



History of PJM Metering Requirements, NERC BAL, TO/TOP Matrix

A brief history and introduction.

Ryan Nice

Srinivas Kappagantula

Mark Kuras

1927: Pennsylvania-New Jersey Interconnection formed, with companies PSEG, PECO and PP&L

1956: BGE and GPU join, becoming PJM

1995: Metering Group drafts Billing Meter Standards and hosts group meetings on metering where at least PSEG, PEPCO, DPL, and PJM are represented

1997: PJM becomes an ISO based on FERC orders that began deregulation

1997: First draft of PJM M01 Control Center Requirements

1997: M01 R0 includes grandfather clause for all metering before 12/1/1997.

1998: First revision of M01

2000: Second revision of M01

2002: AP is the first external control area to join the PJM RTO as a market participant

2003: Third revision of M01 "Complete revision of manual to reflect PJM Standards and Systems"

2004: ComEd, AEP and DPL joins

2005: DLCO, Dominion Virginia Power joins

2011: FirstEnergy (ATSI and CPP) joins

2013: Duke (EKPC) joins

2013: 23rd revision of M01, Major changes to Tie Line telemetry requirements, and other reorganization

2015: 30th revision of M01, would have reorganized and updated metering requirements, but required TF to address concerns

- Attempted to more clearly segregate “revenue metering” from “real-time metering” requirements.
- Addressed some 30 tracked comments/questions/suggestions from members.
- Sought to not actually alter requirements, but to clarify, *and* create at least one clear category for any given meter.
- Highlighted big gaps between PJM understanding/interpretation of M01 text and member understanding/interpretation as well as actual installed metering.

R6. Each Balancing Authority and Transmission Operator shall use **sufficient metering** of **suitable** range, **accuracy** and sampling rate (if applicable) to ensure accurate and timely monitoring of operating conditions under both normal and emergency situations.

R17. Each Balancing Authority shall at least annually check and calibrate its time error and frequency devices against a common reference. The Balancing Authority shall adhere to the minimum values for measuring devices as listed below:

<u>Device</u>	<u>Accuracy</u>
Digital frequency transducer	0.001 Hz
MW, MVAR, and voltage transducer	0.25 % of full scale
Remote terminal unit	0.25 % of full scale
Potential transformer	0.30 % of full scale
Current transformer	0.50 % of full scale

5.4.3 Primary Metering Accuracy

For all new metering installed since December 1, 1997, the following primary transducer accuracy guidelines are followed:

Primary Transducer	Accuracy Guideline
Frequency Transducers	0.001 Hz
Potential Transformers	0.30% of Full Scale
Current Transformers	0.50% of Full Scale
MW/MVAR/Voltage Transducers	0.25% of Full Scale
Remote Terminal Units (A/D)	0.25% of Full Scale

Exhibit 1: Primary Transducer Accuracy Guideline

This accuracy guideline results in an overall metering accuracy better than 2% and satisfies the NERC BAL standards. Billing accurate telemeter data values should be supplied whenever possible.