General Information/Guidelines for Integration of Sub-station data including RES (renewable energy sources) plants data (i.e. solar power, bio-mass, wind power etc.) with SCADA system at Punjab SLDC, Patiala.

Brief introduction about SCADA system installed at SLDC, Patiala : SCADA system supplied/commissioned by M/s Siemens Ltd. is operational at SLDC, Patiala since 2015. The said system is redundant in nature and telemetry data of generating stations (Thermal & Hydro), grid sub-stations in Punjab is available round the clock. In addition, telemetry data of some Solar Power Plants having PPA with PSPCL have also been integrated with said SCADA system. Integration of data with SLDC system involves termination of Field Signals, such as RTU's at Sub-stations, Solar Power Plants, other control centres etc. in the Communication Front End(CFE) equipment(s) housed in the SLDC Complex which is further connected with the SCADA system. The said SCADA system supports both IEC 60870-5-101 & IEC 60870-5-104 protocols.

The IEC 60870-5-101/104 protocols define two data classes. Class 1 data is used for time tagged or spontaneously transmitted ASDUs. Class 2 data contains periodic, cyclic data.

I. **Details of various parameters of protocols used for data communication from field to SCADA system are as under:**

i) **IEC 101/104 Protocol Parameter Details:**

Protocol Id i.e. IEC 870-5-101(Unbalanced) or IEC 870-5-104
Info object address size i.e. 2 or 3 Bytes
Info Object Address Format i.e.Structure
Link and ASDU Address Size i.e. 1 byte Link and 1 byte ASDU for **IEC 101**   0 byte Link and 2 byte ASDU for **IEC 104**
Baud Rate i.e 200 or 300 etc.(for IEC 101 only)
Character Size i.e 8(normal) (for IEC 101 only)
Configuration Type i.e. Point to point (all protocols)
Parity e.g even parity (for IEC 101 only)
Telegram Max Retries i.e. 3
Telegram Time-Out Value i.e. 10 seconds

ii) **Valid ASDU data Types for Digital Points/Binary Points:**

Type ID 1: M_SP_NA_1 – Single Point Information
Type ID 2 :M_SP_TA_1 – Single-point information with time tag
Type ID 3: M_DP_NA_1 – Double Point Information
Type ID 4: M_DP_TA_1 – Double-point information with time tag
Type ID 30:M_SP_TB_1 – Single point information with time tag CP56Time2a
Type ID 31:M_DP_TB_1 –Double point information with time tag CP56Time2a
Type ID 45 : C_SC_NA_1 – Single Command
Type ID 46 : C_DC_DA_1 – Double Command
Type ID 47 : C_RC_NA_1 – Regulating Step Command.
Type ID 58 : C_SC_TA_1 – Single Command with Time Tag (104 only)
Type ID 59 : C_DC_TA_1 – Double Command with Time Tag (104 only)
Type ID 100: C_IC_NA_1 – (General-) Interrogation command
Type ID 103: C_CS_NA_1 – Clock synchronization command

iii) **Valid ASDU data Types for Analog Points :**

Type ID 9: M_ME_NA_1 – Measured Value, normalized value
Type ID 11: M_ME_NB_1 – Measured Value, scaled value
Type ID 13: M_ME_NC_1 – Measured Value, short floating point value
Type ID 15: M_IT_NA_1 – Integrated totals

Further, Telegram addresses are provided by the vendor(s)/ RES data integrator(s). Analog Signal address to be started from 8448, Circuit Breaker address from 256 and Isolator address from 376, and Remote Control Addresses to start from 33024 etc.

II.   For the purpose of integration of RTUs/SAS/RES data with the said SCADA system, all the concerned are requested to kindly go through the following information/general guidelines as reference. **Before finalising/submitting telemetry scheme to PSPCL/PSTCL for approval, the concerned person/system integrator is advised to visit Punjab SLDC,** Near 220KV Grid Sub-station, Ablowal, Patiala **for space requirement for their equipments.**

a)   **List of Documents as required for approval :-**
1) Detailed Data telemetry scheme
2) System Architecture
3) Details of tools/software(s) etc. to be used to counter data hacking/cyber-attacks.
4) Data communication route/scheme details
5) Latest Single Line Diagram of Plant/Sub-Station(indicating inverter capacity in MW)
6) Database/telegram addresses of each type of signal(as per details given in Para (B) Below.
7) Test Reports of all hardware to be installed by the firm.
8) Any other document(s) as deemed necessary from time to time
Note : Documents to be submitted should be arranged as per the above order/sequence.

b)   **Details of Signals**
1) Analog Signals
   a. **Generating Units/Inverters :** Unit wise Active & Reactive Power (MW & MVAR)
   b. **Lines :** Active & Reactive Power (MW & MVAR)
   c. **Bus Bar:** Voltage (KV)
   d. **Frequency** - Hz.
2) **Digital Signals**
   a. Circuit Breaker Status (On/Off)
   b. Isolator Status (On/Off)
   c. Sequence of Events
   d. Remote Control of Circuit Breakers (if any)

c)   **Telemetry system/Infrastructure Requirements :**
1) RTUs/SAS/RES vendor(s)/system integrator shall be required to provide/install & commission required telemetry system/ Infrastructure at their own risk & cost at their respective site(s) and at SLDC, Ablowal, Patiala (i.e. hardware, communication connectivity, mounting arrangements, cables/wires etc. including tools/software(s) to counter data hacking/cyber-attacks etc. as per the approval conveyed by PSPCL/PSTCL/SLDC for successful integration of their remote plant(s)/site(s) data. They shall ensure strict compliance of standard industry practises/safety provisions as required to complete their work to the satisfaction of PSTCL/SLDC.
2) RTUs/SAS/RES vendor(s)/system integrator(s) shall ensure redundancy of the telemetry system as well as Communication Link /Connectivity for round the clock availability of telemetry data of their plant(s)/site(s) in Punjab SLDC.
Note(s):

1. Due to space constraint in SLDC Building as mentioned above, it shall not be binding upon the PSPCL/PSTCL/SLDC to consider/approve an independent telemetry system/infrastructure for each and every RTUs/SAS/RES vendor(s)/system integrator as proposed by them.

