

Lowering Technical Barriers for Small Demand Resources: ISO/RTO Communication Standards



California ISO
Your Link to Power

Dr. Walter Johnson, Principal
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ISO/RTO Council (IRC) Members



IRC Goals for Demand Response

- 🌐 Reduce existing barriers for small demand response resource participation in wholesale markets
- 🌐 Enhance the ISO/RTO control room's ability to rely on small demand response resources to respond to operational requests

What Are the Problems?

- Historically, small resources have not been linked with ISO/RTO control room systems, as the cost of doing so has been high relative to the amount of energy available from the resources
- Without real-time communications to the control room, how can a reliability organization know:
 - How much demand response-based reserve capacity is available?
 - If a resource has responded to a demand request?

IRC Objective

- 🌐 Develop recommendations for technical standards for real-time two-way communication between ISO/RTO control rooms and small resources that are simpler and less costly to implement than the current requirements that originally were designed for larger resources
- 🌐 Focus on real-time operations, not forward markets or post-real-time functions (such as settlements)

What is a Small Demand Resource?

Typical Sizing Criteria:

- < 5 MW
- Aggregated to a minimum, e.g. 100 kW

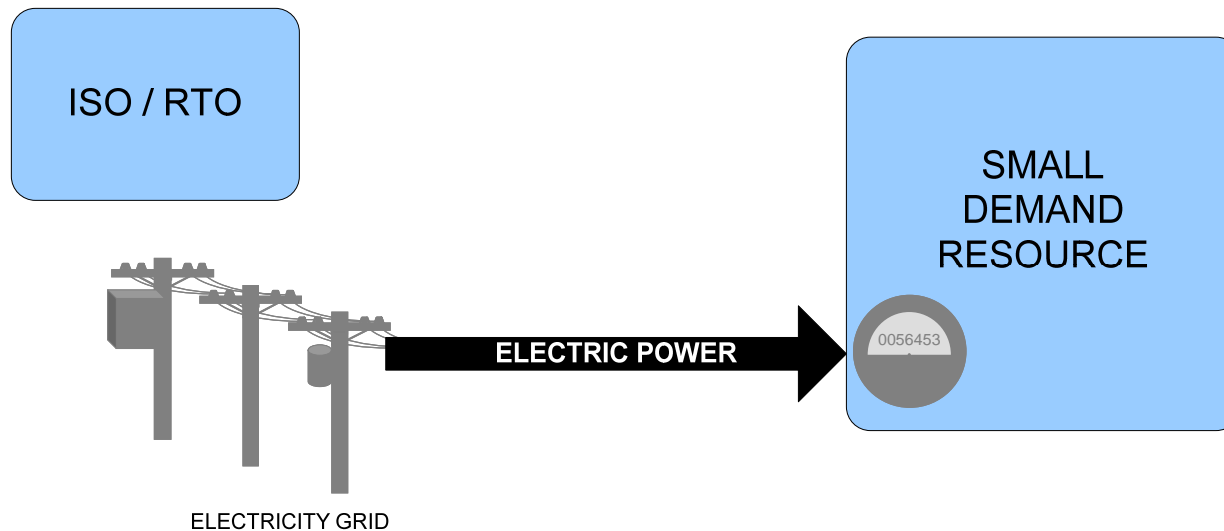
ISO/RTO Relationship:

- Usually not dispatchable
- Often provides no real-time telemetry

Autonomous DR

Resource senses the need for DR and acts independently

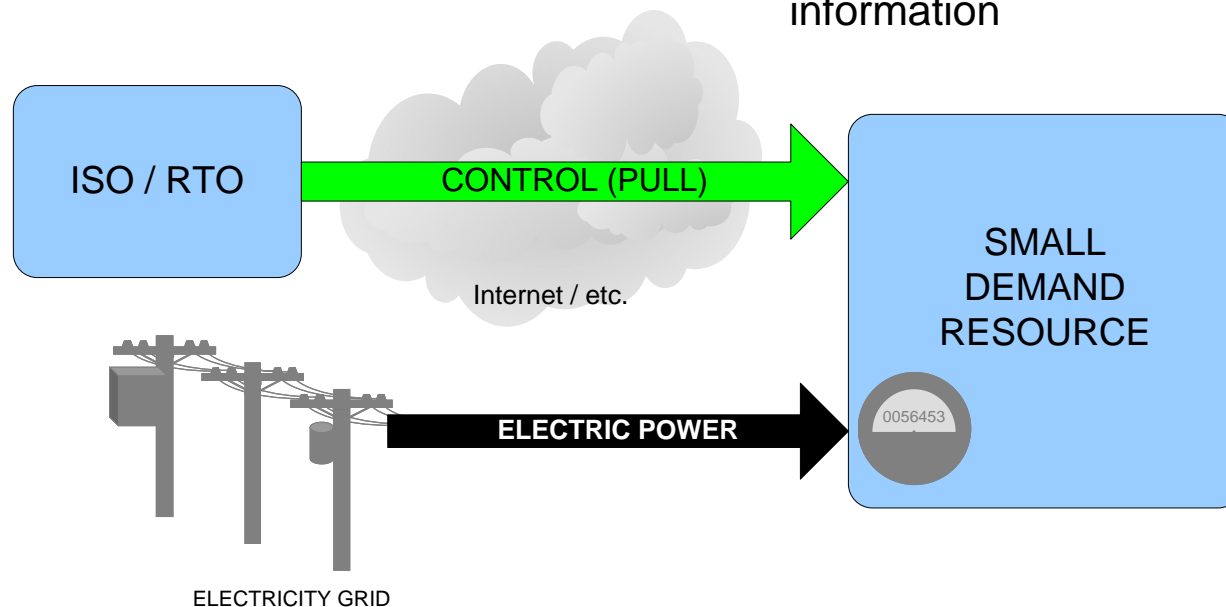
- Built-in sensors detect high or low line frequency or voltage and the resource automatically adjusts its demand for a period of time
- No communication with the system operator is required, but no control is possible, either
- Provides very rapid response to local system conditions, but large amounts might jeopardize the system's stability



Resource-Initiated DR

Resource inquires about the need for DR and adjusts itself accordingly

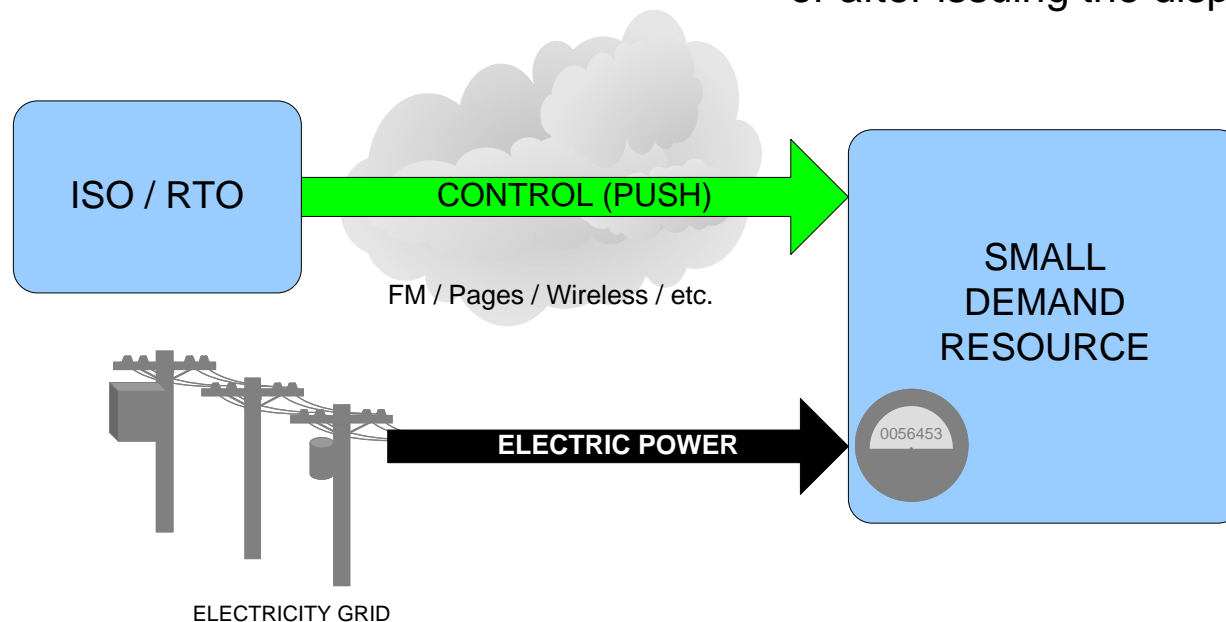
- Resource polls an information source (such as a Web site) and retrieves system prices or condition information for immediate or future use
- Only one-way (inquiry) communication is required, but response may not be immediate or highly predictable
- Operator lacks information on the magnitude of the response, either before or after posting the triggering information



Bulk-Dispatched DR

Operator dispatches a group of resources, each of which may or may not be able (or choose) to respond

