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|  | **ERCOT Dynamics Working Group Large Load Data Survey** |
|  | v. May 2025 |
|  | Instructions:   1. Answer all the questions. Questions with gray background may not be needed to initiate studies but will be required to be submitted by the in-service date. 2. On Q14 – Type of Load: Use drop-down menu to select load type [Click on Other to activate menu]. On second line, add detail load description, including new technologies and large equipment. 3. Q33, Q34 and Q42 contain drop-down menu for data entry selection. |
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|  | **Facility Design & Location** |
|  |  |
| 1 | Contact Name |
|  |  |
| 2 | Contact Address |
|  |  |
| 3 | GPS Coordinates (Lat, Long) of load |
|  |  |
| 4 | For load served at a new or existing POI, please identify (address, ESI ID number, voltage] |
|  |  |
| 5 | For new POIs, provide the desired voltage, POI, maps. TDSP will select final voltage and POI. |
|  |  |
| 6 | Does the customer propose modifying customer-owned ~~interconnection~~ interconnected facilities? |
|  |  |
| 7 | Does the customer propose adding a new substation transformer at the customer-owned facilities? |
|  |  |
| 8 | Include a substation one line of the customer-owned facility up until the utility interconnection |
|  |  |
| 9 | Include a site plan of the facility |
|  |  |
| 10 | Include a drawing of the facility |
|  |  |
|  | **Basic Load Information** |
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| 11 | Submission Date |
|  |  |
| 12 | Target energization in-service date? |
|  |  |
| 13 | Type of Load? [Select load type from drop-down and provide additional data about such load] |
|  | \_\_Other\_\_ |
|  |  |
| 14 | Total MW consumption and load power factor |
|  |  |
| 15 | List the estimated load ramp schedule (MW and MVAr per month or per year) |
|  | |  |  |  |  | | --- | --- | --- | --- | | **Year** | **Month** | **Load (MVA)** | **p.f.** | |  |  |  |  | |  |  |  |  | |
| 16 | Amount of load transferred from an existing substation (peak MW) |
|  |  |
| 17 | If there is a co-located generation at the substation, specify the amount of customer's self-serve load |
|  |  |
| 18 | Provide any additional information TDSP should know. |
|  |  |
|  | **Technical Characteristics** |
|  |  |
| 19 | Load characteristics (large motor, small motor, motor types (MW or % of total load) |
|  |  |
| 20 | For Power Electronic Loads, describe the kW, AC-DC converters, filters. |
|  |  |
| 21 | List the capacitors/reactors or other power factor correction equipment installed at the customer-owned facility |
|  |  |
| 22 | Load Profile [Daily] Provide a typical daily load curve. Detail cyclic ramping rates, cycle frequency |
|  |  |
| 23 | Load Profile [seasonal] Provide a typical min max conditions of load curve per seasonal ERCOT case. Detail cyclic ramping rates, cycle frequency. |
|  |  |
| 24 | Load Profile - does cyclic ramping up/down occurs in the subsynchronous frequency range? |
|  |  |
|  | **Equipment Data** |
|  |  |
| 25 | Will the load require new transmission transformers (e.g. 345 kV to 34.5 kV) or utilize existing transformers for the customer-owned facility/substation? |
|  |  |
| 26 | If customer intends to install a transformer at the customer-owned facility, specify the transformer characteristics name plate, tap changing. Provide the transformer configuration (i.e. Delta-Wye, Wye-Delta-Wye, or other) |
|  |  |
| 27 | Provide a transformer test report including transformer saturation characteristics for the customer-owned facility |
|  |  |
| 28 | How is the load cooled? [Computer room AC, Computer room air handlers, Air Handling Units, Other] |
|  |  |
| 29 | How are the motor components of the cooling system driven? [Single-speed AC connected, VFD/inverter, other] |
|  |  |
| 30 | Percentage of computer/server load and the percentage of cooling load? |
|  |  |
| 31 | How does the percentage change seasonally? |
|  |  |
| 32 | For all major motors, list the size and type |
|  |  |
