Black Start Services for NE Alberta: Request for Proposals (RFP) Information Session

Monday, January 29, 2018

Agenda

- Introductions
- Update
- Black Start Services background
- Black Start procurement process
- Overview of RFP requirements
- Next steps
- Break (opportunity to submit questions)
- Q & A

Introductions

- Kyle Stretch
  - Manager, Procurement Development
- Mohamed Kamh
  - Manager, Procurement Implementation
- Lane Belsher
  - Real Time Manager, Operations
- Sunil Prahalad
  - Principal Engineer, System Restoration
- Mahdi Hajian
  - Senior Engineer, Operations
- Young Dawson
  - Project Manager, Procurement Implementation

Update

- Key changes
  - Procurement timeline extended through to end of 2018
    - Opportunity to provide comments on Black Start Service Agreement (BSSA)
    - Additional time to develop and submit proposals
  - Procurement process simplified
    - Removed separate RFQ phase from process
  - Technical requirements updated
    - Area boundary moved from Whitefish Lake to Heart Lake in south
    - Maximum start time adjusted to four hours from three hours
    - Capable of two starts in eight hours instead of three starts in nine hours
  - Commercial terms
    - 10–year fixed availability adjusted monthly payment

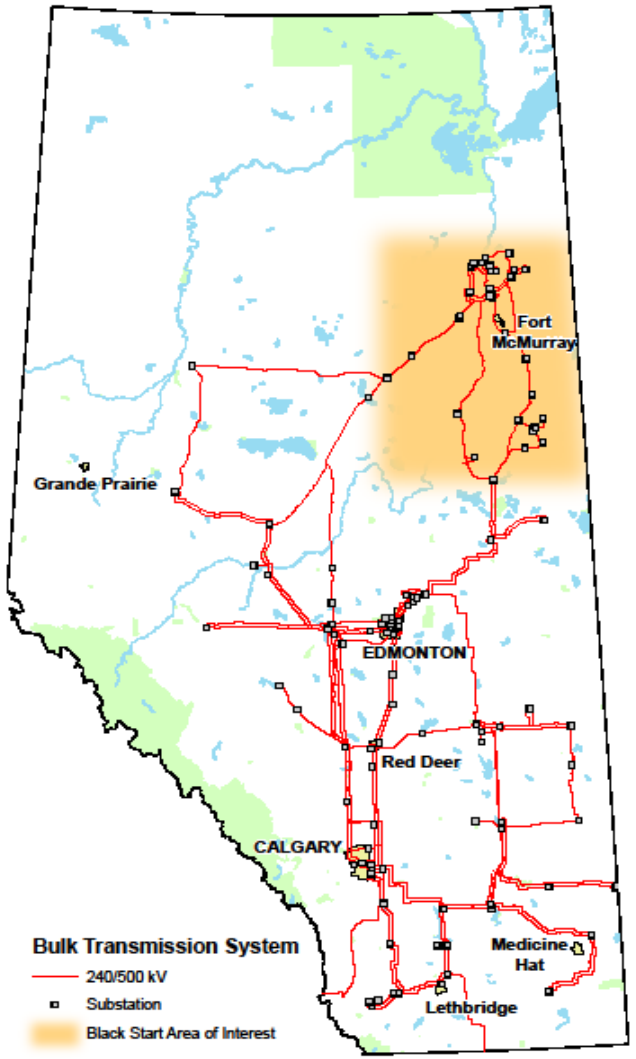
Need for Black Start services

- Black Start services providers perform an essential service:
  - Providers restore electricity to the grid without using outside source of electrical supply in unlikely event of blackout
- Need is driven by several factors, including:
  - Need to restore customer supply as soon as possible
  - Restoration requirements of transmission network
  - Startup requirements of baseload generation
  - Need for geographically dispersed Black Start services throughout Alberta

Black Start services are critical in reducing public safety risk and damage to infrastructure

Providing Black Start services in NE Alberta

- Area currently being considered for Black Start services is area up to and including:
  - As far south as Heart Lake substation including any facilities that directly connect to Heart Lake substation
  - As far north as Fort Hills substation including any facilities that directly connect to Fort Hills substation
  - As far east as Saskatchewan border
  - As far west as Brintnell substation



