California ISO

NEW RESOURCE IMPLEMENTATION FORUM

Energy Data Acquisition Systems
October 2026

Welcome

Our presentation will begin shortly.

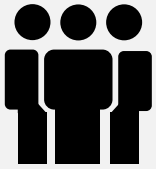
Today's Presenter: Jakob Helsher – Energy Data Acquisition Specialist

Today's Agenda

- ❑ **EDAS Overview**
- ❑ **EDAS BPM Updates**
- ❑ **EDAS Documents**
- ❑ **EDAS Notifications**
- ❑ **Telemetry Validation**
- ❑ **Telemetry Non-Compliance/Exemptions**
- ❑ **Discussion/Wrap-Up**

EDAS OVERVIEW

EDAS Overview - Responsibilities



Energy Data Acquisition Specialist Team (**EDAS**) is responsible for engineering requirements and standards for:

- Revenue Metering via:
  - Approved CAISO Meters (CAISO Inspected and Certified)
  - CAISO Meter data processing
  - Settlement Quality meter data (SQMD) plans

- Direct Telemetry via:
  - Distributed Network Protocol 3 (DNP3) devices
  - Generation Desk Support Center (GDSC)
  - Ancillary Services (AS) Testing

EDAS Overview – The EDAS Team

Full-Time

- Priyanka Namburi
- David Acevedo
- Vitaliy Daniliuk
- Stacia Lee
- Timothy Sysa
- Jakob Helsher
- Ryan Aboueljoud

Contractors

- Jeffrey McDonald
- Joshua Caldeira
- Mohammed Dhali
- Mark Kennedy

EDAS Overview: EDAS Metrics (2025)

2025 Fieldwork Appointments

- Point-to-Point (P2P) Tests: **256**
- Meter Maintenance: **1106**
- Meter Replacement: **73**
- Remote Intelligent Gateway (RIG) Replacements: **8**
- Communication Maintenance: **74**
- RIG Maintenance: **109**
- RIG Certificate Renewal: **21**

Generation Desk Support Center (GDSC)

