**Draft Grid Services Business Practice Standards**

Introduction

This Business Practice Standard identifies categories of operationally based grid services utilized within the wholesale electric market as well as the electrical, timing, and performance determination attributes that may be used by system operators to define the unique requirements for services within their markets.

Business Practice Standards

WEQ-XXX-1 A System Operator’s Governing Documents shall specify the attributes defining the grid services offered within its market.

WEQ-XXX-1.1 Attributes to define a grid service shall include but are not limited to electrical attributes, timing attributes, and performance determinations.

WEQ-XXX-1.2 A provider of grid services may use resources that encompass energy production and/or consumption capabilities.

WEQ-XXX-2 **Energy Service**

WEQ-XXX-2.1 Energy Services may require a resource to provide energy at an electrical service location over a specified period.

WEQ-XXX-2.2 Electrical Attributes

The Governing Documents shall specify the electrical attributes for Energy Service, if offered. Factors used to define the electrical attributes may include but are not limited to:

WEQ-XXX-2.2.1 Energy

The quantity of electric energy, expressed as electrical energy units such as megawatt hours or kilowatt hours over the performance period. A service agreement for Energy Service may specify the price for a quantity of energy at different power levels (a curve).

WEQ-XXX-2.2.2 Power

The required power level of the resource expressed as electrical power units, such as megawatts or kilowatts over the performance period.

WEQ-XXX-2.2.3 Electrical Location

WEQ-XXX-2.3 Timing Attributes

The Governing Documents shall specify the timing attributes for Energy Service, if offered. Factors used to define the timing attributes may include but are not limited to:

WEQ-XXX-2.3.1 Delivery Schedule

The delivery schedule, represented by the start time and end time to perform the service or a start time and length of duration.

WEQ-XXX-2.3.2 Delivery Schedule Notification

The timing associated with the notification that the delivery for the Energy Service is established. This may be conveyed through a delivery schedule notification that is publication of the results of a market process, published by specified times, to notify the market participant of its scheduled delivery of the service.

WEQ-XXX-2.4 Performance Determinations

The Governing Documents shall specify performance determinations, including how performance is quantified, and may include measurement equipment and location, measurement units and frequency, and calculations of estimating methods.

WEQ-XXX-2.4.1 Factors used to define the performance quantifications may include but are not limited to:

WEQ-XXX-2.4.1.1 Revenue grade meters that measure energy intervals synchronized to the delivery schedule for the Energy Service.

WEQ-XXX-2.4.1.2 Periodic power measurements to estimate energy over the performance period.

WEQ-XXX-2.4.2 In performance determinations, measurement of the electrical location may be different from the measurement location, and correction factors may be applied to address discrepancies between the delivery point and measurement point.

WEQ-XXX-2.4.3 The electrical location may be related to a pricing node or zone for settlement computations.

WEQ-XXX-3  **Reserve Service**

WEQ-XXX-3.1 Reserve Service may require a resource to produce or consume energy at an electrical location when called upon over a specified period.

WEQ-XXX-3.2 A resource shall be capable of providing a Reserve Service if the resource can meet performance expectations as described by a System Operator’s Governing Documents.

WEQ-XXX-3.2.1 A resource may meet performance expectations for Reservice Service by producing and/or consuming energy.

WEQ-XXX-3.3 Electrical Attributes

The Governing Documents shall specify the electric attributes for Reserve Service, if offered. Factors used to define the electrical attributes may include but are not limited to:

WEQ-XXX-3.3.1 Energy

The quantity of electric energy, expressed as electrical energy units such as megawatt hours or kilowatt hours, held in reserve which could be called upon over the performance period. A service agreement for Reserve Service can specify the quantity of energy as different power levels (a curve) that will be called upon.

WEQ-XXX-3.3.2 Power

The required power level power level of the resource expressed as electric power units such as megawatts or kilowatts over the performance period.

WEQ-XXX-3.3.3 Electrical Location

The electrical location where the service is provided to the electric system.

