



Demand Response in the U.S.

Key trends and federal facility participation

Phil Coleman
Lawrence Berkeley National Lab
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- Demand response defined
- Current status in U.S.
- Key trends
 - Increasing opportunities in “economic” DR
 - Rise of DR in “capacity” markets
 - Rise of dynamic pricing
 - Rise of automated DR (“auto-DR”)
- Federal participation is small – why?
- Ramping up federal participation

- **Def.: A short-term decrease in electrical consumption by end-use customers due to either a) increased electricity prices, or b) incentive payments (triggered by high wholesale market prices or compromised grid reliability).**
- **DR participation can be either through load curtailment (short-term conservation) or self-generation**



Status of DR in the U.S. now



- ~ 37.5 GW (~ 5 % of grid peak) enrolled in 2006
 - 2008 FERC study expected to show big increase
- Main program types:
 - Reliability-based: “emergency” and “capacity”
 - Most common are classic “interruptible/curtailable” rates
 - Also includes direct load control
 - Program calls generally require mandatory response
 - Price-based: “economic”
 - Participation usually voluntary
 - Day-of and day-ahead options common
 - Demand bidding programs
 - Also tariff-based: real-time, time-of-use, and “critical peak” pricing

Trend #1: More opportunities in “economic” programs

- Among MISO (midwest) DR programs, LBNL study found that 60% of enrolled resources could be triggered by either reliability or economic reasons
 - *Big surprise to researchers*
- Among Southwest Power Pool programs, LBNL study found 2/3rd of interruptible programs could be triggered by either reliability or economic reasons
 - *Historically, only grid emergencies could trigger*
- **Caveat: many states/regions require air permits for using generators in economic DR programs**

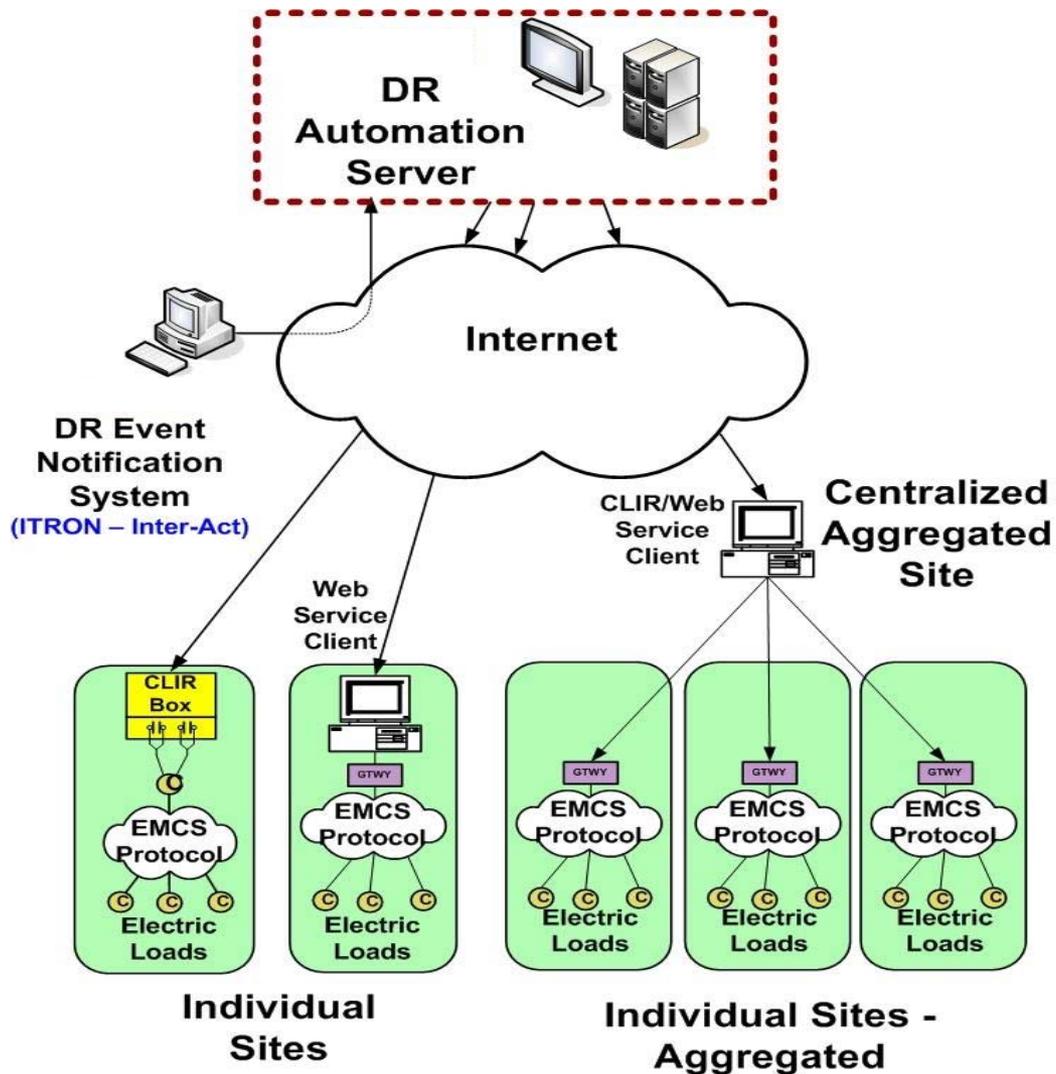
Trend #2: DR participation in capacity markets

