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# Demand Response Load Impacts: How do you count them?

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# Agenda

- Definitions
- Background
- Program Design
- Resource Adequacy
- Cost of Service
- Pricing DR programs
- Wrap-up

# Three Types of Demand Response Programs

- Dispatchable programs include:
  - Interruptible / curtailment
  - DLC programs (residential & small commercial)
  - Auto-DR (commercial & industrial)
- Event-based pricing programs include:
  - CPP
  - PTR
- Non-event pricing programs are not considered here:
  - TOU
  - RTP


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# Is DR a Resource or Not?!?!?

- Are DR program impacts considered a resource or a load reduction for . . .
  - Program design?
  - Resource planning & forecasting?
  - Cost of service?
- How you answer this question may depend on:
  - **Program type**
  - Customer class
  - Reliability, size, or age of the program
  - ISO definitions
  - Regulatory requirements
  - Cost allocation methods

# Program Design – It's a Resource

- Nearly all DR programs are evaluated based on one of the accepted cost-benefit tests (i.e. TRC)
  - Program impacts deliver benefits in the form of avoided energy, capacity, and T&D costs
- Incentives and payments for dispatchable programs are usually based on avoided costs
  - Capacity value - $/kW avoided
- Rates and rebates for pricing programs are also based (to some extent) on avoided costs
  - Most have a capacity component, but revenue neutrality, and additional fixed and variable costs may also play a role

*NOTE: This is where the program gets credit*

# Resource Planning – It Depends . . .

- At least some DR program impacts are usually included as a resource for planning
- But how do utilities make the distinction?
  - Dispatchable vs. event-based pricing vs. non-event programs
  - Size of the program
  - Reliability of impacts / program maturity
- Consistency is the most important thing

# Resource Planning – Utility Experience

- SCE and OG&E both currently define a dispatchable program as a resource and exclude pricing programs
  - Right now that includes the DLC, interruptible, and demand bidding programs
  - There is some uncertainty about the desire to exclude pricing programs in the future
- NV Energy defines programs on reliability and MW
  - The Cool Share program (AC Cycling) had over 50 MW in 2008 and is operated as a resource by their system operators – A proven program


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# Cost of Service – It Should Be

If the program is used as a resource, it should be treated as a resource in cost allocation

- Most utilities use some form of CP or related method for cost allocation
  - A customer class' share of costs is based on the class contribution to system peak
- If a DR program is called on the system peak and the impact lowers a class' contribution to peak, then should COS be adjusted to reflect what would have been?

*The short answer is yes.*


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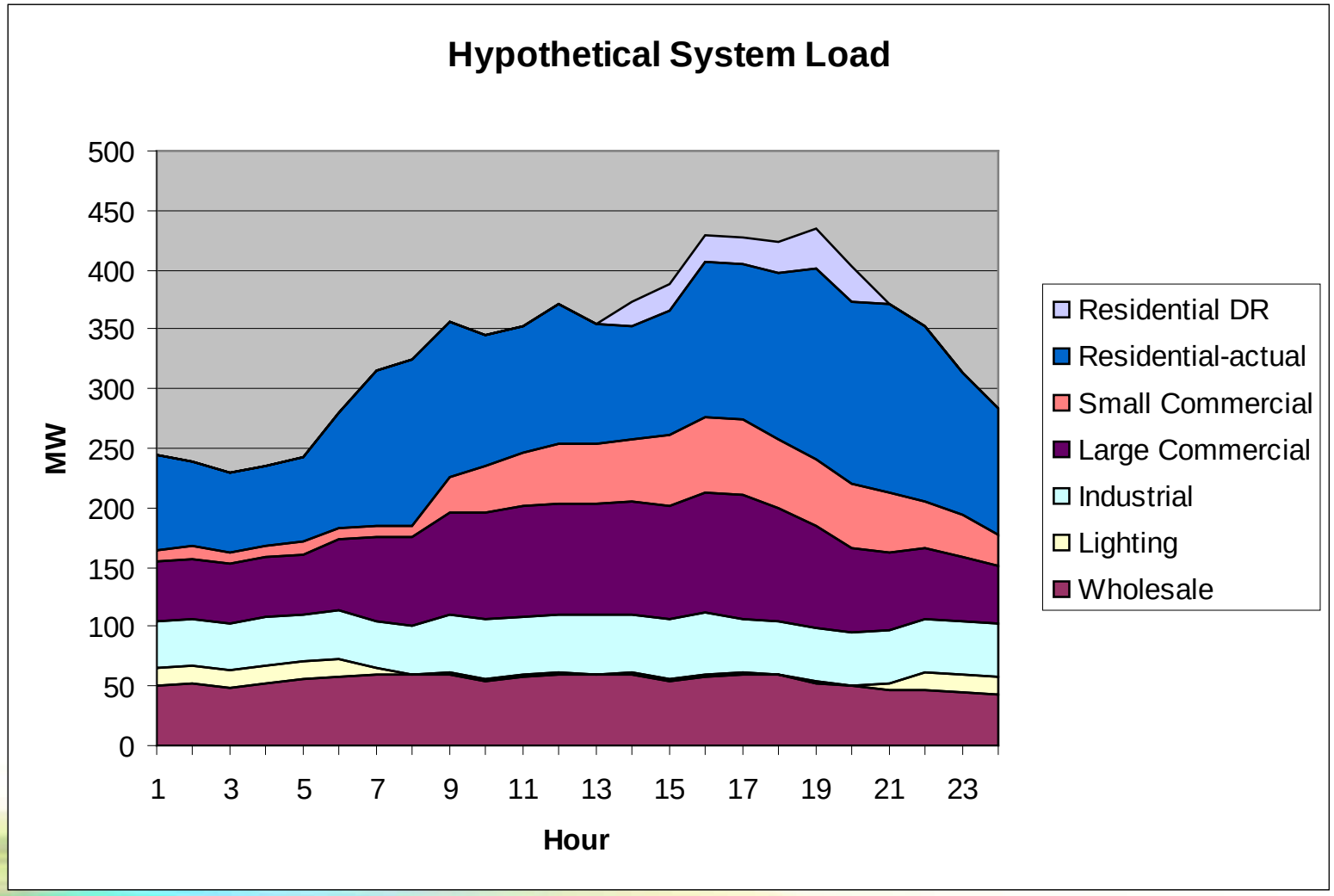
# The Problem with DR & Cost of Service



