

PUNJAB STATE TRANSMISSION CORPORATION LIMITED

(Regd. Office: PSEB Head Office, The Mall, Patiala)

OFFICE OF THE CHIEF ENGINEER / SO&C
SLDC Building, 220KV Grid Sub-Station, Ablowal, Patiala-147001, India
Contact No.: 0175-2365901, 2366007, 2365340 (Fax), 96461-18007 (M)
<http://www.punjabsldc.org>, <http://www.pstcl.org>

Expression of Interest (EOI)

EOI No SLDC/114/2010: Shortlisting of automation systems, SCADA and applications to be developed as an Integrated Project for State Load Dispatch Center in PSTCL.

State Load Dispatch Centre for Punjab (India) is already set up and functional at Patiala under PSTCL. To provide visibility to SLDC Operators, SCADA/ EMS system is also functional since 2002 with online data from a limited number of important 220kV & 132kV substations, generating substations & interstate tie-lines substations. Online electrical data from other states & utilities falling in Northern Regional Grid is also available in the SLDC via Northern Regional Load Dispatch Centre, where online data from all these utilities is exchanged. Subsequent to implementation of SCADA/ EMS many new developments have taken place in the Electrical Sector in State as well as at National Level as well as in Information & Communication Technology (ICT) globally. As a result many new requirements have been felt and/ or specified by the regulations, policies etc. To meet these requirements many systems similar to SCADA have been proposed and are being implemented independent from each other in different utilities all over the country. The rapid developments in energy sector have also expanded the power system tremendously and present installed SCADA system has reached its limitations.

Keeping all these factors in view it has been decided to implement an Integrated SCADA system which shall incorporate all the present & foreseen requirements of SLDC, share the existing & proposed resources to avoid duplicity, affect economy and provide a consolidated view of the grid along with analysis, reporting & decision making tools for the SLDC Operators for effectiveness.

Through this EOI, PSTCL invites interested parties to showcase their SCADA systems, discuss & understand SLDC requirements, give presentations/ demonstrations, supply literatures/ brochures, list advantages/ disadvantages, etc. in respect to their respective SCADA systems which could meet various conceptualized requirements of the SLDC by visiting the SLDC and/ or substations under PSTCL. The interested parties also have to keep in view various regulations at national & state level in respect of SLDC's responsibilities & functions and the recommendations of various committees for such systems. As already stated the intension of the PSTCL is to have maximum possible integration of required resources to fulfill the conceptualized requirements between various proposed systems.

By following the process PSTCL want to gauge the availability of desired systems and capacity & willingness of the interested parties to further develop & adapt their off the shelf systems to meet with the requirements of the SLDC. PSTCL shall shortlist systems & their specifications so

as to frame a consolidated technical specification of the Integrated System depending upon the suitability, requirement and viability of each individual system and the suggested approach for its implementation by the parties.

Implementation of the integrated scheme is proposed to undertaken through Open Tendering scheme by selecting a single System Integrator who shall be responsible for the every aspect of the complete implementation of the Integrated Scheme on turnkey basis along with extended warranty and O&M Contract as may be decided (for say 15 years).

Detailed terms & conditions along with write-up on present visualization and the conceptualized requirements of the SLDC, to be implemented as an integrated scheme is attached herewith for reference & understanding of the interested parties.

In short the objective of this EOI is to

1. Implement an Integrated scheme to Provide SLDC Operators/ Power Controllers in Punjab with real-time visibility, instant communication capability and tools for the purpose of monitoring & control of state transmission grid, NR Grid, effective load dispatches, coordination with other utilities, to meet the electricity acts, regulatory & grid code requirements.
2. For this purpose vendors in these fields are invited to showcase their systems so that PSTCL may be able to explore & shortlist the technologies available.
3. To understand the capabilities & willingness of the vendors/ OEMs to further develop their systems in line with SLDC requirements.
4. Based upon the above to develop project specifications & tender document including detailed technical specification for inviting open tenders for implementation of the Scheme for Punjab SLDC under PSTCL.