| 33 | Induction Motor starting characteristics – Motor type, starting method, inertia, voltage level, locked rotor amps.  **NEC Table 430.7(b) Locked Rotor Code Letter**   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Code Letter | KVA per Horsepower with Locked Rotor | Code Letter | KVA per Horsepower with Locked Rotor | Code Letter | KVA per Horsepower with Locked Rotor | | A | 0.0-3.14 | H | 6.3-7.09 | P | 12.5-13.99 | | B | 3.15-3.54 | J | 7.1-7.99 | R | 14.0-15.99 | | C | 3.55-3.99 | K | 8.0-8.99 | S | 16.0-17.99 | | D | 4.0-4.49 | L | 9.0-9.99 | T | 18.0-19.99 | | E | 4.5-4.99 | M | 10.0-11.19 | U | 20.0-22.39 | | F | 5.0-5.59 | N | 11.2-12.49 | V | 22.4 and up | | G | 5.6-6.29 |  |  |  |  |   [To add new entry rows, copy & paste an existing row] |
|  | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **#** | **HP** | **Starting Method** | **Inertia** | **Voltage (kV)** | **Code** | **Locked Rotor (Amp)** | **# of Starts** | **Per Period** | **Model provided (Yes/No)** | | 1 |  | Unknown |  |  |  |  |  | None |  | | 2 |  | Unknown |  |  |  |  |  | None |  | | 3 |  | Unknown |  |  |  |  |  | None |  | | 4 |  | Unknown |  |  |  |  |  | None |  | |
|  | [Provide additional motor # characteristics here, per TDSP recommendation] |
| 34 | Synchronous Motor starting characteristics – Check NEC Table 430.7(b) above |
|  | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **#** | **HP** | **Starting Method** | **Inertia** | **Voltage (kV)** | **Code** | **Locked Rotor (Amp)** | **# of Starts** | **Per Period** | **Model provided (Yes/No)** | | 1 |  | Unknown |  |  |  |  |  | None |  | | 2 |  | Unknown |  |  |  |  |  | None |  | | 3 |  | Unknown |  |  |  |  |  | None |  | | 4 |  | Unknown |  |  |  |  |  | None |  | |
|  | [Provide additional motor # characteristics here, per TDSP recommendation] |
| 35 | If a transmission line is constructed and/or owned by the customer, provide the conductor type, conductor rating, conductor length in feet, shield wire type, zero sequence in ohms, positive sequence in ohms, and mutual coupling if applicable. |
|  |  |
|  | **Dynamic Model** |
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| 36 | Please provide a composite load model or other library models or user defined models along with PSSE network model representation. |
|  |  |
| 37 | Please provide a composite load model or other library models or user defined models along with PSCAD Network model representation. |
|  |  |
| 38 | If applicable, provide data on FACTs devices (SVCs, other). Provide dynamic models |
|  |  |
|  | **Back Up** |
|  |  |
| 39 | Is there backup power such as a generator or battery UPS? Describe the size, type. |
|  |  |
| 40 | If load has backup generation, what is the backup generation operating scheme? Include triggers and timings for switching to backup generation (ex. reached a voltage level of 0.75 pu for 3 cycles). Include criteria and timing for reconnection to the grid. Is it automatic or manual? |
|  |  |
| 41 | If load has UPS, what is the UPS operating scheme? Include triggers and timings for switching to UPS (ex. reached a voltage level of 0.75 pu for 3 cycles). Include criteria and timing for reconnection to the grid. Is it automatic or manual? |
|  |  |
| 42 | UPS Operating Mode: Which operating mode is the UPS configurated for? Does dynamic model reflect the operating mode? If not, provide corresponding models for the UPS.  Offline mode: Power to the load is fed directly from the grid to the load.  A transfer switch to the UPS closes when the grid power is lost.  Inline mode:  The UPS is essentially connected in “shunt” with the grid mains.  During standby, the inverter is online but carries zero power and the rectifier charges the batteries.  When the grid power is lost, a mains transfer switch opens, and power immediately begins flowing from the inverter to the load.  Online mode: UPS operates in series with the grid mains.  Grid power is first rectified then inverted back to AC to feed the load.   * Does the online UPS have a bypass switch for higher efficiency (eco mode)?   Flywheel (includes “dynamic diesel rotary”):  UPS is in shunt and uses a flywheel instead of batteries to provide immediate backup   * Is the flywheel connected through an inverter or directly connected via a synchronous machine? Models provided should reflect this dynamic behavior.   [Add additional information on second entry line after selection is made] |
