1. **Normal operating conditions** *(including the DER/ES, Demand Response, and interrelationships between the transmission and automated distribution operations)*
   a. Resource planning functions System planning functions
   b. Operation Planning functions
      i. Outage scheduling
      ii. Day(s)-ahead operation planning
      iii. Unit Commitment/Hydro-Thermo Scheduling
      iv. Transaction scheduling
   c. Load forecasting functions
      i. System load forecast
      ii. Bus load forecast
   d. Near real-time generation monitoring functions
      i. Reserve monitoring
      ii. Production cost monitoring
      iii. Evaluation of re-dispatch cost
      iv. Other
   e. Near real-time and real-time generation control functions
      i. Economic Dispatch
      ii. AGC
      iii. Volt/var/Watt control
      iv. Other
   f. Near real-time transmission monitoring functions (Wide Area Situational Awareness)
      i. Topology monitoring (incl. availability of controllable devices)
      ii. Bus load modeling (include Load-to-Voltage and Load–to-Frequency dependences and load management capabilities)
      iii. State estimation (with PMU)
      iv. Dynamic limit monitoring
      v. Network Sensitivity Analysis
      vi. Static contingency analysis
      vii. Dynamic security analysis
         - Angle stability
         - Short-term voltage stability
         - Frequency stability (Generation-load mismatch)
         - Slowly developing voltage stability
   viii. **Cyber Security Contingency Analysis**
      ix. Intelligent alarm processing
      x. Other
   g. Near-real-time transmission optimization functions
      i. Optimal power Flow (including load management means in distribution)
         - Loss minimization
         - Cost of energy minimization
         - Locational Marginal Price minimization (Congestion management)
      ii. Security Constraint Dispatch
   h. Real-time transmission control functions
1. Distributed Intelligence control functions (localized control with overrides and arming)
   ii. Close-loop combined OPF (including aggregated controls of means in distribution)
   i. Post mortem analyses of transmission operations.

2. Emergency Operating Conditions (including the DER/ES, Demand Response, and interrelationships between the transmission and automated distribution operations)
   a. Protection functions based on local information
   b. Emergency control functions based on local information
   c. Data gathering functions for post mortem analyses
      i. Event recording
      ii. Transient processes recording
      iii. Gathering static data on substation/generator level
      iv. Gathering static data on generation, transmission and distribution system levels (includes DER)
      v. Gathering static data on inter-utility level
      vi. Gathering static data on customer level
   d. Post mortem analyzing functions on substation level
   e. Post mortem analyzing functions on system level
   f. Post mortem analyzing functions on inter-utility level
   g. Near-real time monitoring function
      i. On substation/generator level
      ii. On generation, transmission and distribution system levels
      iii. On inter-utility level
      iv. On customer level in aggregated manner
   h. Near real time pre-arming and re-coordination functions
      i. Relay protection
      ii. Load-shedding
      iii. Generator-shedding
      iv. Fast generator starts based on operational parameters (angle, voltage, frequency, other)
      v. Intentional islanding in transmission
      vi. Intentional islanding in distribution
      vii. System stabilizer
      viii. Voltage, var, and power flow controlling functions
      ix. Distributed generation pre-setting
      x. Demand response pre-setting
      xi. Electric storage enabling pre-setting
      xii. Distributed intelligence schemes in distribution for fault isolation and service restoration
      xiii. Re-coordination of protection in distribution systems
      xiv. Other
   i. Real-time remedial action functions
      i. Load-shedding
      ii. Generator-shedding
iii. Fast generator starts based on operational parameters (angle, voltage, frequency, other)
iv. Intentional islanding in transmission
v. Intentional islanding in distribution (micro-grids)
vi. Distributed generation starts
vii. Demand response enabling
viii. Electric storage enabling
ix. Transmission sectionalizing
x. Voltage, var, and power flow control
xi. Other
j. Real-time restorative functions
   i. Auto-synchronization
   ii. Restoration of shed loads
       • After under-frequency load shedding
       • After under-voltage load shedding
       • After special load shedding
   iii. Reset of distributed generation
   iv. Reset of Demand Response
   v. Reset of electric storage
   vi. Other