- Total Calls: **6635**
- Unannounced Ancillary Services (AS) Tests: **39**

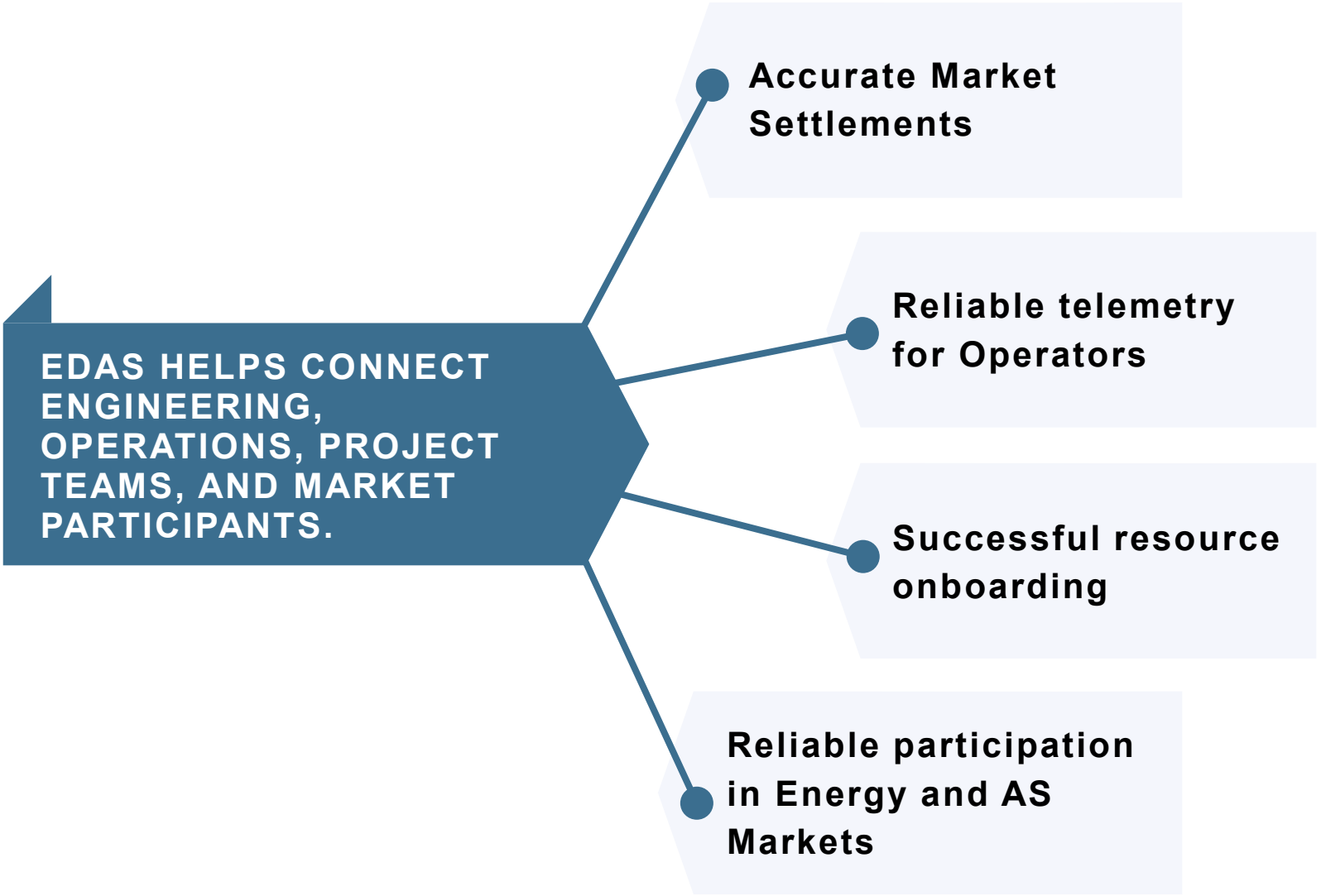
Telemetry/Meter Issue Tracking

- Tickets Created: **2383**
- Telemetry Exemptions: **1767**
- Meter Exemptions: **974**

NRI Metrics

- RIMS Documents Approved: **3728**
- AS Certification Tests: **404**
- COC, OR, EDAS Reviews: **522**

EDAS Overview – Why EDAS Matters



EDAS UPDATES

EDAS Updates

AVR Data Requirement

- NERC VAR-002-4.1
- WECC VAR-002-WECC-1
- Notifications will be sent to the resources that are required to provide AVR data.

Metering BPM

- Updated Inspection Requirements
  - Section 3.2.3.3
  - For New Installs – if a separate inspection company inspects the New Install, the Programmer may perform future inspections of the site.

Telemetry BPM

- Added new point: Minimum Continuous Energy Limit
  - Minimum MWh that can be stored in the BESS for CAISO participation
  - Should align with Master File registered value and should adjust based on outage, derate or rerate, in real-time

Question

What has caused the most delays on your projects?

- Document Issues
- P2P Testing
- 72-Hour Testing
- Other (Call it out)

EDAS DOCUMENTS

EDAS Documents – NRI Projects

Bucket 1

- SLD/3LD
  - CTs/PTs Correctly Labelled
  - Only occlude/greyscale out of scope feeders
  - Always include Capacitor Banks on a shared Bus
  - Switches/MODs – unique naming, marked Normally Open vs Normally Closed
  - Checklist
- CommBlock
  - Clearly identify source points
  - Submit updates for any changes identified prior to or during P2P testing
  - Checklist
- RIG Details Form
  - Checklist
  - Notify/Resubmit if IP changes
  - Cannot be Local IP
- Metering Scheme Overview
  - Required for any complex metering schemes
  - BESS IDLE – detail loss of comm to BESS IDLE source device

EDAS Documents- NRI Projects

Bucket 2

- Meter Configuration Worksheet
  - Correct channels
  - Port numbers
  - Public IP – ISO firewall
  - Multipliers
  - Load/Standby provider

Bucket 3

- 24/7 Contact Form
  - (Optional) Meter Contact Form. Submit to EDAS@caiso.com
- CPS Agreement
- External Network Form (Previously ECN Agreement)