|  | Unknown |
|  |  |
| 43 | Will there be any on-side generation that may be grid-tied (other than island backup power)? Please provide details |
|  |  |
| 44 | What is the size of the generator and the battery relative to the total load? |
|  |  |
| 45 | Can the load be islanded and supplied by backup emergency power? |
|  |  |
| 46 | Can the generator or battery be dispatched to support the load during system events? |
|  |  |
| 47 | Can the load participate in demand-side management during a grid emergency as an ancillary service? |
|  |  |
| 48 | In the event of a trip, how much computational load could be transferred to a data center outside of ERCOT? |
|  |  |
| 49 | How fast and how many MW reductions due to transfer can the transfer be accomplished? Will this transfer only occur because of grid system conditions? |
|  |  |
| 50 | Can the UPS condition incoming power (e.g. if the incoming voltage is too high or low, the UPS will condition it rather than switch over to a backup energy source)? |
|  |  |
|  | **Protection Settings** |
|  |  |
| 51 | Voltage sag levels and timing (sec) where the load is disconnected or transferred to UPS or Backup Generation? |
|  |  |
| 52 | Frequency sag levels and timing (sec) where the load is disconnected or transferred to UPS or Backup Generation? |
|  |  |
| 53 | Voltage sag levels and timing (sec) where the cooling system is disconnected or transferred to UPS or Backup Generation? Describe the operating schema if loss of the cooling system induce a transfer of load to UPS or Backup Generation. |
|  |  |
| 54 | Voltage swell levels and timing (sec) where the load is disconnected or transferred to UPS or Backup Generation? |
|  |  |
| 55 | Voltage swell levels and timing (sec) where the cooling system is disconnected or transfer to UPS or Backup Generation? |
|  |  |
| 56 | Do the loads automatically reconnect when voltage returns to normal? Immediately? With delay? Describe conditions and methodology. |
|  |  |
| 57 | If reconnection with a stagger or ramp, please explain |
|  |  |
| 58 | Count of voltage disturbances monitored at POI within a time period before the load is disconnected or transferred to UPS or Backup Generation? |
|  |  |
| 59 | Is the voltage protection measured per-phase or rms 3-phase? |
|  |  |
| 60 | Any frequency protection above/below which may disconnect and time delays? |
|  |  |
| 61 | Provide frequency and voltage dynamic model if applicable (Q51 - Q60) |
|  |  |
| 62 | If the customer owns the transformer, provide transformer high side protection settings. Please provide protection settings for transmission high side breakers owned by the customer. |
|  |  |
| 63 | If the customer owns the transformer, provide transformer low side protection settings. Please provide protection settings for feeder low side breakers owned by the customer. |
|  |  |
| 64 | Any communication sign from the customer’s protection (such as transfer trip, breaker fail, and breaker status) for protection schemes? |
|  |  |
| 65 | Any other protection settings that may disconnect the load for grid operating conditions at POI? |
|  |  |
|  | **SSO** |
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| 66 | If SSO study is required, provide details of the power supply for the load (diode/IGBT based) Provide the manufacturer and model number, and specify whether it uses a simple diode bridge converter with a filter, an IGBT-based converter with advanced controls, or a complex IGBT controller with a UPS etc. |
|  |  |
| 67 | What is the expected magnitude of variation in MW or percent of peak demand and timing (frequency in Hz or period of cycle in seconds) when data center load is expected to cycle up and down based on the anticipated application or machine learning computational process? Oscillations or Pulsing behavior per second, per minute, and per hour. |
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| 68 | If SSO study is required, provide a PSCAD Network and Dynamic data for the Large Load |
|  |  |
| 69 | Expected harmonic current/voltage spectra. Include information on harmonic filters. |
|  |  |