal of excess quantum of Solar PV modules /WTGs.

Open Access

3<sup>rd</sup> Party Sale

Captive

Captive through wheeling

- 2) The Generator & Developer shall abide by all rules and regulations of APERC, CERC, CEA and IE ACT2003, IEGC.
- 3) The Generator & Developer shall abide by all the instructions of SLDC including on Curtailment.
- 4) The Generator shall pay the Deviation charges and other Charges if any as per the Regulations on time.
- 5) The Generator & Developer shall establish and maintain uninterrupted SCADA and transfer of Energy meter data in real time.
- 6) The Generator & Developer shall conduct the tests of Harmonics, DC injection and flicker within 30days from the date of Synchronization.
- 7) The Generator/Developer/QCA shall provide day-ahead Forecasts of generation.
- 8) The CMD/DISCOM shall ascertain the commercial conditions to be fulfilled by the Generator & Developer before synchronization.
- 9) The CMD/ DISCOM shall ascertain the implementation of the approved protection Scheme.
- 10) The Generator and Developer shall keep the SLDC indemnified at all times and shall undertake to indemnify, defend and save the SLDC harmless from any and all damages, losses, claims and actions, including those relating to injury to or death of any person or damage to property, demands, suits, recoveries, costs and expenses, court costs, attorney fees and all other obligations by or to third parties, arising out of or resulting from the SLDC Clearance for synchronization.

**CHIEF ENGINEER/APSLDC/VIJAYAWADA**