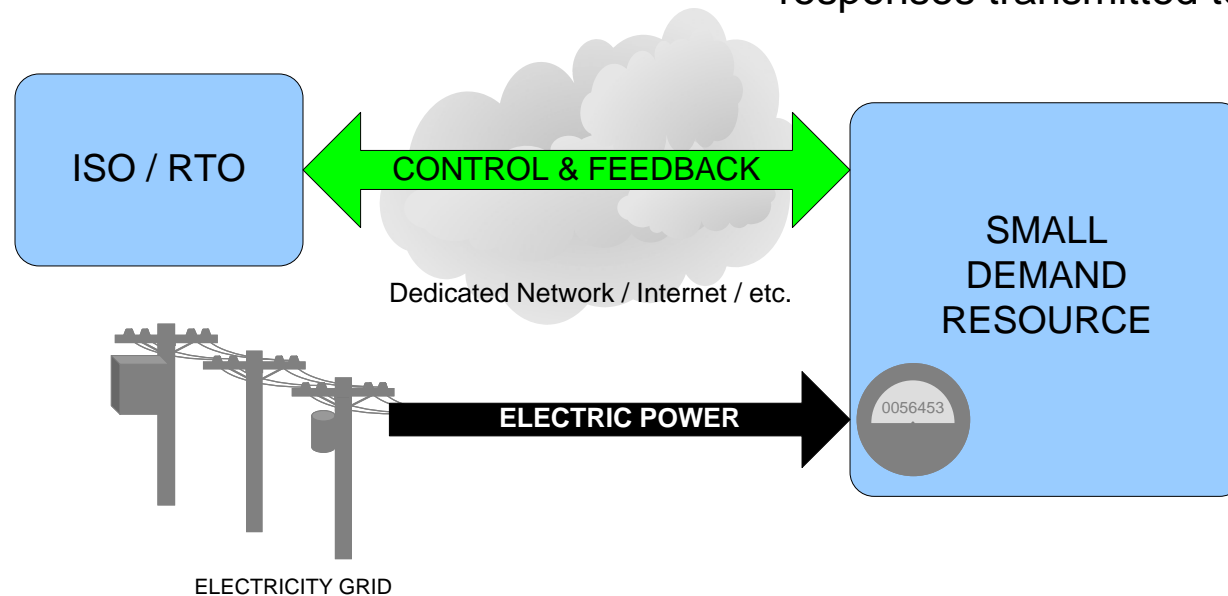
- Based on system prices or conditions, a dispatch instruction (load interruption, thermostat set point change, etc.) is broadcast (e.g., via radio, broadband, AMI, etc.), is received by the resources, and is acted upon
- Only one-way (broadcast) communication is required, but the magnitude of the response is unpredictable
- Operator lacks assurance of the magnitude of response, either before or after issuing the dispatch instruction



Precision-Dispatched DR

Operator dispatches a group of resources based on real-time knowledge of available response

- Two-way communications with the operator are required
- Provides rapid response and on-going visibility of DR
- Based on system prices or conditions and real-time knowledge of the state of the resources, a dispatch instruction (load interruption, thermostat set point change, etc.) is sent (e.g., via radio, broadband, AMI, etc.) to the resources, is acted upon, and the responses transmitted to the operator

