



T1-S SCADA ADS Integration

Overview

- Enables PV resources to participate in CAISO's real-time energy market.
- Automate receipt, assessment, acceptance and execution of 5-minute dispatch commands.
- Executes complex plant control logic required to achieve the dispatch operating target in seconds.

Trimark's T1-S SCADA includes the ability to accept, schedule and execute California ISO (CAISO) Automated Dispatch System (ADS) commands.

This functionality enables utility-scale PV resources to participate in the real-time energy market by responding to 5-minute dispatch commands.

These functions allow resources maximum flexibility in accepting commands for either economic (bid price) reasons or to support grid reliability by accepting curtailment requests.

T1-S SCADA Integrates Directly with CAISO ADS

Trimark's T1-S SCADA securely integrates with CAISO's ADS to authenticate requests then automate the acceptance and execution of CAISO instructions including startup, shut down, transition, curtail and ancillary service requests.

T1-S SCADA supports all forms of ADS instruction. Due to their intermittent nature, PV plants are only required to accept negative (curtailment) dispatches.

For example, if a PV resource's current generation capability is less than the dispatchable minimum,

the PV resource is not required to curtail. This allows the PV resource to generate at full capacity.

The full range of ADS commands may be applicable to other resources, such as Energy Storage, that wish to participate in the real-time market.

Integrating ADS management with PV plant SCADA improves efficiency and eliminates the requirement for separate ADS integration processes.

What is ADS?

CAISO's ADS is a secure messaging system that facilitates dispatch instructions to power generation resources that participate in the real-time energy market. CAISO's ADS system sends unambiguous requests to generation resources, tracks the real-time operational profile, records the transaction, and documents whether the instruction was approved or rejected.

Under normal conditions, CAISO dispatches an ADS commitment instruction (e.g. startup, shut down, transition) every five minutes. CAISO can also dispatch energy instructions (e.g. Max) on a 10 minute, 15 minute, or hourly interval. ADS commands are also used to communicate ancillary service awards.

ADS Command Processing

When T1-S SCADA receives a command, CAISO allows 90 seconds for the resource to take action.

During this time, T1-S SCADA authenticates the command, reviews the instruction against pre-defined acceptance criteria, and documents the transaction. If the command meets the acceptance criteria, CAISO expects the resource to smoothly ramp changes to reach the new dispatch target by the middle of the 5-minute window. T1-S SCADA ensures that the changes in power characteristics at the point of interconnection occur in a smooth, controlled, manner, thereby avoiding grid disturbances. T1-S SCADA coordinates automatic adjustments across all plant devices (e.g. inverters, capacitor banks, etc.) to meet the ADS instruction.

All dispatches and resulting control actions are recorded with time stamps and retained for reporting and auditing.

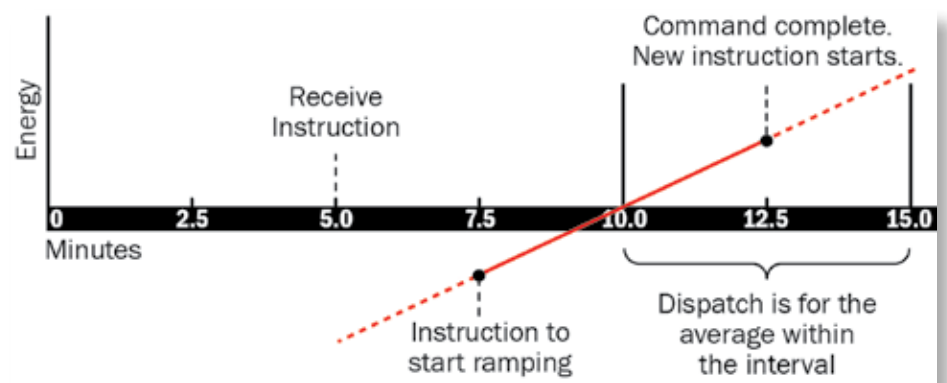
Configuring T1-S SCADA for ADS Request Execution

Deploying an ADS certificate in T1-S SCADA is relatively easy. The system will automatically recognize and use the certificate to connect to the CAISO ADS system to receive requests.

Trimark's engineering team works with the resource owner to define control logic required to effectively accomplish the ADS implementation strategy for the resource.

The frequency, complexity and decision criteria required to accept and execute these commands would be overwhelming for an individual. Trimark's T1-S SCADA manages the security, assessment and execution of ADS instructions automatically in a matter of seconds.

Lifespan of a 5-Minute ADS Dispatch



CAISO's ADS system sends a Dispatch Operating Target (DOT) at least 90 seconds before the command must execute. The command includes the "DOT START TIME" (when CAISO expects the resource to be at the DOT Generation Level). CAISO ramping logic is set so that resources ramp continuously from the middle of one dispatch interval to the middle of the next. Ramps are expected to follow a linear trajectory between DOTs. Following the DOT trajectory will result in zero uninstructed energy imbalance deviation charges/credits.



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