Request for Information

DTEK PILOT BESS 1 MW / 1.5 MWH PROJECT

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PART 1. INTRODUCTION

For the future procurement procedure DTEK invites the submission of technical proposals to design, manufacture and installation supervising of 1 MW / 1.5 MWh Battery Energy Storage System (BESS) to be located at the DTEK site in Ukraine .

The successful bidder will work with the DTEK Energy, one of the DTEK holding business division.

Respondents must demonstrate successful completion of energy storage systems using the same technology proposed.

All submissions, to be considered, must be prepared in accordance with the requirements specified in this Request for Information (RFI) document.

Any exceptions to the requirements of this RFI are to be identified on a separate form and clearly marked exceptions.

The technical proposal is to be emailed to dtek-tender@dtek.com **. The maximum size of one e-mail message is 20Mb.**

PART 2. GENERAL

Project Description

In February 2020 DTEK management has decided to pilot a BESS system. DTEK intends to install a utility scale BESS to provide an ancillary service (FCR) and energy bulk service (arbitrage). The energy storage market in Ukraine is in inception mode and there is no strong bankable business model for BESS yet. DTEK will use this pilot BESS case as a knowledge acquiring exercise and may try different revenue models, pivoting if needed.

According to the Generation Adequacy Report by Ukrenergo (Ukraine TSO), country battery reserve is 200 MW in 2021 and 1000 MW in a nearest future.

The BESS shall be sized for a minimum 1 MW capable of operating for 1.5 hours at nameplate rating.

The project area is in Energodar, Ukraine. DTEK wants to collocate BESS at Zaporizhya coal fired power plant. A BESS to be considered in this document must be capable of acting as a standalone asset regardless whether it is co-located with a generation asset.

Proposal Process and Schedule

DTEK is requesting information from qualified Battery Energy Storage System (BESS) vendors to design,supervise installation and on site test an Energy Storage System to meet the requirements as described in this Request for Information document.

The desired schedule for the BESS project (subject to change by DTEK) is shown in the below table (DD.MM.YY).

1	RFI issue and responses	30.03.20..12.04.20
2	Bidding platform RFP invitation to selected bidders	13.04.20..26.04.20
3	RFP review, scoring and selection	27.04.20..10.05.20
4	Contract awarded	11.05.20..31.05.20
5	BESS site acceptance test	01.12.20..06.12.20

PART 3. SCOPE OF WORK AND REQUIREMENTS

The purpose of this scope of work section is to provide future bidders with more detail on the description of the project, explanation of how it will be managed and to clarify what deliverables are to be provided by the successful BESS vendor.

Scope of Supply

The scope of supply for the BESS shall include the following principal elements:

- Design, fabricate, ship, installation supervising, test, startup, warrant and make ready for service a fully functional BESS and balance of plant equipment that meets or exceeds all requirements delineated in this document.

- All required equipment / materials labor and tools required to installation assistance, test, and supervising commissioning of the BESS.

- Design and assist to install the electrical connection from the BESS to the AC point of connection as determined by DTEK.

- Design install and test a Human Machine Interface (HMI) at the DTEK's offices which is remotely connected to the BESS over the DTEK network.

- Provide on-site training classes for DTEK operators, engineers, technicians and maintenance personnel. No certification is needed.

- Supply any special equipment and tools required for the operation and maintenance of the project.

- Supply an initial complement of spare parts.

- Provide at minimum a five-year warranty for all BESS components, and confirm additional 5 years warranty if asked by DTEK.

- Submit for DTEK review and comment all design drawings, O&M manuals, and miscellaneous documentation required to provide a complete installation. Provide all as-built documentation including software, design, equipment and electrical connections drawings required for the BESS.

- Provide and maintain a preliminary schedule for design, fabrication, installation and testing activities for the project. Preferable in MS Project file format.

Documentation Deliverables

The future bidder shall furnish complete documentation package that will be used for operation and maintenance of the BESS. The documentation shall be in English, well detailed and instructive.

At this point of time (RFI stage) DTEK expect at a minimum:

- Conceptual design package for DTEK review;

- BESS performance specifications and application-specific specifications;

- Maintenance schedule and checklist;

- Preliminary project schedule;

- Other project documentation;

All shall be provided in electronic format.