2. As an alternative to the above, RTUs/SAS/RES vendor(s)/system integrator(s) may use existing data integration facilities as provided, as per the terms & conditions mutually agreed upon. Details of the system integrator(s) are tabled below:-

S.No	Name of Firm	Concerned Person	Cell No.	E-mail
1	Dynamic Engineers Pvt. Ltd.,Noida	Rahul Verma	9555591964	rahul.verma@depl.biz
2	MB Controls & System Pvt Ltd, Kolkata	Supriyo Paul	9811037172	spaul@mbcontrol.com
3	Process & Machines Automation Systems, Jaipur	CP Raghav	9829399928	violasupport@pmas.in
4	Rhythym Automation Limited,Noida	Anil Sharma	9818228587	anil.sharma@rhythmautomation.com
5	Secure Meters Ltd., Udaipur	Uday Gupta	9872007535	Uday.Gupta@securemeters.com
6	SmarTech Energy Services, Ghaziabad	Ashish Aggarwal	7290078297	ashish.aggarwal@smartechenergy.in
7	TAS India Private Ltd.,Pune	Vilas Pacharne	9823509550	vilas.pacharne@tasind.com

3. PSTCL(SLDC) is also in the process of creating data integration facilities (in near future) common for all vendors/ system integrator(s) details of which including modalities/charges/terms & conditions etc. as applicable shall be notified later on.

4. RTUs/SAS/RES vendor(s)/system integrator(s) shall be liable to upgrade/replace their existing telemetry system (at their own cost & risk) in compliance to meet with regulations/statutory requirements as issued by any Government agency/ CEA/CERC/PSERC/PGCIL/NRPC/FOLD/PSPCL/PSTCL/SLDC etc. from time to time. There shall be no financial implications to PSPCL/PSTCL/SLDC.

5. RTUs/SAS/RES vendor(s)/system integrator(s) shall be liable to pay the charges (in addition to the above), if any, as decided/levied by Government of India/Punjab/CEA/CERC/PSERC/FOLD/PSPCL/PSTCL/SLDC etc. from time to time.

d) **Other General Requirements (for RTUs/SAS/RES vendor(s)/system integrator(s)) :**

1) They shall be required to get all the requisite prior approval from concerned offices of PSPCL as well as PSTCL(Punjab SLDC Office) before taking up any activity (in hand).

2) They shall be fully responsible for proper upkeep and maintenance of their telemetry system so as to ensure round the clock availability of telemetry data in Punjab SLDC. **PSTCL/Punjab SLDC shall not be responsible in any way**.

3) Telemetry Data as integrated with SCADA system at SLDC Ablowal shall remain under observation for its quality /continuous availability at SLDC Control centre, Ablowal, (Patiala) for a period of minimum of 30 days from the date of it's integration before declaring the said telemetry system as "Successfully Integrated with SCADA system"

4) They shall also ensure cyber security audit of their telemetry system from the third party Independent agencies registered with Indian Computer Emergency Response Team, which is a functional organisation of Ministry of Electronics and Information Technology, Government of India (http://www.cert-in.org.in/) or other agencies only authorised by government time to time in compliance against cyber security threats and accordingly shall submit certified reports to this office within 30 days of integration of their RTU/SAS/plant data with SCADA system and subsequently submit certified reports as above every year.

5) In case of any failure of SCADA system/ any loss of data either due to non -compliance of Sr. no. 4 above or any other lapses in the telemetry system provided by RTUs/SAS/RES etc. vendor(s)/system integrator(s), they shall be liable to pay damages/penalties as per the provisions of various acts in place and as decided by competent authority.

6) They shall have to comply with the instructions issued by CEA/CERC/PSERC/PSPCL/PSTCL or any other statutory body etc. from time to time. In case of any dispute regarding hardware/software/or any other technical issues, the decision of PSTCL (SLDC) shall be applicable whatsoever.

7) Contact details/ e-mail Ids of all the concerned persons, including office contact details of Company(owner of plant), site engineer, Control room Number and that of the

PSTCL/PSPCL sub-station to which RES power is proposed to be injected, shall be made available to this office & may be updated after every 3 months.

III   Contact Details of Officers/Officials of Punjab SLDC are as follows:

S.No.	Name	Designation	Contact No.	E-mail ID
1	Er. Arvinder Pal Singh	SE/SLDC(P&S)	9646118007	se-sldcprojects@punjabsldc.org
2	Er. Harinder Pal	ASE/SCADA-EMS	9646112561	srxen-sldc2@pstcl.org
3	Er. Ankit Bedi	AE/SCADA-EMS	9646105014	
4	Er. Narinder Sharma	AAE/SCADA-EMS	9646112817	
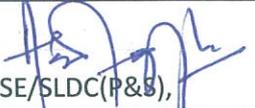
SE/SLDC(P&S),
PSTCL,Ablowal(Patiala)