- In 2008, ISO-NE started capacity auction and let supply and demand resources compete
 - Demand resources (inc. EE) beat out supply by 2/1 margin for new capacity in New England
 - 2/3rd of winning demand resources (~ 1600 MW) were DR
 - Clearing price ~ \$4/kW-mo. or ~ \$50,000/MW-yr.
- PJM now incorporating DR in capacity markets also
 - One auction for 2009 capacity attracted 1,300 MW of new resources, half of which were DR
- Fixing value in advance-year auctions provides reliable revenue stream for DR projects
 - This will likely attract ESCOs working with guaranteed savings contracts (read: feds)

- Real-time pricing is default for large accounts of some or all utilities in ~ 10 states
 - Though most customers opt out by choosing 3rd-party supply
- Partial RTP is popular choice among large customers of some southern utilities
 - Alabama Power, Georgia Power
- Critical peak pricing is default for all CA customers over 200 kW peak
 - TOU rate with up to 12 CPP events/summer where afternoon price is 3-5 times higher

- **Auto-DR: load drop or self-generation routine triggered automatically by external signal (e.g., XML)**
 - Signal can indicate market price threshold (e.g., 20¢/kWh) or utility's instigating DR program event
 - EMCS and other systems carry out shed based on pre-programmed strategies
- **Moving from pilot to widespread implementation in CA (from supermarkets to federal buildings)**
 - 3 major elec. utilities using auto-DR with CPP customers
- **Provides customers with the capability to identify and automate site-specific DR strategies**
- **Provides utilities with dispatchable operational capability similar to generation resources**

Trend #4: Automated DR



- **DR is growing in the U.S. and will continue to because it's getting:**
 - a) easier**
 - b) more lucrative**
- **Also, building power plants is getting more and more difficult**

So why is federal participation so low?

- **Classic “split incentive” problem**
 - Who benefits when fed. facility saves \$ w/ DR?
 - And can fed. facility even take proceeds?
- **Lack of push in legislation or EOs**
 - EE & RE goals are strong, but DR/LM not addressed
- **Ignorance – partly due to two issues above**
 - “Our loads are flat so it doesn’t make sense”
 - “It’s too risky”
- **Variable returns, esp. w/ economic programs**
 - This hinders DR in guaranteed savings ESPCs, UESCs
- **Lack of proper retail tariffs or programs**
 - Load shifting and other price responsiveness not rewarded
 - In some cases retail DR programs may be limited or unavailable



How to increase federal participation



- **Assure savings retention**
 - **Make 100% savings retention law (EPACT-'05) a reality**
- **Encourage in EOs and legislation**
 - **Effort underway to incorporate in FEMP leg. pkg.**
- **More education – e.g., FEMP training**
 - **Offer DR/load management webinar?**
- **Strong push against average cost pricing**
 - **Gov't. facilities should not be paying for these insurance policies**
- **Others???**