Later on DTEK expect:

- System integration study for the application;

- Design package and BOM for DTEK review;

- Network diagram of the BESS system and SCADA points list;

- Complete commissioning plan including test and startup procedures for DTEK review;

- Complete set of test results package for record;

- Installation manuals, instruction manuals and operation guides for all equipment and subsystems;

- Specific instruction manuals for operation of the BESS controller are required;

- BESS control and protective settings;

- Project schedule;

- Software documentation;

- As-built drawing and documentation upon final project acceptance;

- Other project documentation that would reasonably be required for DTEK to document the construction of the BESS and operate the BESS in the future;

All documentation shall be provided in:

- Paper hard copy

- PDF format

- Native file format when applicable: In addition to PDF format documents shall be provided in native file format. Drawing shall be provided in AutoCAD format. Documents that were created in Word or Excel, etc. shall also be provided in those formats in addition to PDF.

Design Conditions

- Design Temperature Range: min -40 F (-40 C), max 110 F (43.3 C)

- Peak Wind Gust: 110 mph (161 km/h)

- Seismic Hazard: low (0.2-0.8 m/s2 PGA[1])

- Relative Ambient Humidity – 10-95%

- Outdoor installation

-Pressure 101325 Pa (1 atm)

Electrical Design Parameters

- Nominal voltage at (location) = 6,3 kV

- Normal frequency = 50 Hz with normal deviation of +/- 0.2 Hz

BESS Requirements

- 1MW AC capable of operating at nameplate rating for 1.5 hours. The system must maintain this capability over the expected lifetime.
- Full power discharge for 1.5 hours.

[1] PGA – Peak Ground Acceleration

- BESS efficiency: minimum 90% AC round trip
- Ambient temperature range -40 F (-40 C) to 110 F (43.3 C). It is the responsibility of the BESS vendor to design all components to operate at safe rated sustainable operating temperatures over the required ambient temperature range.
- Monitoring requirements to include voltage, current, power, PF, frequency, error alerts. Data acquisition system shall have 30 calendar days on site data storage and capability to be remotely accessed and data downloaded.
- Meet the existing DTEK cyber security requirements, virtual access to the BESS by the BESS vendor will be provided by DTEK via a virtual private network (VPN) connection.
- The ramp rate of charging and discharging of the BESS shall be programmable or set to a defined value by manually entering a value into the BESS HMI or by the DTEK SCADA system communicating a ramp rate set point.
- The BESS control system shall be designed to provide for automatic, unattended operation of the BESS. However, the control system design also shall provide for local manual operation, remote operation, or dispatch of the BESS from DTEK SCADA system or remote access point. All modes of operation and its operational set-point functionality shall be remotely adjustable from the DTEK offices to allow change in settings and to turn on/off all controls or modes when appropriate.

The Data Acquisition/monitoring/alarm requirements

Alert DTEK, via SCADA, when the number of failed or inadequately performing cells or other vendor determined conditions indicate that;

- Preventative maintenance should be performed to keep the BESS at the specified performance levels.
- The BESS is in imminent danger of failing to meet specified performance levels or potential safety hazards exist.
- The BESS can no longer meet the specified performance criteria or safety hazards exist.

The BESS vendor shall have the capability to remotely monitor the BESS and independently and automatically be alerted to BESS alarm conditions without relying on DTEK personnel to communicate such an alarm condition exists. The BESS vendor shall have the capability to respond to alarm conditions and provide required remote service to correct such alarm conditions within four hours from the inception of the alarm condition.

The vendor shall include, in the Operation and Maintenance Manual, the recommended corrective action and maintenance procedures for each alarm level or observed condition provided.

Monitor Points shall include but not be limited to: AC – Voltage, Current, Power factor, KW, KVA, KVAR. DC – DC voltage and current. Points of monitoring TBD during design. Also, BESS temperature shall be monitored at a minimum of 4 points. System should have the ability to remotely access and monitor the data as well as have a 30 calendar days on-site memory storage capacity. Data points shall have the ability be recorded at a minimum of 1 ms, with the capability for instantaneous collection of data when data is outside of set parameter.

Modes of Operation

Automatic Scheduling

In order to take advantage of the fast response time possible with the BESS, DTEK desires the BESS to be capable of ramping to a predetermined output level as set by a remote signal from DTEK's SCADA system or by entering a ramp rate into the BESS HMI. The ramp rate and output level shall be selectable and the output level shall be programmable, on a continuous real time basis, by the remote signal from

DTEK's SCADA system. Once initiated in this operating mode, the BESS shall remain at the designated output until terminated by a remote signal or the vendor specified discharge limit is reached. Average state of charge is 50-80%

Protection Requirements

The BESS system shall contain protective relaying features, circuit breakers or fuses which selfprotect the BESS in the case of internal electrical faults.