Dy. Chief Engineer /SLDC (P),
220KV Sub Station, PSTCL,
Ablowal, Patiala
Email:se-sldcprojects@punjabslcdc.org
Mobile: 9646118007

Terms & Conditions:

1. Interested Parties are advised to study & understand the conceptualized requirements of the SLDC as projected in this document.
2. The projected requirements are not possible to be met with supplying & implementing an off the shelf system. Extensive R&D efforts, adaptation & customization shall be required to integrate the existing & proposed systems to meet these.
3. Interested parties need to give undertaking in following respects before they may be called for/ invited for discussion/ presentations etc.
 - a. That the party is willing & capable to work on as System Integrator to implement the whole scheme as an Integrated projects
 - b. That the party is interested to meet with the requirements as conceptualized/ listed/ visualized in this document to the full extent and even beyond to provided suitable integrated system.
 - c. That the party has or is in agreement with OEM of the offered system to acquire the required licenses, rights, arrangements etc for further developing, adapting, customization of the available off the shelf systems and has the required expertise to do it to meet with the proposed requirements.
 - d. That the PSTCL shall have the right to use the submitted proposals of the parties to make detailed specifications of the proposed Integrated Scheme and call tenders as required and no copy rights shall be claimed by interested party of any third party over such scheme, system etc or its sub parts.
4. The Interested Parties shall bear all costs associated with the preparation, presentation, demonstration, submission of any documents etc. including cost of clarification/ verifications of the claims made by the interested party, if so required at any stage by PSTCL.
5. PSTCL will in no case be responsible or liable for any costs incurred or otherwise by the interested party, regardless of the conduct or outcome of this EOI and proposed Open Tendering for implementation of the Integrated Scheme for SLDC. As such PSTCL has the full & final rights to decided about the outcome or of any other matter related to this EOI and subsequent tendering.
6. The solution proposed shall be based on latest technology, preferably proven technology.

7. Before coming for Presentation/ Demonstration of the offered systems interested party is required to submit a brief write-up & schematic (4 Copies) on the proposed scheme in advance (atleast 48 hours) which should be self explanatory and lucid to read in say 2-3 hours. Based upon this write-up and other stated requirements invitation shall be formally extended to the party concerned for making presentation/ demonstration etc.
8. Detailed specifications (4 Copies) of the various sub-systems proposed shall also be submitted at the time of presentation or immediately afterwards within 2 days of such presentation in proper catalogued/ indexed form along with a write-up briefing the need, advantages/ disadvantages for each sub-system, estimated/ budgetary cost and overall picture of the proposed system. Proposal shall cover & include detailed technical specification indicating hardware, software, communication media/s etc required/ to be used, protocols details along with requirement of any APIs, proprietary protocols, 3rd party software integrations and such like issues, complete in all respects.
9. The Interested Parties are required to bring budgetary quotations for each sub-system as well as for the whole scheme. These budgetary offers shall be used to estimate the cost of the whole sub-systems/ scheme by PSTCL for its internal use such as preparation of estimates, arrangement of funds etc.
10. The response to this EOI should be full and complete in all respects. Incomplete, partial or conditional proposals shall be rejected. PSTCL reserves the right to clear any doubt/ contradiction/ ambiguity/ in the stipulations of this EOI at any time. PSTCL's decision on this account will be absolute, final and binding.
11. The EOI has given only the conceptualized requirements of SLDC as visualized at the present. Interested parties are required to give presentations/ demonstrations etc in respect of systems available with them, how the parties are proposing to provide an integrated system for these sub systems, how these shall be able to fulfill the requirements of the SLDC, along with projecting/ proposing their own systems which PSCTL may have omitted at this stage or have not visualized till now but might be required for effective functioning of SLDC. If such innovative systems proposed by the parties and/ or otherwise also, are felt to be required by SLDC, then the requirements shall be modified/ updated. As such interested parties are requested to keep watching/ viewing the web site for any changes in the requirements (proper version number shall be maintained) if any which shall be incorporated by PSTCL as the presentations by various vendors shall progress and SLDC requirements depending upon these presentations are updated. Depending upon this each interested party may ask for more chances to present/ shows case their systems before the closing deadline and shall be given a chance.
12. No further notice may be given in the press/ news papers in respect of any corrigendum etc. All interested parties are required to keep a watch on the above websites for any such

requirement/ exigency. Further for this purpose interested parties are requested to get registered for the purpose by sending an email id of the concerned for sending copy of such notices in respect of this EOI and in respect of subsequent tendering etc. Further interested parties are also requested to send a name of the person, designation, address, contact numbers (phone, fax, mobile & email) so that person may be contacted for any clarifications and/ or messages etc.