WEQ-XXX-3.4 Timing Attributes

The Governing Documents shall specify timing attributes. Factors used to define the timing attributes may include but are not limited to:

WEQ-XXX-3.4.1 Delivery Schedule

The delivery schedule or the start and end time to perform the service. This can also be specified with a start time and a duration. The Governing Documents specify the periodicity of the scheduling agreement (e.g. daily, hourly, 30-minute periods).

WEQ-XXX-3.4.2 Delivery Schedule Notification

Delivery schedule notification is the timing associated with notification that the delivery schedule for the Reserve Service is established. For example, the results of a market process are published by specified times and notify the market participant of their scheduled delivery of the service.

WEQ-XXX-3.4.3 Speed of Response

Speed of response is the quality of the resource to change its operating position over a time interval. This can be measured in the amount of time to have the resource available (e.g., 30 minutes), the power level, a percent of reserved power level quantity per unit, and/or an agreed quantity over an interval.

WEQ-XXX-3.5 Performance Determinations

The Governing Documents shall specify shall specify performance determinations, including how performance is measured and can combine energy interval metering with time stamped power measurements.

WEQ-XXX-4  **Regulation Service**

WEQ-XXX-4.1 Regulation Service may require a resource to provide an increase or decrease in real power from an electrical location over a specified scheduled period against a predefined real-power basepoint following a signal provided by the service requestor.

WEQ-XXX-4.1.1 A resource providing Regulation Service shall be able to respond to regulation signals sent by the service requestor.

WEQ-XXX-4.1.1.1 The signal interval from a service requestor for Regulation Service may be one to several seconds and the associated performance period is of a shorter duration than the typical energy schedule service performance period.

WEQ-XXX-4.2 Electrical Attributes

The Governing Documents shall specify the electrical attributes for Regulation Service, if offered. Factors used to define the electrical attributes may include but are not limited:

WEQ-XXX-4.2.1 Power

The amount of real power change required from the resource expressed as electrical power units, such as megawatts or kilowatts, for increase and decrease over the signal performance period.

WEQ-XXX-4.2.2 Power Regulation Range

The power regulation range, which specifies the required upper and/or lower bound for the change in power level in electric power units, such as megawatts of kilowatts, expected over the service period.

WEQ-XXX-4.2.3 Power Mileage

The power mileage, or the summation of power level movements up and down that a resource providing regulation service must take over the course of the delivery schedule

WEQ-XXX-4.2.4 Service Location

The location or region where the service is delivered in the electric system.

WEQ-XXX-4.2.4.1 The location or region for service delivery can be represented by a zone or area of the system.

WEQ-XXX-4.3 Timing Attribute

The Governing Documents shall specify timing attributes. Factors used to define the timing attributes may include but are not limited to:

WEQ-XXX-4.3.1 Delivery Schedule

The delivery schedule or the start and end time to perform the service. The delivery schedule may be specified with a start time and a duration (e.g., 1 hour or 4-hour periods).

WEQ-XXX-4.3.2 Delivery Schedule Notification

The timing associated with notification of the delivery schedule for the Regulation Service and can be known as the delivery schedule notification. For example, the results of a market process are published by specified times and notify the market participant of their scheduled delivery of the service.

WEQ-XXX-4.3.3 Signal Periodicity

The signal periodicity, or the periodicity of the regulation signal (e.g. 2 or 4 seconds).

WEQ-XXX-4.3.4 Speed of Response

The speed of response required for the resource. This may be expressed as the quality of the resource to changes its operating position over the signal period.

WEQ-XXX-4.4 Performance Determinations

The Governing Documents shall specify performance determinations, including how a real power increase or decrease will be measured. The Governing Documents may also include the determination of a performance score or performance index.

WEQ-XXX-5  **Frequency Response Service**

WEQ-XXX-5.1 Frequency Response Service may require a resource to provide active response of a resource based on locally measured or sensed changes in frequency

WEQ-XXX-5.1 Electrical Attributes

The Governing Documents shall specify the electrical attributes for Frequency Response Service, if offered. Factors used to define the electrical attributes may include but are not limited:

WEQ-XXX-5.1.1 Percent Droop

The percent droop or the amount of real power change for an increase or decrease of frequency over the performance period as expressed in units such as percent of megawatt per one tenth Hertz.