SCADA Integration

The vendor's SCADA design and BESS control system interface shall be integrated with DTEK's existing SCADA system and associated RTU/substation communication network. Existing hardware is available and useful, depending on final design, for interfacing to the new BESS control system into DTEK's SCADA system.

Spill Containment

The BESS design shall mitigate against electrolyte spills that are credible for the types of cells used. The design shall include features that contain electrolyte spills (to be emptied by contracted chemical disposal company in the event of a spill) and prevent discharge to surrounding site soils.

Fire Protection

The vendor shall design and install a fire protection system. The fire protection system design and associated alarms shall take into account that the BESS will be unattended at most times. Current industry accepted best practices shall be employed.

Spare Parts and Equipment

The vendor shall evaluate its design with regard to failure rates, effects and BESS reliability. The vendor shall provide a recommended spare parts list.

Factory Testing

At a minimum, the following tests shall be performed.

- Capacities, Amp-hour and Watt-hour

- Ramp rate

- Heat Generated

- Efficiencies

- Application simulations as required by DTEK

The vendor shall capacity test 100% of the production cells to ensure compliance with design requirements. The vendor may propose optional alternate testing programs that result in a benefit to DTEK. However, the base proposal shall include capacity testing of 100% of the cells. All proposals for alternate testing shall include details of the proposed plan and the cost benefit to DTEK. DTEK shall witness performance and modes of operation testing during the factory acceptance test (FAT) routine.

Commissioning - Acceptance and Performance Testing

The vendor shall develop and perform a commissioning program that will include, but not be limited to, procedures for design verification, operational acceptance testing, start-up procedures, functional acceptance testing and safety testing. This commissioning program will assure that the BESS will perform as designed and that the system meets the performance criteria specified elsewhere in these specifications. All modes of operation as described in these specifications shall be tested. The vendor

shall determine that the BESS is fully operational and suitable for acceptance testing witnessed by DTEK. The vendor shall document all acceptance and performance tests performed. The vendor shall submit documentation, analyses, and a summary in a test report for DTEK's records. The commissioning program will be developed by the vendor (approved by DTEK) and shall demonstrate to DTEK that the BESS is operational and performs as specified. These tests shall include, as a minimum:

- Verification of sensors, metering and alarms

- Verification of all control functions, including automatic, local and remote control

- Verification of performance criteria

Warranty

Future bidder warrants DTEK that the equipment and materials furnished hereunder and the completed BESS project are fit for the purpose of producing and storing electricity in accordance with the requirements and are free from defects in workmanship and materials. Bidder makes all such warranties for a period of five (5) years after the date of site acceptance of the project by DTEK. Additional warranty might be asked by DTEK.