13. The technology proposed should be generic and modular in nature and shall be compatible with the IT applications/ solutions as prevalent in other utilities like SCADA-EMS and future IT applications like ERP-SAP, etc.
14. System Integrator needs to clearly mention the role and responsibilities of itself, any sub vendor, consortium member, JV partner etc and as well as of PSTCL's too in implementing the proposal.
15. Offer shall include detailed account of proposed methodology for taking up field survey, design, assembly, erection, testing, commissioning, O&M, warranty, extended warranty etc. along with details of man power to be deployed etc.
16. Methodology for capacity building for PSTCL officers/ officials shall also be included so that subsequently system may be handled independently by them.
17. In nutshell all relevant information/ inputs shall be given/ presented to develop a detailed Technical Specification of the Integrated Scheme.
18. Timeline for interaction, discussions, presentations, demonstrations, etc. between the interested parties with PSTCL shall as follows.

Sr.	Description	Deadline
1.	Earliest Reception of Requests from Interested parties for making presentation/ demonstration.	30.10.10
2.	First Presentation starting from	15.11.10
3.	Last date for receiving requests from Interested parties for making presentation/ demonstration.	25.11.10
4.	Last date for making first presentation by the respective parties	15.12.10
5.	Request from any party from among the parties who have already made presentation asking for another chance.	25.12.10

19. Interested parties are welcome to visit and interact with the PSTCL's officers dealing with implementation of this project and with the end users i.e. from SLDC Operation side, from energy accounting/ auditing side, from P&M and from Substation Design organization etc. for any clarification to get a fair picture of the conceptualized requirement of the entire integrated system if required, with prior arrangement Such parties may be given time for interaction alone or in groups with other interested parties depending upon the number of such parties who desire for such interaction before coming to give presentations, demonstrations one by one before the committee. Also to facilitate such interaction interested parties may send their technical queries relating to conceptualized requirements/ visualization on email id faq-eoi114@punjabsldc.org. Question as well as the suitable response may be made available to all the interested parties through FAQ page on <http://www.punjabsldc.org>.
20. The parties are also expected to give only a brief outline about their concern may be in 5-6 slides and more time shall be devoted to presenting/ demonstrating their technologies and capabilities in adapting to PSTCL requirements. However parties may give detailed account of their standing, introduction, experience, expertise indicating their strengths, user certificates, PO details, performance report of any similar projects done earlier etc separately in a folder (single copy). A softcopy of the documents on CD/DVD shall also be required. There should be four root level folders on the CD/ DVD named (i) **Main Proposal** containing scanned copy of the submitted proposal in same order as are available in the hardcopy format, preferably in scanned PDF format, (ii) **Presentations** containing softcopy of the PPTs, (iii) **Contact Info** containing contact information & (iv) **Misc** containing any other information/ demo programs etc further sub foldered.
21. Each party shall be given two days for giving presentation and/ or demonstration etc. Suggested outline of the presentation to be made/ interaction shall be in the following order:
- Session 1: (1:30 Hrs)
- (i) Introduction about concern/ constitution of group etc. including other relevant non technical details (5-6 slides).
 - (ii) Few slides on what has been understood by the party in respect of PSTCL's conceptualized requirements.
 - (iii) Overview of the party's proposed system which shall be meeting PSTCL's requirements.
 - (iv) Any other system suggested/ proposed by the party which can be accommodated in this scheme.
 - (v) A brief time line/ time period required for implementing the project and any suggestions for implementing the whole proposed scheme in stages.
- Session 2 to 4: (1:30 Hrs each)
- (i) Presentation on Salient features of the proposed systems.

- (ii) Estimated cost of implementing the respective systems.
- (iii) Handing over of Technical Specifications along with the presentation in respect of proposed system.

Session 5: (3 Hours)

- (i) Demonstration etc., if any.

Following systems are visualized to be part of the Integrated SCADA/ EMS Scheme.

The proposed scheme is visualized to implement following systems but not limited to as an Integrated SCADA/ EMS system to provide effective visibility & control to State SLDC.