Black Start services agreement

- Key commercial terms
  - 10–year term
  - Target operational readiness date: Dec. 31, 2020
    - Operational readiness date can be advanced
  - Availability payment for providing service
    - Fixed monthly payment with no escalation
    - Availability adjustment (forced outages, force majeure)
    - Non-performance adjustment
  - Exercise payment
    - During Black Start event will receive MWh x Pool Price Cap

Black Start procurement timeline

- Key dates:
  - RFP and BSSA posted: Feb. 15, 2018
  - Feedback on BSSA due: Apr. 3, 2018
  - Final BSSA posted May 4, 2018
  - RFP submission deadline June 20, 2018
  - Successful proponent(s) selected: December 2018
  - Target in-service date is at or before Dec. 31, 2020

RFP evaluation stages

- Stage 1 – Proposal completeness (pass/fail)
- Stage 2 – Mandatory technical requirements (pass/fail)
- Stage 3 – Proposal shortlisting (scored)
  - Effectiveness (55%)
  - Cost (35%)
  - Redundancy (10%)
- Stage 4 – Detailed engineering study
- Stage 5 – Selection of successful bidder(s)

Technical Requirements

Technical and operational requirements

- Facilities must:
  - Be located in Fort McMurray area (see previous map)
  - Be transmission-connected (at point of connection)
  - Have ability to start unit without need for outside electrical supply
  - Start time must be less than or equal to four hours
  - Be capable of two black starts or more within eight hours
  - Have ability to close onto a de-energized bus
  - Be able to energize at least one cranking path, and have sufficient capability to start up at least one other transmission-connected generator in Fort McMurray area

Technical and operational requirements

- Facilities must:
  - Be able to control frequency and voltage under AESO direction
  - Be able to operate in zero droop (isochronous) or droop mode
  - Be capable of maintaining speed no load (net to grid) for at least 30 minutes

General requirements

- Providers must:
  - Be (or plan to be) registered as AESO pool participant
  - Act as a resource to the AESO and respond to instructions and directives from the AESO, and transmission facility owner (TFO)
  - Dedicated to system restoration during a Black Start event
  - Comply with relevant Alberta Reliability Standards, AESO interconnection standards and applicable ISO Rules
  - Comply with AESO's power system restoration plan and procedures

Outage reporting and communication requirements

- Providers must:
  - Provide notice to AESO for all scheduled and unscheduled maintenance outages
    - 306.5 – *Generation Outage Reporting and Coordination*
  - Maintain compliance with all communications requirements as per ISO Rules Sections
    - 502.4 – *Automated Dispatch and Messaging System and Voice Communication System Requirements*
    - 502.8 – *SCADA Technical and Operating Requirements*

Engineering study

- Purpose of a Black Start study:
  - To verify capability of Black Start resource to energize cranking path and start up other generators in Fort McMurray area in terms of both steady state and transient operating conditions
- Steady state analysis of this isolated power system includes:
  - Capability of Black Start units to absorb MVars produced by transmission system (line charging current)
  - Step-by-step energization of transmission system (cranking path) connecting Black Start resource to the destination plant

Engineering study

- Dynamic (transient) analysis includes the following:
  - Frequency control
  - Voltage control
  - Load rejection – voltage and frequency dynamics
  - Self-excitation assessment
  - Transformer energization
  - Large induction motor starting and motor starting sequence assessments
  - System stability

Engineering study data requirements

- Facility data (SLDs, WECC test report, etc.)
- Dynamic models (generators, excitation system, governor, etc.)
- Protection data (over/under voltage, over/under frequency, over/under excitation, V/Hz, etc.)
- *Details of data requirements will be provided in RFP*

Black Start unit(s) one-time test

Black Start unit(s) shall perform a comprehensive one-time test to demonstrate that each Black Start unit can self-start without any connection to the transmission system