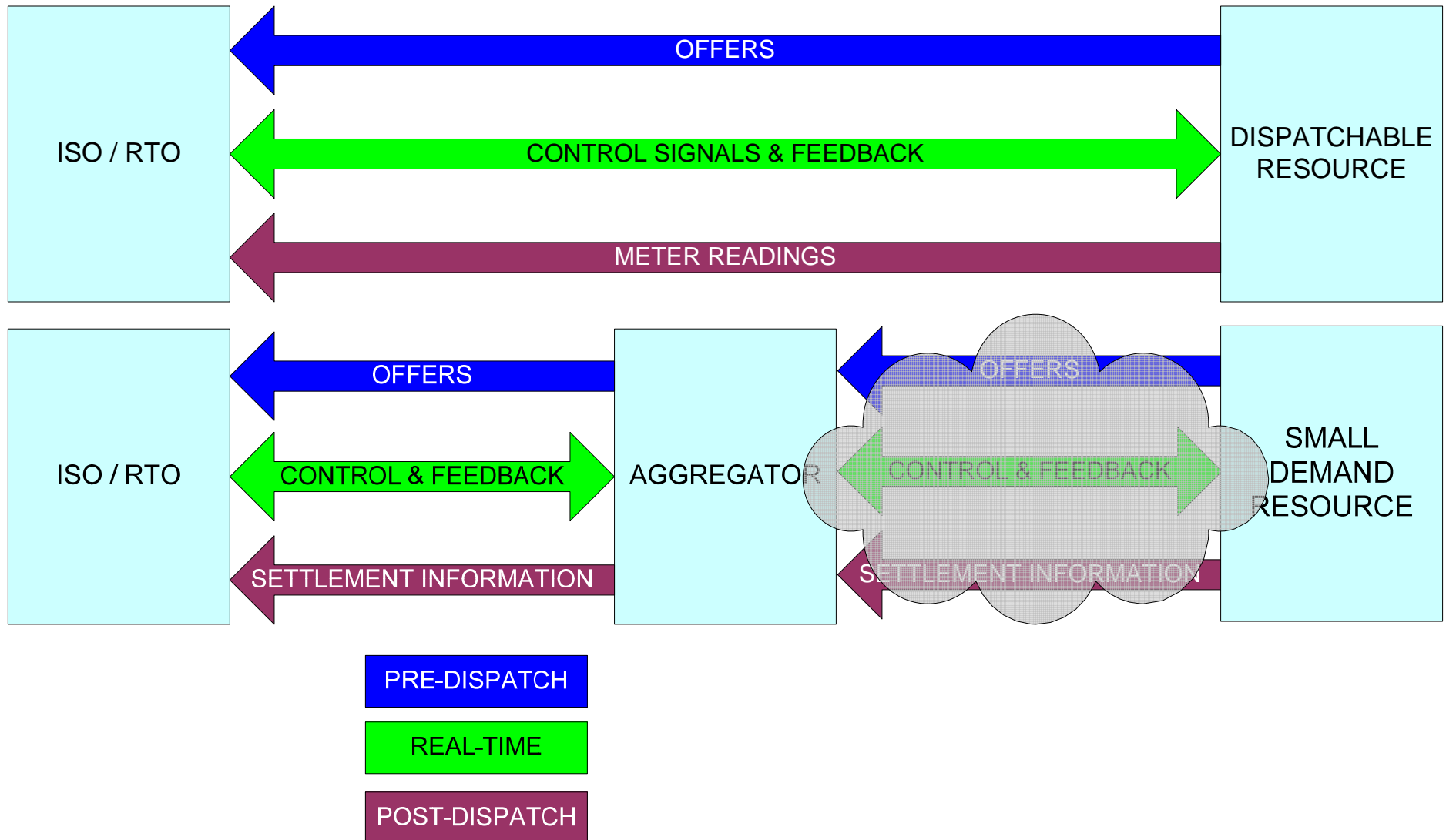


Types of DR Functionality

	<i>Response Initiation</i>	<i>Control Signal</i>	<i>Response Signal</i>	<i>Location Known</i>
Autonomous	Resource			
Resource-Initiated	Resource	✓		
Bulk-Dispatched	ISO/RTO	✓		
Precision-Dispatched	ISO/RTO	✓	✓	✓

Note: Individual devices may possess more than one type of DR functionality

Communication Basics



Standardization Opportunities

BUSINESS DEFINITIONS

DATA DEFINITIONS

FORMATTING

COMMUNICATIONS



IRC Draft Recommendation

- On April 21, 2008 the IRC held a technical conference related to “lowering barriers”. From a telemetry perspective, a preference was expressed for the IRC to focus on the “ISO/RTO-to-aggregator” link and to go no further. Thus:
 - DR aggregators would be required to meet performance targets
 - Performance targets would be identical for both generation and DR aggregators
 - Performance targets would vary by region, just as they can for generation today
 - Technology choice for communication down to the DR resource is open to the aggregator

- These concepts may not apply equally to all products (Regulation, Reserve, Energy, and Capacity)

Next Steps

- 🌐 Create a 1-2 page “position” paper
- 🌐 Work on adoption of the position at each ISO/RTO
- 🌐 Formulate an adoption plan, which may involve talking to reliability organizations, filing local market rule changes, etc.
- 🌐 Present the position paper and adoption plan to the IRC Markets Committee for review at their August meeting

Contact Information

IRC Program Manager			
Scott Coe	Consultant	203-947-5269	scoe@iso-ne.com
ISO/RTO DR Regional Contacts			
Robert Burke	ISO-NE	413-535-4356	rburke@iso-ne.com
John Conboy	PJM	610-666-4630	conboj@pjm.com
Walt Johnson	CAISO	916-608-5919	wjohnson@caiso.com
Steve Krein	ERCOT	512-248-6830	skrein@ercot.com
Maria, Gamal	IESO	905-855-6367	gamal.maria@ieso.ca
Robert Pike	NYISO	518-356-6156	rpike@nyiso.com
Michael Robinson	MISO	317-249-5741	mrobinson@midwestiso.org
Gerrud Wallaert	SPP	501-614-3358	gwallaert@spp.org
Paul Wattles	ERCOT	512-248-6578	pwattles@ercot.com