- 1) Upgradation of Existing SCADA/ EMS by utilization existing system (H/W, S/W etc) as far as practically possible.
- 2) Backup Control Centre.
- 3) Intrastate ABT Boundary Metering
- 4) Online Intrastate & Interstate ABT Scheduling & Billing.
- 5) Online & Offline Energy Auditing
- 6) UFR and df/dt relay Monitoring & Rotation Control.
- 7) Messaging System between SLDC and Substations/ other utilities.
- 8) Provisions of Remote Consoles connected to SLDC system.
- 9) Secure Website for online & offline information distribution.
- 10) Demand Estimation & Load Forecasting (Similar day, Weather).
- 11) Elaborate Reporting system
- 12) Data exchange & Integration of data in SLDC SCADA from other states/ regions being received through NRLDC system on mutually agreed protocols for complete NR Grid Visibility.
- 13) Similarly Integration of data in SLDC SCADA from DMS/ SCADA of Discoms and Generator Management System from generators.
- 14) Provisions of Data streams from SLDC to other systems to use SCADA data.
- 15) Data Exchange with other utilities i.e. SCADA/ DMS of PSTCL etc.
- 16) Substation Automation through RTUs and Local Display, Control & Substation Management System.
- 17) Some sort of SMS based fault intimation/ alert system.
- 18) Additional RTUs to cover left out substations in PSTCL
- 19) Integration of existing RTUs.
- 20) Any other system found suitable during showcasing/ presentations/ demonstrations by interested vendors
- 21) Further research & development and adaptation as per the requirements of PSTCL/ SLDC from time to time.
- 22) Online & Offline Load flow study system
- 23) Extended warranty, O&M, any further development of the implemented system for at least 15 years.
- 24) Training and capacity building of PSTCL personals

Introduction of existing system and major requirements.

Some of the Projects presently commissioned, being undertaken or in pipeline, with the purpose to provide real-time visibility of the state transmission & other grid systems in NR region to Operators stationed at SLDC Control Rooms in respect of online load flow, system parameters & offline data for undertaking SLDC activities like Monitoring, Control, Grid Security, Analysis, UI control & Billing etc to PSTCL are as follows:

- 1.0 **Brief of the NR Unified Load Despatch and Communication Scheme (already commissioned):** A state of the art State Load Dispatch Centre is already commissioned since 2002 at Patiala under NR Unified Load Dispatch and Communication (NR-ULDC) Scheme which was implemented by PGCIL to establish computerized Control Centres for implementation of SCADA/ EMS (Supervisory Control and Data Acquisition/ Energy Management System) along with necessary communication facilities such as PLCC (power Line Carrier Communication), Microwave, Optical fiber on Ground Wire (OPGW) etc. so as to get real time data of the Power system with the purpose to efficiently operate the Northern grid. Under the NR-ULDC scheme, computerized Control centres (SLDC and Sub-LDCs) were commissioned in each state electricity utility falling under Northern region i.e. Punjab, Haryana, Rajasthan, Himachal Pradesh, Uttar Pradesh, Delhi, J&K and BBMB. In addition to above, one apex level control centre i.e. NRLDC was established in Delhi (PGCIL) to which real time data of these states is being streamed. PLCC is being used to transfer data from RTU locations to the nearest Microwave/Fiber optic location. Wideband communication system comprising of Microwave and Fiber Optics is being used for data transfer between control centres and from substations located on wideband nodes. NRLDC and SLDCs have SCADA/ EMS functionality while Sub-LDCs have only SCADA functionality with limited storage.
- 1.1 SCADA/ EMS basically consist of two parts SCADA which is technology of acquisition of online/ streamed data from a process in real time based upon telemetry principals and supervisory control of the process depending upon the judgment of the operator based upon his experience and set of EMS applications to assist the supervisor/ operator in taking decisions. Facility for initiating the control actions/ commands under supervisory control and/ or automatically is also provided.
- 1.2 In Punjab, State Load Dispatch Centre (SLDC) at Ablowal, Patiala and two number sub-LDCs i.e. at Laltonkalan and at Jamsher were established under the scheme. All data of Lalton Kalan (Ludhiana) and Jamsher (Jalandhar) is being streamed to SLDC Ablowal (ICCP Protocol) which is further streamed to NRLDC (ICCP Protocol). Data of other constituents of NR is also being streamed to NRLDC and all such data available at NRLDC is streamed back (ICCP Protocol) to all the constituents so that whole of NR data available at NRLDC is also available at each SLDC. For acquisition of online data from sub stations, there were only 49 nos. RTUs commissioned to cover important

generators, interstate tie line sub stations etc. under this scheme, details of which are as under:

- 1.2.1 19 nos. RTUs were supplied by Powergrid under the NR-ULDC scheme.
- 1.2.2 15 nos. RTUs were from existing Interim SCADA scheme implemented by M/S C-DAC previous to ULDC.
- 1.2.3 6 nos. new RTUs were procured from M/S ABB Ltd in the year 2002.
- 1.2.4 Thereafter 9 nos. RTUs were procured & commissioned by M/s Areva in the year 2005.
- 1.3 Presently, there are 49Nos. RTUs at sub-station locations and these cover all the Generating stations in PSPCL, Interstate tie lines, important 220KV & 132KV grid substations. These are supplying real time data to control centre(s) using communication media such as PLCC, Microwave & OPGW.
- 1.4 Microwave system in Punjab was also commissioned by PGCIL under the NR-ULDC scheme in year 2002. In year 2008, though, the frequency band allotted for Microwave Communication was allotted to some other service providers by Central Government. Hence PGCIL is now converting all communication along trunk route where there was Microwave system to OPGW system of communication.
- 1.5 In order to sort out the coordination problems with NR Constituents, NRPC set up USMG (ULDC Scheme Monitoring Group). Further in order to maintain the high-tech system, PGCIL has also signed AMC with M/S Areva on a Unified basis and same was initially for a period of five (5) years which was extended for further five (5) years up to 2012. PGCIL has informed that AMC support shall not be available after the Year 2012 and an alternative to the problem need to be looked into jointly by the all.
- 1.6 Ownership of the SCADA/EMS equipment/system is still with PGCIL and shall be transferred to PSEB after full payments.
- 2.0 **Expansion of NR Unified Load Despatch and Comm. Scheme (Phase-II) (To be implemented by Sep 2012):**
 - 2.1 In order to look into operational, technical & coordination problem of existing SCADA/EMS scheme, a ULDC Monitoring Group (USMG) was formed by erstwhile NREB/NRPC. Previously the meeting of this group was generally held every month but at present it is being held every 3 months or as required. The various issues/ problems relating to SCADA/ EMS implemented under SCADA/ EMS as reported by NR Constituents are sorted out by this group.
 - 2.2 The ULDC scheme which has been in operation since 2002 was conceptualized in 1990s, specifications were framed around 1995-96 and thereafter orders were placed. At the time

of project formulation for ULDC scheme only critical component of the Northern Region were included in the project. Subsequent to the commissioning of the ULDC scheme, the expansion of Power System has taken place at considerable pace along with organizational, regulatory and technological changes thus fueling the need of expansion of the existing scheme. In the 23rd Meeting of ULDC Scheme Monitoring Group (USMG) held on 27/04/09, a Sub-Committee was constituted to look into the details regarding the expansion scheme. Which has suggested an approach/ report in this regard.

- 3.0 **Intrastate Boundary Metering Scheme (On Priority):** With the unbundling of erstwhile PSEB there is a requirement for intrastate boundary metering between PSTCL & PSPCL to monitor, control, analyze & bill the load flows, energy transactions etc across the defined electrical boundaries within the state. Also there is requirement of accurately monitoring the ESO (Energy Sent Out) of the Generators besides energy & load flows across interstate electrical boundaries. As per the stipulations of State Grid Code (SGC), PSTCL needs to install ABT type Energy meters at intrastate electrical boundaries.
- 3.1 For recording interstate transactions PGCIL has put up ABT Type Energy meters called Special Energy Meters (SEMs) at interstate points for the purpose of UI calculations in accordance with the prevalent ABT tariff regime at interstate level. These interstate boundary SEMs are offline type meanings these are incompatible with AMR systems etc. So presently monitoring & control of interstate transactions is being done through available SCADA/ EMS only where energy transactions in real time are being calculated by time averaging the load flow data/ reading available through Transducers/ RTUs. Net result of this is that being two different systems i.e. monitoring & control from using SCADA/ EMS and billing using offline ABT Meters, at times there is huge mismatch leading to losses to the state.
- 3.2 SLDC needs to accurately monitor these transactions to restrict state's UI in interstate and intrastate transactions. For which a control centre system almost similar in functionality to existing SCADA/ EMS system is required probably with less features than the EMS system but additional feature of ABT Scheduling, UI Calculation, billing etc.
- 3.3 The scope of the boundary metering includes online & offline remote reading of ABT meters for Monitoring, Scheduling, Billing & Reporting suitable for Availability Based Tariff as adapted in Punjab for metering interface points of Open Access Customers, CPPs, IPPs, Inter & Intra State Power systems in PSTCL. Most of these interface points are located at PSTCL substations where either RTUs are already installed or shall be installed, however some of these interface points are also at non-PSTCL substations where RTUs couldn't be installed. Where ever RTUs are present and reporting to the SLDC, meters shall be interfaced to those RTUs and where ever it is not possible Meter or cluster of Meters be interfaced with SLDC Control Centre through appropriate