Bucket 5

- Meter and Site Verification Sheet (MSVS)
  - 10-day review time
  - Reprogram vs New Install
- Point of Receipt (POR) Calculation (If applicable)
- Distribution Compensation Factor (DCF)
- Meter Exemption
  - Required for external inputs to CAISO Meter (e.g. loss schemes, BESS IDLE)

EDAS Documents– Meter Projects

Meter Replacement

- MSVS required
- PORCalc/3LD may be required
- Work occurring after the appointment may alter the inspection date
- Delays can cause missing measurements issues

Meter Maintenance or Troubleshooting

- MeterMaintenance form required
- MSVS/PORCalc may be required
  - Meter Reprogram
- Comm Change vs Meter Maintenance
  - MeterConfig

- Only ONE Meter project per Meter may be open at a time.
- Ideally projects should be closed within 2 months of completion of the work

EDAS NOTIFICATIONS

EDAS Notifications - Contact Forms

Metering Non-Comm:

- SC Contacts – now self-managed by SCs
- All MSA/PGA contacts – managed by Regulatory Contracts team
- Meter contacts submitted to EDAS using the MeteringContactForm

Telemetry non-compliance:

- Telemetry contacts submitted to EDAS using the 24HourContact-Operations form
  - RT24HOUR
  - Primary
  - Alternate
- SC Contacts – now self-managed by SCs

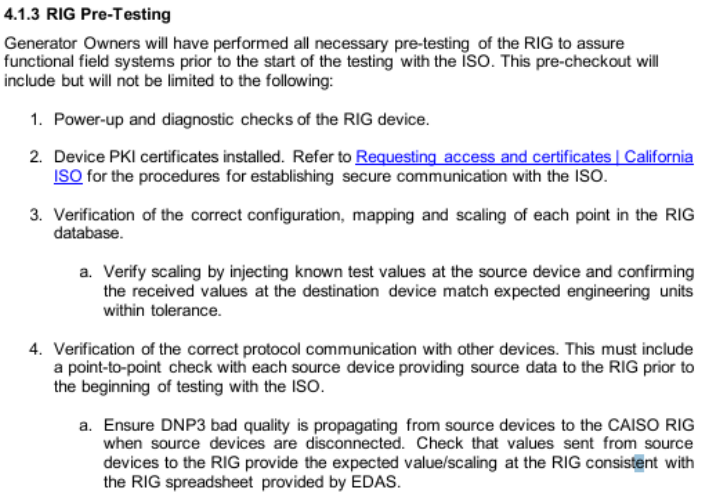
TELEMETRY VALIDATION

Question 2

Raise your hand if you've ever heard the phrase "it worked yesterday" during the P2P test

Telemetry Validation – Point to Point Testing

- Updated P2P Procedure (2026)
- https://www.caiso.com/documents/rigacceptancetest-rat-procedures.pdf
- Important topics
  - Pretesting/Comm Check
    - Future Attestation requirements
  - Source Devices – Telemetry BPM Section 5.6
  - Test Kit Requirements
  - Communication Pulls
  - BESS IDLE – award component
  - Loss schemes – testing failover to static loss
  - Netting – typically not allowed.
  - AGC Setpoint Testing
    - Control logic – don't rely solely on ADS AGC flag



4.1.3 RIG Pre-Testing

Generator Owners will have performed all necessary pre-testing of the RIG to assure functional field systems prior to the start of the testing with the ISO. This pre-checkout will include but will not be limited to the following:

1. Power-up and diagnostic checks of the RIG device.
2. Device PKI certificates installed. Refer to Requesting access and certificates | California ISO for the procedures for establishing secure communication with the ISO.
3. Verification of the correct configuration, mapping and scaling of each point in the RIG database.
   a. Verify scaling by injecting known test values at the source device and confirming the received values at the destination device match expected engineering units within tolerance.
4. Verification of the correct protocol communication with other devices. This must include a point-to-point check with each source device providing source data to the RIG prior to the beginning of testing with the ISO.
   a. Ensure DNP3 bad quality is propagating from source devices to the CAISO RIG when source devices are disconnected. Check that values sent from source devices to the RIG provide the expected value/scaling at the RIG consistent with the RIG spreadsheet provided by EDAS.

