



Use of DR/DER Assets to Improve Distribution Grid Operations

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CPUC Learning Session - Integrated Demand-Side Management
San Francisco, CA
February 20, 2015



Trade Secret

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Overview

- Sample case studies from out of state DERMS/DRMS projects with relevance to California
- OATI
 - *Focused on mission critical utility systems and services*
 - *Established in 1995*
 - *Over 1,400 energy industry clients*
 - *Over 1,000 employees*
 - *Headquarter in Minneapolis; local branch office in Redwood City, CA*



DERMS/DRMS Projects Objectives

- Enhanced Situational Awareness of Demand Response (DR) and Distributed Energy Resource (DER) for Grid Operations
 - *Breaking data silos*
 - *Extend grid operation visibility to customer site assets*
- Coordinated Scheduling
 - *Forecasting (load, DR, DER)*
 - *Resource Availability (contractual, temporal, weather)*
 - *Representation of diverse DR programs as Virtual Power Plant (VPP) (DLC, Notification, CPP, CVR/DVR, etc.)*

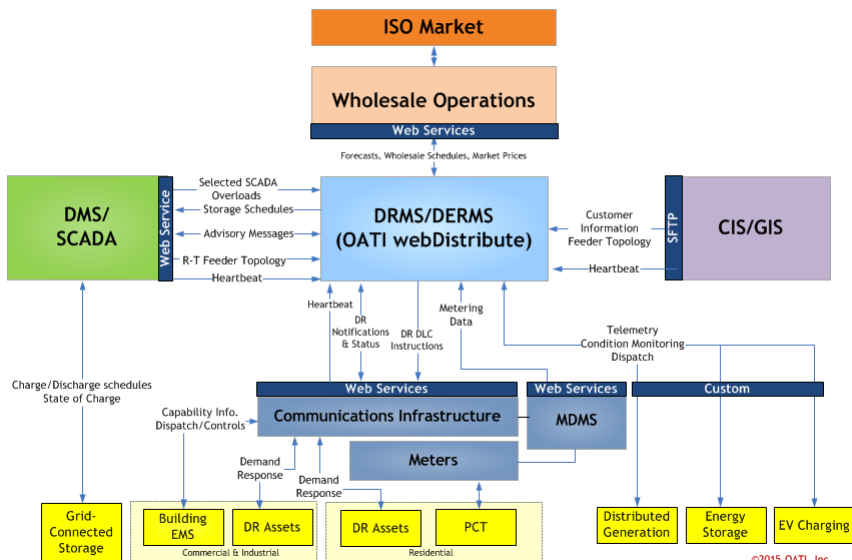


DERMS/DRMS Projects Objectives (Continued)

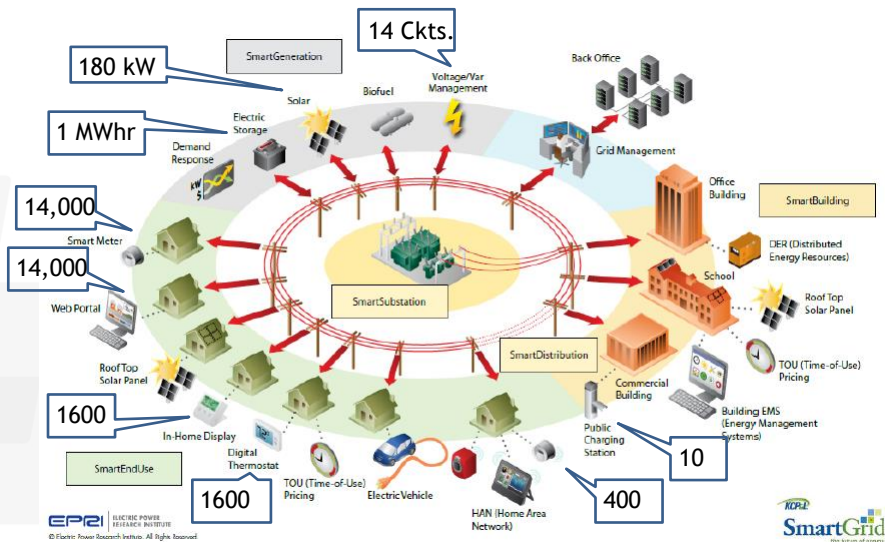
- Economic Objectives
 - Reduce demand charges (load shaving)
 - Reduce imbalance (load shaping)
 - Defer capital expenditure
- Reliability Objectives
 - Overload (substation, feeder, circuit)
 - Phase imbalance