WEQ-XXX-5.1.2 Deadband

The deadband or the upper and/or lower frequency deviation threshold. This attribute may be expressed in units such as Hertz, around nominal system frequency within which the resource will not perform frequency response and beyond which the resource will operate to correct a deviation.

WEQ-XXX-5.1.3 Service Location

The location or region where the service is delivered in the electric system, typically the Balancing Area.

WEQ-XXX-5.2 Timing Attribute

The Governing Documents shall specify timing attributes. Factors used to define the timing attributes may include but are not limited to:

WEQ-XXX-5.2.1 Delivery Schedule

WEQ-XXX-.5.2.2 Delivery Schedule Notification

The timing associated with the notification of the on-call schedule for the frequency response and can be known as the delivery schedule notification.

WEQ-XXX-5.3 Performance Determinations

The Governing Documents shall specify performance determinations, including frequency response measurements.

WEQ-XXX-6  **Voltage Management Service**

WEQ-XXX-6.1 Voltage Management Services may require a resource to provide voltage support (raise or lower) within a specified upper and lower voltage range at an electrical location over a specified scheduled period

WEQ-XXX-6.2 Electrical Attributes

The Governing Documents shall specify the electrical attributes for Frequency Response Service, if offered. Factors used to define the electrical attributes may include but are not limited:

WEQ-XXX-6.2.1 Target Voltage

The target voltage for the service which can be expressed as electrical voltage units such as kilovolts at the electrical service location over a performance period.

WEQ-XXX-6.2.1.1 A Voltage Management Service agreement may specify a single target or an upper and lower range of voltage magnitude or an RMS value at the service location.

WEQ-XXX-6.2.2 Service Location

WEQ-XXX-6.3 Timing Attributes

The Governing Documents shall specify timing attributes. Factors used to define the timing attributes may include but are not limited to:

WEQ-XXX-6.3.1 Delivery Schedule

WEQ-XXX-6.3.2 Delivery Schedule Notification

The timing associated with notification that the delivery schedule for the Voltage Management Service is established. For example, the results of a market process are published by specified times and notify the market participant of their scheduled delivery of the service.

WEQ-XXX-6.3.3 Signal Periodicity

The signal periodicity or the periodicity of the voltage management signal (e.g., daily, hourly, 15 minute periods).

WEQ-XXX-6.4 Performance Determinations

The Governing Documents shall specify performance determinations, including how performance is measured.

WEQ-XXX-7  **Emergency [or Black Start] Service**

WEQ-XXX-7.1 Emergency [or Black Start] Service may require a resource to energize without an outside electrical supply or quickly change energization levels during an electric grid emergency.

WEQ-XXX-7.2 Electrical Attributes

The Governing Documents shall specify the electrical attributes for Emergency [or Black Start] Service, if offered. Factors used to define the electrical attributes may include but are not limited:

WEQ-XXX-7.2.1 Power

The amount of real power change required from a resource. This value may be expressed in electrical power units such as megawatts or kilowatts for increase or decrease over the signal performance period.

WEQ-XXX-7.2.2 Power Regulation Range

The upper and/or lower bound for the change in power level in electrical power units such as megawatts or kilowatts expected over the service period.

WEQ-XXX-7.2.3 Service Location

The location or region where the service is delivered in the electric system.

WEQ-XXX-7.2.3.1 The location or region for service delivery can be represented by a zone or area of the system.

WEQ-XXX-7.3 Timing Attributes

The Governing Documents shall specify timing attributes. Factors used to define the timing attributes may include but are not limited to:

WEQ-XXX-7.3.1 Delivery Schedule

The delivery schedule or the start and end time to perform the service. The delivery schedule may be specified with a start time and a duration (e.g., 1 hour or 4-hour periods).

WEQ-XXX-7.3.2 Delivery Schedule Notification

The timing associated with notification that the delivery schedule for the Emergency [or Black Start] Service is established. For example, the results of a market process are published by specified times and notify the market participant of their scheduled delivery of the service.

WEQ-XXX-7.3.3 Speed of Response

The required speed of response or the quality of the resource to change its operating position over the signal period.

WEQ-XXX-7.4 Performance Determinations

The Governing Documents shall specify performance determinations, including how performance is measured.