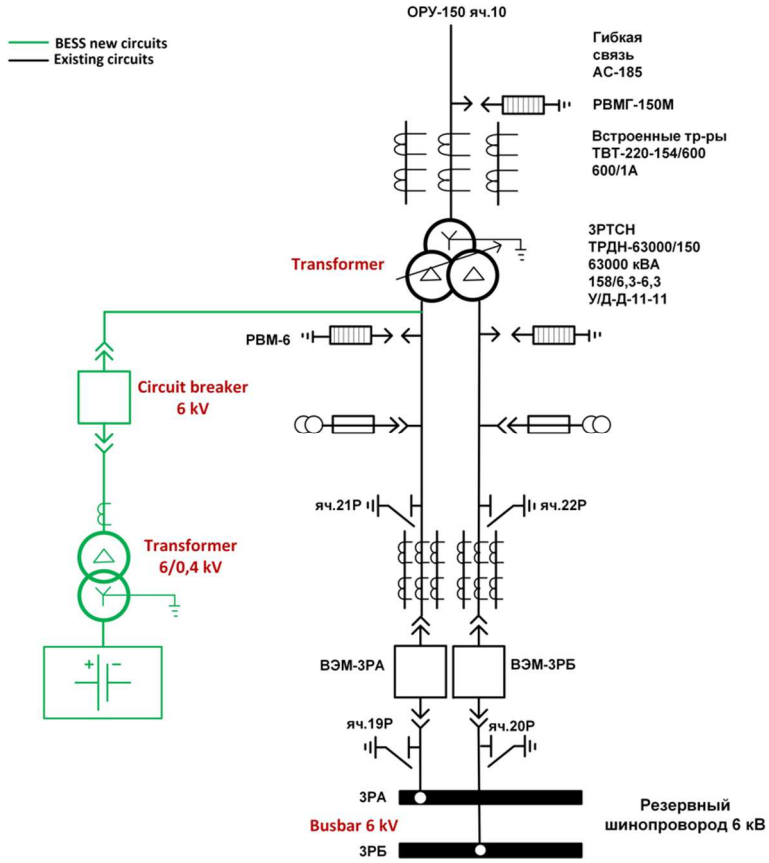
Interconnection

The LV terminals of the step-up transformer will be considered the point of electrical demarcation between DTEK and the BESS vendor for the design and supply of equipment and materials. It's expected that vendor will supply battery capacity, DCAC invertor and 6.3 KV transformer.. The self-contained BESS shall include the battery cells and racking, DC interconnection cabling, an AC service transformer and distribution panels, HVAC systems, energy metering, data historian server, an HMI for energy management control and monitoring / diagnostics and all other materials and equipment needed to provide a fully functional battery system capable of being integrated to the distribution grid.

The design of the foundation pads (base) for the BESS and LVAC and DC cabling shall be done by DTEK and BESS vendor. DTEK will self-perform the installation of the concrete pad/foundation based on the design provided by the BESS vendor. DTEK will self-perform the modifications required to the existing substation ground grid and the connections from the existing ground grid to the grounding points of the BESS.

The BESS will be connected to the DTEK medium voltage distribution system at substation 6.3 KV bus.

BESS will be connected to the low voltage side (6.3KV) of transformer type ТРДН-63000/150. HV side is connected to the 150 KV busses. BESS AC output must by synced with AC of LV side. See drawing below.



Modifications

Modifications to the DTEK conceptual design may be made. As these changes affect the BESS vendor, they will be communicated and coordinated with the successful BESS vendor.

Operator training

Training of DTEK personnel shall be given prior the completion of the works in English in accordance with a timetable to be agreed upon with DTEK and shall include onsite and classroom training covering the O&M of the BESS. Such training shall be conducted by trainers who are experienced in the O&M of the BESS's components, equipment's and systems. The vendor shall coordinate the overall program, which will be developed to familiarize the DTEK personnel with mechanical equipment, software and the control systems. The training shall allow DTEK's technical personnel to safely and reliably start up, operate, and shut down all components, equipment, and systems. Training shall be presented with actual simulation, allowing each trainee to gain a practical experience.

Given the novelty of the equipment installed for the DTEK team, the training program shall not prescind any item required for the safe and reliable operation of the BESS system. The vendor shall assume DTEK to possess little or basic experience in the maintenance and operation of BESS equipment.

Schedule

The future bidder shall provide a proposed preliminary schedule with their technical proposal. The schedule shall include design, fabrication, delivery, on site work and testing phases with subtasks as needed. The schedule will be discussed and finalized prior to the final award of this project. Detailed project schedule includes but not limited to the following activities:

- Basic engineering design
- Manufacturing
- FAT

- Shipment
- Installation supervising
- Training
- Commissioning assitance

PART 4. SELECTION PROCESS.

The DTEK's Selection Committee will review submitted technical proposals. After evaluation shortlisted vendors will be added to the DTEK' bidding platform to take part in the procurement procedure.

During the evaluation or review process, the Selection Committee reserves the right to request additional information or clarification from any submitter, or to allow corrections of errors or omissions.

PART 5. SUBMISSION REQUREMENTS.

Respondents must demonstrate successful completion of energy storage systems using the same technology proposed. Provide a complete listing of and contact information for all similar projects performed by your company over the past five (5) years. For each such project, provide a project description, including project size, completion date, major equipment vendors used, warranty claims if any.

The future bidder shall provide a proposed schedule with their technical proposal.

The future bidder shall submit with its technical proposal a list of information that the future bidder will require from DTEK at the kickoff of the project in order to be able to proceed with design.

Typical degradation curve information for the battery system proposed.

If it is recommended by the battery supplier that cells be changed out at regular intervals, provide proposed battery replacement schedule. Providve information on battery replacement procedure, including estimated time to complete replacement.

Provide Power Conversion System (PCS) manufacturer specifications.

Provide warranty terms and information on required environmental conditions or maintenance procedures (if any) that performance guarantees are based on.

Provide a description of all required maintenance activities, including estimated manhours and frequency of occurrence.

Provide information on guaranteed life expectancy to maintain rated capacity as number of discharges.

The technical proposal is to be emailed to dtek-tender@dtek.com . The maximum size of one e-mail message is 20Mb.

Please address all technical questions by email to Vadim Utkin, DTEK Energy Storage Lead, utkinvav@dtek.com

END OF THE DOCUMENT.