KCP&L Architecture Overview



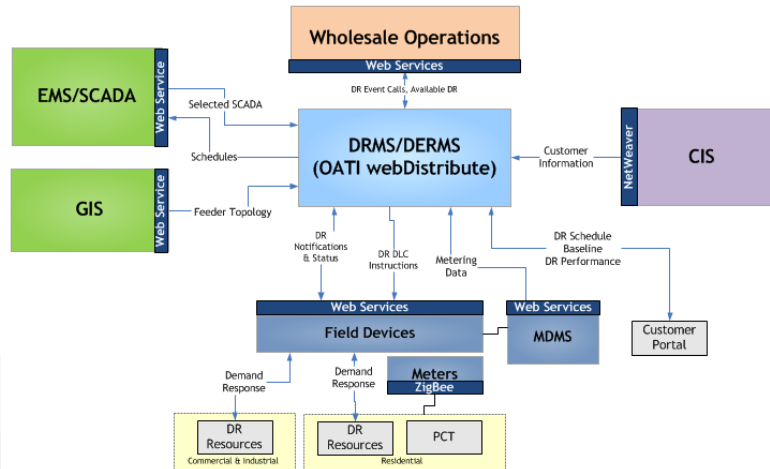
OATI KCP&L: A True End-to-End Smart Grid



Source: KCP&L SmartGrid Demonstration Overview, Presentation by Bill Menge, MPSC Smart Grid Workshop, November 29, 2011

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OATI DERM in EPB Smart Grid Architecture



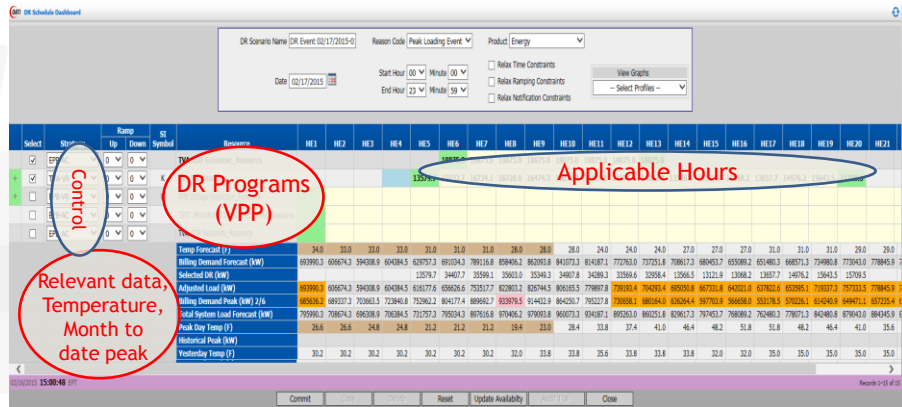
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DR Schedule Dashboard

- DR Program shown as VPP
- Availability taking into account forecasting and contractual limitations
- Relevant data readily available



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Lessons Learned

- Grid Operator visibility to DR and DER
 - Location (Physical/Electrical)
 - Forecast/Availability
 - Schedules
 - Grid Impact Assessment
 - Control
- Operational coordination with third party
- Ability to offer DR/DER as a service to Wholesale
- Support bilateral transactions

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Similarities with Wholesale Scheduling Process

Attribute	Wholesale/Transmission	Retail/Distribution
Registration and Qualification:	Entities	Entities
	Location	Location
	Products	Interconnection Agreement Products and Services
Reservation:	Products (Transmission)	Products and Services
	Path	Transactive Node
	Timing/Duration	Timing/Duration
Scheduling Process:	Protocols/Timing/Approval/ Curtailement	Protocols/Timing/Approval/Control
	Scheduling: Bilateral/Self Schedule	Scheduling: Bilateral/Self Schedule
	Bid/Offer	Bid/Offer
	M&V	M&V
	Settlement	Settlement

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Roadmap

- Regulation to allow level playing field in Retail/Distribution System (CPUC, DRP, and NY Rev)
 - *Access rights*
 - *Timing rules*
 - *Approval rights*
- Uniform business practices and standard protocol (Registration/Qualifications, Forecasting, Monitoring, Near Real-Time Control, Measurement and Verification (M&V), Settlement)

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Questions



Thank You

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