Question 2

Raise your hand if you've wished you had earlier visibility into telemetry quality issues during a 72-Hour Test.

Telemetry Validation – 72-Hour Test

72-hour Test Procedure (2025)
https://www.caiso.com/documents/nri-72-hour-test-procedure.pdf

Important topics

- New Automated 72-Hour quality export feature
  - Informational only – to assist troubleshooting
  - Exports the past 72 hours of quality information daily and sends to project contacts
- Performance Validation in real-world conditions
- Successful 72- hour test builds Operator trust
- DNP3 Quality vs Operational Data and logic
- Notify EDAS in advance of planned work
- EDAS may request additional runtime
- 10 Business days processing time

AGG UPMW_GEN AGG POINT OF DELIVERY MEGAWATTS	• Check scaling is correct in comparison to HSIDE MW, UGMW • Should report positive polarity when exporting to the grid • Should report slightly less than UGMW unless there is a DCF or small losses. • If resource has child UPMW, sum of Child/Feeder UPMW should equal AGG/Parent UPMW • Child/feeder UPMW should propagate bad quality to AGG/Parent UPMW
AGG UPMV_GEN AGG POINT OF DELIVERY MEGAVARS	• Check scaling is correct in comparison to HSIDE MV, UGMV • Should report positive polarity when exporting to the grid • Should report slightly less than UGMV in simple configurations (smaller sites) – check losses in MSVS to verify. VARS can also differ from UGMV to UPMV for more complex sites. The UPMV value can be affected by VARS from adjacent resources, the discrepancy between UGMV/UPMV is not always problematic. • If resource has child UPMV, sum of Child/Feeder should equal AGG/Parent UPMV • Child/feeder UPMV should propagate bad quality to AGG/Parent UPMV
AGG HSLMW AGG HIGH SUSTAINABILITY LIMIT MEGAWATTS	• Check scaling is correct in comparison to HSIDE MW, UPMW • HSLMW should not report below UPMW • PAIRD should propagate bad quality to HSLMW if all available PAIRD inputs are bad quality • SPD should propagate bad quality to HSLMW if all available SPD inputs are bad quality
HSIDE_BNK_MW TRANSFORMER HIGH SIDE MEGAWATTS	• Should report negative polarity when exporting to the grid • Uncompensated value (inverse of UGMW) • If multiple transformers, check that relevant units under each transformer are correctly summing to respective transformer.

TELEMETRY NON-COMPLIANCE/EXEMPTIONS

Telemetry Non-Compliance/Exemptions - Critical Points

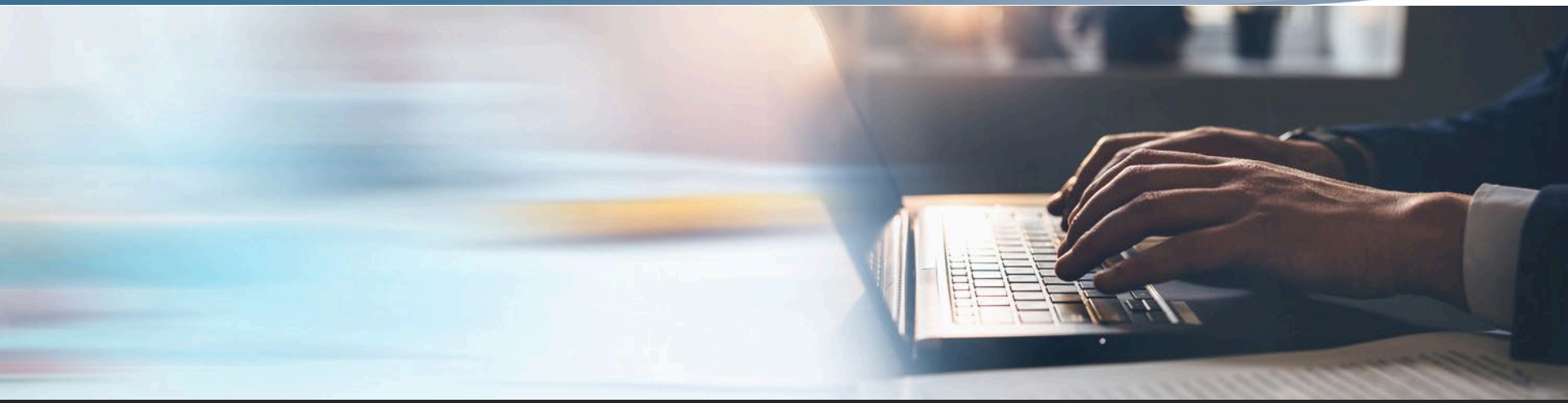
Updated Critical Points:

- **Generation Points – All resources**
  - UPMW - Unit Point of Delivery MW
  - UGMW – Unit Gross MW
  - UNMW – Unit Net MW
  - UAMW – Unit Auxiliary MW
  - UCON -– Unit/\Resource Connect
- **Meteorological Points - Solar and Wind Resources**
  - BPTMP - Back Panel Temperature
  - PAIRD – Irradiance
  - SPD - Wind Speed
  - DIR - Wind Direction
- **Battery Specific Points**
  - SOC – Instantaneous State of Charge in MWh
  - MXENERGY – Maximum Continuous Energy Limit in MWh
- **Ancillary Service Specific Points – for units providing Regulation**
  - UOHL - Unit Operating High Limit
  - UOLL - Unit Operating Lower Limit
  - UAGC - Unit Automatic Generation Control
- **Co-Located, and Hybrid, and VERs Providing AS Resource Specific Points**
  - HSL – High Sustainability Limit

Telemetry Non-Compliance/Exemptions – Exemption Requirements

- Initial exemptions are granted in good faith
- Required Information for extensions
  - Detailed description of the steps taken to resolve it along with the timeline
  - Expected date of resolution of the issue
  - Purchase order of the parts
  - Signed agreements of contractors
  - Service tickets with communication service providers
  - Extended generation outages evaluated on case-by-case basis
- Exemptions beyond 90 days will require a phone call discussion with Resource Owner, Scheduling Coordinator and any involved technicians
- When submitting renewals, keep the existing description and append new information with new submissions.
- Always be sure to use the most current exemption versions from the CAISO Metering and Telemetry public website

DISCUSSION/WRAP-UP



Recap

- ✓ **EDAS Overview**
- ✓ **EDAS BPM Updates**
- ✓ **EDAS Documents**
- ✓ **EDAS Notifications**
- ✓ **Telemetry Validation**
- ✓ **Telemetry Non-Compliance/Exemptions**
- ✓ **Discussion/Wrap-Up**

Discussion Ideas

- What has been your experience using a DNP3 master for pre-testing? In general, how successful has pre-testing been in identifying issues before a P2P test?
- Are there any checklists, examples, or guidance documents that would be helpful additions from EDAS?
- What are some improvements in metering/telemetry you would like to see heading into 2027?
- What recommendations would you give to a new project team meeting EDAS requirements for the first time?

Helpful Links

Certification of Metering Facilities
http://www.caiso.com/Documents/5710.pdf

Meter Data Acquisition and Processing Procedure
http://www.caiso.com/Documents/5740.pdf

Appointment Scheduling for EDAS Fieldwork
http://www.caiso.com/fieldworksupport/Pages/default.aspx

Direct Telemetry BPM
https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Direct%20Telemetry

Fieldwork Guide
http://www.caiso.com/Documents/FieldworkGuide.pdf

RIG Acceptance Test (RAT) Procedures
http://www.caiso.com/Documents/RIGAcceptanceTest_RAT_Procedures.pdf

Metering Exemptions from Compliance
http://www.caiso.com/Documents/5730.pdf

Helpful Links (Cont.)

Pre-COD ADS Testing Procedure 5320B
https://www.caiso.com/documents/5320b-pre-commercial-automated-dispatch-system-ads-resource-test-procedure.pdf

72-hour Test Procedure
https://www.caiso.com/documents/nri-72-hour-test-procedure.pdf

Meter Exemption Request Form
exemptionrequestform.docx

Telemetry Exemption Request Form
telemetryexemptionrequestform.docx

Fieldwork Support Request Form
Fieldwork support requests | California ISO