- Testing of Black Start capability will, at minimum, consist of:
  1. Self-start of individual Black Start unit from an initial dead station without any source of external electrical supply
  2. Operate excitation system in automatic voltage control
  3. Regulate frequency in isochronous mode or in droop mode as directed by AESO for testing purposes
  4. Run for at least 30 minutes with station auxiliary load without connection to transmission system
  5. Demonstrate that unit breaker will successfully close onto a dead (de-energized) bus and all other breakers from the generating unit out to the interconnecting Transmission Facility Owners substation bus
  6. Demonstrate capability of any capital upgrades

Testing and training requirements (Alberta Reliability Standard: System Restoration from Black Start Resources EOP-005-AB-2)

- R9 – ISO must have Black Start resource testing requirements to verify that each Black Start resource is capable of meeting requirements of ISO's restoration plan
- These Black Start resource testing requirements must include:
  - R9.1 – Frequency of testing such that each Black Start resource is tested at least once every three calendar years

Testing and training requirements (Alberta Reliability Standard: System Restoration from Black Start Resources EOP-005-AB-2) cont'd

– A list of required tests including:

a) A test to verify the ability of the Black Start resource to:

i. start the generating unit(s) associated with the Black Start resource when isolated with no support from the interconnected electric system; or

ii. remain energized without connection to the remainder of the interconnected electric system, if designed to do so; and

b) upon completion of (a), a test to verify the ability of the generating unit(s) associated with the Black Start resource to energize a bus; if it is not possible to energize a bus during the test, the testing entity must otherwise demonstrate that the generating unit(s) associated with the Black Start resource has the capability to energize a bus

Testing and training requirements (Alberta Reliability Standard: System Restoration from Black Start Resources EOP-005-AB-2) cont'd

- R17 – Each operator of a generating unit with a Black Start resource must provide a minimum of two hours of training every two calendar years to each of its operating personnel responsible for:
  a) the startup of its Black Start resource; and
  b) energizing a bus
- R17.1 – Training program must include training on the following:
  a) those elements of ISO's restoration plan that are applicable to the Black Start resource, including coordination with the ISO and adjacent operator of a transmission facility

Reliability Standards governing restoration

- Providers must comply with all relevant Alberta Reliability Standards and AESO interconnection standards, including:
  - Alberta Reliability Standard EOP-006-AB-2 – *System Restoration Coordination*
    - Outlines AESO's restoration role and responsibilities
  - Alberta Reliability Standard EOP-005-AB-2 – *Alberta Reliability Standard System Restoration from Black Start Resources*
    - Outlines roles and responsibilities of AESO, TFOs, GFOs, DFOs and Black Start service providers
    - EOP-005-AB-2 has effective date of July 1, 2018 and will replace and supersede ISO Rule 305.3 – *Black Start Restoration*

Reliability Standards governing restoration: EOP-005-AB-2

- R13 – ISO must have written Black Start resource agreements or mutually agreed upon procedures or protocols with each operator of a generating unit with a Black Start resource, specifying terms and conditions of their arrangement; such agreements must include references to Black Start resource testing requirements, including those specified in requirement R9
- R14 – Each operator of a generating unit with a Black Start resource must have documented procedures for starting each Black Start resource and energizing a bus
- R15 – Each operator of a generating unit with a Black Start resource must notify ISO of any known changes to capabilities of that Black Start resource affecting ability of the operator of a generating unit to fulfill requirements of ISO's restoration plan within 24 hours of becoming aware of such change

Next steps

- Q&A, information session presentation and any competition updates will be posted at www.aeso.ca/market/ancillary-services/procurement/
- Email blackstart@aeso.ca for general inquiries
- SharePoint registration
  - To receive Black Start RFP, registration for Black Start SharePoint online site is required
  - To register for SharePoint, contact blackstart@aeso.ca
  - SharePoint user agreement
  - Non-disclosure agreement

Break

Please submit your questions

Q & A

Considerations

- Adhere to timelines
- Pay attention to detail
  - Sign forms where requested
  - Complete information in manner instructed
- Seek clarification during the process
  - Inquiries period during RFP open until May 17, 2018

Thank you