Communication media. Initial requirement of ABT type meters is of the order of 900 to 2200 depending upon the boundary demarcation between PSTCL & PSPCL. Subsequently more meters may be added as required for boundary metering.

- 4.0 **Additional RTUs (In progress and remaining shall be covered in the Integrated Scheme):** By 2012 PSTCL shall have some 150 nos. 220kV & 132 kV Sub Stations. Out of which only 49 nos. substations are reporting in present EMS/ SCADA system and have been covered by installing Remote Terminal Units. A tender is under process to cover the remaining 220kV sub stations by installing some 42 nos. new RTUs plus 5 RTUs to cannibalize equal nos. of existing RTUs for the purpose of maintaining the previously installed RTUs as required spares are not available or if available are very costly even more than the cost of new RTU. Besides 220kV substations, there are some 65 nos 132kV Sub stations data from which is also required in the SLDC.

However to effectively monitor & control the state grid it is imperative that load flow data from at least one step lower sub stations i.e. 66 kV & 33kV Sub Stations is also brought in the SLDC. There are more than 500 nos. such sub-stations; real-time data from these is required in SLDC for effective load dispatches.

- 5.0 **Other Requirements of SLDC (To be implemented):** Besides above systems for effective SLDC operations in present fast changing scenario, new regulations, and policies following workable sub systems with additional & advanced features in the above mentioned existing/ proposed system also needs to be implemented.
- 5.1 First and foremost demand from any of the SCADA systems is that the data streaming from RTUs should be accurate & reliable and should cover all electrical parameters of transmission level and sub transmission level voltages of the sub-station where RTUs are installed and all the sub stations of transmission grid should be covered. Analog data from grid elements may be taken from sealed energy meters instead of transducers, MFTs, MFM etc. So that there is no ambiguity between monitored/ controlled and billed data.
- 5.2 For State Transmission systems operating at 132kV & 220kV levels load is at 66kV and below voltage levels. SLDC Operators have to monitor & control the state transmission grid which is wheeling power from generators and interstate transmission tie-lines to loads operating mainly at 66KV and below voltage levels.
- 5.3 **Energy Accounting & ABT Scheduling:**
- 5.4 **Energy Auditing:** Online & offline energy auditing is also required to be made possible for which data from sealed energy meters whether ABT type or ordinary electronic meters shall be required.

