

# RTO OPCG/Metering Group

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Any discussion of revenue metering requirements for RTO West needs to begin with a definition of when revenue metering is required versus operations metering (SCADA, etc.) Revenue metering is used for billing and settlement. Operations metering is used for system control, path scheduling, dispatching, etc. There are very different requirements for the two.

## Revenue Metering

- Requires meter class accuracy CT's and PT's.
- Requires some form of totalizer, internal or external to the meter.
- Requires polling periodically to collect the meter data.
- May require time stamping of data in order to facilitate time of day metering.
- Testing is required on a periodic basis, typically two year intervals.

## Operational Metering

- Typically uses relay class accuracy CT's and PT's.
- The utility SCADA system collects the data on a periodic scan (typically around two second intervals)
- Data is used for all aspects of system control (scheduling, monitoring, automatic generation control, etc).

This group will focus on the revenue metering requirements rather than operational requirements.

## Revenue Meter Locations

In a perfect world, revenue metering is located everywhere money is exchanged. In the RTO West world, revenue metering will be required at the following locations.

- RTO West control area boundaries
- Generator interconnections
- Scheduling Coordinator (SC) boundaries
- Points of utility load – radial and looped subtransmission

Each transformer connection between subtransmission serving load and transmission will require revenue metering. The SC's transmission system is an open highway, and the amount of energy must be precisely known at each interconnection. This will enable the SC to distinguish between transmission losses and distribution losses. The distribution

transformer losses will be the responsibility of the SC, so ideally metering will be done on the high side of a distribution transformer. If it is done on the low side, a loss calculation will be added to the low side metered quantities. There are cost advantages to metering on the low side of the transformer.

### Revenue Meter Data Requirements

The RTO world will operate on hourly schedules. In order to true up schedules with actual interchanges, hourly (or possibly more frequent 15 minute) data will be required out of the meters. There are two ways to deal with this:

1. Time stamp the meter data. Read once per day, week, month, etc. An external totalizer may be required with some meter installations.
2. Read the meter every hour, or more frequently.

As would be expected, costs rise with the frequency of meter polling. An hourly poll will likely require a dedicated communications circuit, whereas a less frequent poll, such as daily or weekly, may only require dial up access.

A central system is the best approach to collect the meter data. Details will need to be defined as to what sort of data format is required. Certain locations may require redundant or backup metering.

In essence, there are three key parameters to revenue meter performance.

1. Quality (degree of accuracy)
2. Periodicity (polling interval)
3. Granularity of data (recording interval – 15 min, 1 hour, etc.)

### Installation Costs and Ownership in Metered Facilities

This is an open discussion. Who should pay for any meter installations required for the RTO? If a service provider or generator does not pay the costs up front, they will be rolled into the RTO's transmission rates. So they will pay anyway. It is in RTO West's interest to own the meters, service them, and upgrade them as needed. Some RTO's have decided to require the service provider or generator to provide and install the meters. These costs are then passed on in the service provider or generator's rates. Installed costs of new meters in existing facilities could grow to be significant sums. The following estimates include required CT's and PT's. These estimates do not include cost for communications from a central system to the meter.

- 13.8 kV - \$20k
- 115 kV - \$70k
- 230 kV - \$100k

In any event, RTO West will need to be responsible for verifying accuracy and functionality of the meters, which are the source of RTO West's revenues. This means RTO West will require meter technicians to perform testing and repair functions. Given the large number of meters and the typical test interval of two years, staffing requirements to perform these functions must be studied.

### Initial Tasks

The following issues must be addressed in general before the details of the revenue metering requirements can be determined.

- Locations where revenue meters are required
- Granularity requirements of the data (15 minutes, hourly, etc.)
- Data collection system requirements
- Meter ownership
- Staffing

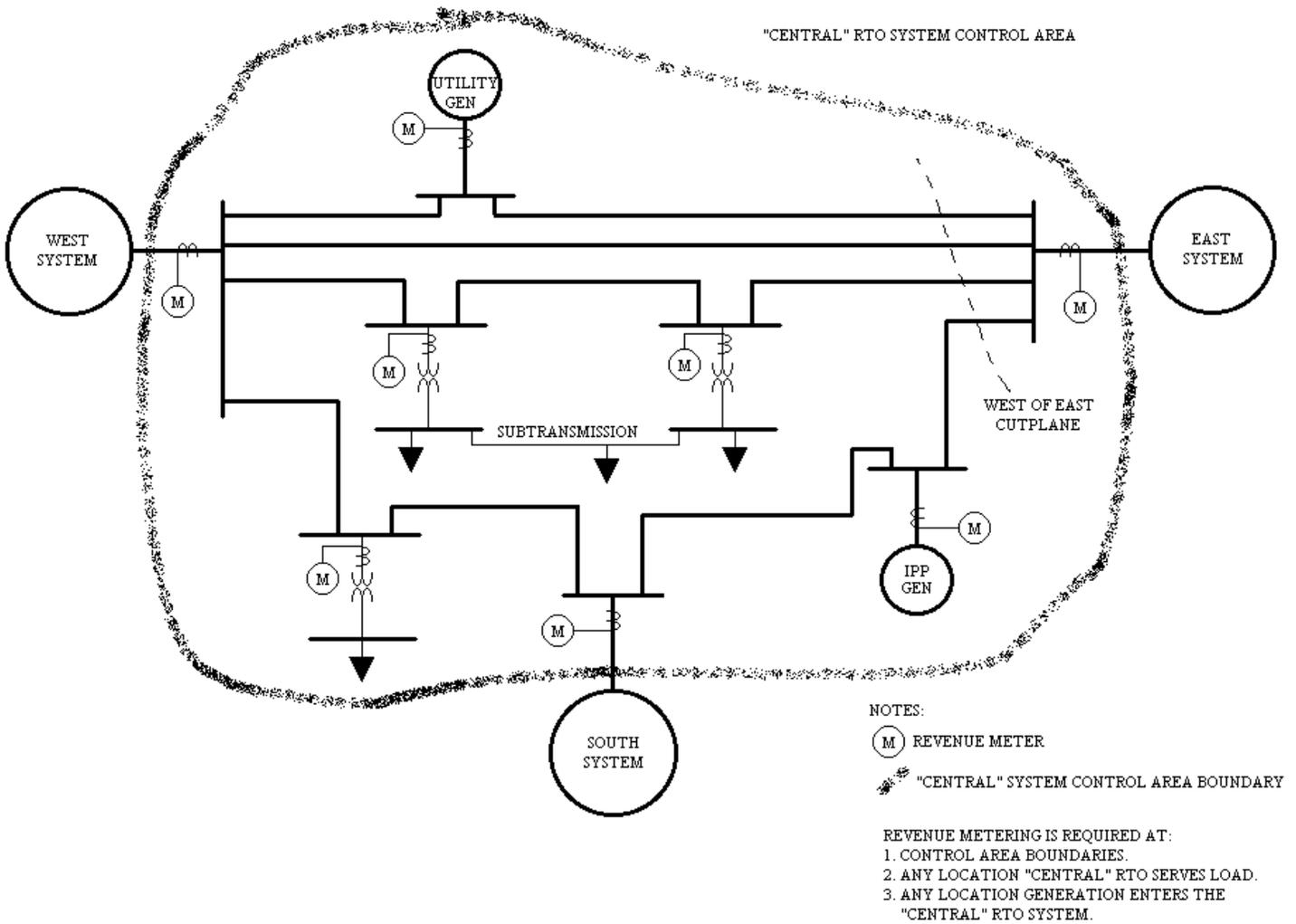


Figure 1. A typical RTO control area with boundary with various internal connections.