- 5.5 **Messaging System:** Presently if any message is to be delivered to a substation/ utility etc even in emergency it is conveyed telephonically adopting relaying methodology i.e. SLDC Operators give the message to sub station operators at a predetermined substations who relay the message further down and so on. Most of times it has been observed that there is so much delay in the response from desired set of substations that concern of message initiating is already over when action is taken by the target sub stations, which at times lead to negative consequences for grid stability. And this is one of the reasons that at times even SLDC Operators avoid giving messages in case of small mismatch in schedule and draws. To make effective message relaying so that action is possible at a sub stations as required and in real-time, it is necessary that effective messaging system be also designed & implemented.
- 5.6 **UFRs:** Presently Under Frequency Relays (UFRs) are static type and repeatedly trip the same transmission lines/ load lines. The end result of this is that most of the times UFRs are taken out of circuit for local considerations and SLDC is not even informed. This as could be seen can have disastrous consequences for grid security. The monitoring of UFRs is possible through SCADA/ EMS, thus making the grid more secure. Further to avoid the problems of repeated tripping of same feeder due to the fixed location of UFR, suitable schemes which can do rotational enabling/ disabling of UFRs. This is possible if these relays are also interfaced with SCADA through RTUs and necessary applications are available in CC sub-system.
- 5.7 **Automatic load shedding features:** based upon pre decided supply schedules should be possible through SCADA as a backup to manual tripping based upon message relaying methods adopted at present.
- 5.8 **Disturbance Recording and Event Logging data:** SLDC also needs to get Disturbance Recording & Event data from the independent devices installed at substations for analysis of the disturbance.
- 5.9 **Fault alert system:** SLDC operators as well as field maintenance cells also need some sort of automatic fault alert system so that prompt action can be taken to restore the faulty equipment etc.
- 5.10 There are many other systems which are also required such as Demand Estimation, Integration of Load forecasting with weather forecasting data, online & offline Load flow studies, Data interchange with NRLDC systems (Data from other utilities should come to SLDC and data from SLDC should flow to NRLDC), Data interchange with Discom SCADA systems (i.e. SCADA/ DMS under implementation at few important cities), redundancy of systems at SLDC, Back up control centre which may take over in case of any eventuality at primary control centre etc.
- 5.11 **Sub station Automation:** Sub station automation is possible by two broad methods

- 5.11.1 By providing SAS systems: This is possible by retrofitting all the existing substations for making its switchgear, control gear & protection gear suitable for sub station automation. But this shall be very costly affair as all the EM relays etc shall be required to be changed.
- 5.11.2 Through an RTU: This is possible by providing Local SCADA system at substation level for sub station operators connected to the same RTU which acquire data and implement control commands from SLDC. At present RTUs acquire data from limited/ selected switchgear which is required by the SLDC Operators. For sub station SCADA, RTUs should acquire complete electrical data from the substation switchgear operating at any voltage level even at LT, Stations DC/ Auxiliaries and selected protection gears of transmission lines & transformers without the need for replacing the existing relay system etc. Protection should be through existing relays only and only monitoring of tripping etc the switch gear can be provided through RTUs and local SCADA system. Complete data acquired and complete control of switch gear need not be available to SLDC operators but to sub station operators through a Local SCADA system only and selected/desired data can be routed to SLDC Operators.
- 5.11.3 For this purpose, already commissioned substations can be automated by providing a Local Display & Control System (LDCS) which shall be interfaced with local RTU at the substation, which is already being used for acquiring data for SLDC.
- 5.11.4 LDCS besides displaying the substation information locally and providing control of the local switchgear to substation operators should also have features for providing records, data, log sheets, maintenance schedules/ plans/ coordination with SLDC, work to permits system etc.
- 5.11.5 By providing such systems, features & functions at substation level, PSTCL shall be able to, if not fully, at least semi-automate the substation operations with incremental cost only.
- 5.11.6 Non compatible already installed RTUs if not found compatible for such system may be replaced, instead of carrying on with legacy systems.
- 5.11.7 Analog values which shall be available for LDCS & further in CC sub-system should be from sealable compatible energy meters (in case of non-boundary points and from ABT meters in case of boundary points) to avoid mismatches and for the purpose of energy audit. Where energy meters are not required/ not possible those points should be monitored through transducers. Digital/ status inputs should be from C&R panels' respective switchgear as is the present practice.

Frequently Asked Questions

(FAQ)

As stated earlier interested parties are welcome to visit and interact with the PSTCL's officers dealing with implementation of this project and with the end users i.e. from SLDC Operation side, from energy accounting/ auditing side, from P&M and from Substation Design organization etc. for any clarification to get a fair picture of the conceptualized requirement of the entire integrated system if required, with prior arrangement. Such parties may be given time for interaction alone or in groups with other interested parties depending upon the number of such parties who desire for such interaction before coming to give presentations, demonstrations one by one before the committee.

Just to facilitate interested parties a FAQ shall be developed and maintained on the website till the completion of this EOI process to facilitate interaction between interested parties and SLDC under PSTCL. Parties may send their technical queries relating to conceptualized requirements/ visualization on email id faq-eoi114@punjabsldc.org. Question as well as the suitable response may be made available to all the interested parties through FAQ page on <http://www.punjabsldc.org>.