# The Impact of the Problem

| | Based on actual load | | With DR added back | |
|---|---|---|---|---|
| | Peak at hour 16 | | Peak at hour 19 | |
| | MW | % | MW | % |
| Wholesale | 58 | 14.3% | 53 | 12.2% |
| Lighting | 1 | 0.2% | 1 | 0.2% |
| Industrial | 53 | 13.0% | 45 | 10.4% |
| Large Commercial | 100 | 24.6% | 85 | 19.6% |
| Small Commercial | 65 | 16.0% | 57 | 13.1% |
| Residential-actual | 130 | 31.9% | 193 | 44.5% |
| System Load | 407 | | 434 | |
| Residential DR at peak | 23 | | 32 | |

# The Long Answer . . .

- Programs impacts that are counted toward resource adequacy *should* be added back in when calculating cost of service
- If DR impacts associated with these programs are not added back in for COS:
  - The coincident peak for classes with participants may be underestimated, lowering rates for that class at the expense of all other classes
  - Nonparticipants in the same rate class benefit
  - The utility underestimates their true peak load
  - The event could move the system peak, further affecting allocations to all classes

# It Really Comes Down To …

- How does the system operator view the program?
  - Whether the operator chooses to meet the load with a DR resource or a supply resource ***should not*** affect the allocation of costs.
- Have the benefits of the load reduction already been included in the pricing or incentives?
- Lack of confidence in or uncertainty of impact estimates can be an issue
  - Stakes are high – real dollars hang in the balance

# Current Practices

- Every utility we talked to agreed that in principle impacts from dispatchable programs should be added back for COS
- But, only 1 out of 9 actually add the impacts back in. Why?
  - The programs are emergency programs that very rarely coincide with a peak day
  - The programs are not big enough to make a difference in COS allocation
  - Different COS allocation techniques are more or less sensitive to this issue
  - May be another way to correct for the problem

# Current Practices Cont.

- OG&E does add DR impacts back in for COS
  - Add back the M&V hourly avoided MW
  - Standard practice for the last 5-10 years
  - Do not consider pricing programs

# More Current Practices: Pricing Programs

- Not all utilities agree on what to do with impacts from Event-based pricing programs such as CPP and PTR; it's probably about ½ and ½
  - The utilities with small, pilot, or non-existent programs either hadn't thought about DR impacts and COS, or did not think impacts should be added back in
  - Utilities with growing programs acknowledged that there will be a need to address DR impacts
- Especially for large scale pricing, all signs point to a need to account for the impacts

# More Current Practices: Pricing Programs

- In some sense because they are event driven, they are operated like a resource and could be considered dispatchable
- Most utilities plan to call several events each summer and plan to hit the highest demand days
- Pricing and rebates are generally based on avoided costs
- Utilities want to include impacts in resource adequacy

At this point, most utilities don't have programs large enough to make a difference . . .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# Pricing Programs in the Future

- Throughout the country utilities are ramping up Event-based DR pricing programs
  - SCE and SDG&E are moving forward with PTR for all residential customers with estimated impacts in the hundreds of MW
  - PG&E is currently offering both a residential SmartRate and commercial Peak Day Pricing (CPP Style)
  - BG&E is also moving forward with PTR
  - OG&E, Idaho Power, CPS and others are looking at pilot programs for various dynamic pricing programs
- At some point the industry will have to address this issue for event-based pricing programs and growing DR programs in general

# Future DR Scenarios = No More Excuses

- The programs are emergency programs that very rarely coincide with a peak day
  - We see utilities moving away from “emergency DR” and into pricing-based DR that can and should be operated as a resource
- The programs are not big enough to make a difference in COS allocation
  - Large scale deployments like those proposed in CA will make a difference.
- Different COS allocation techniques are more or less sensitive to this issue
  - This may be true, but if programs are called often, and they hit many of the high days, DR impacts will affect most COS methods.

# Special Considerations for Load Research

- We have been implying that DR impacts and the actual class load are known – which may or may not be the case
  - Some programs might have a separate EM&V sample that can be used, some might not
- The make-up of the load research sample matters – what is it that you are estimating with the sample?!
  - If program participants are excluded from the sample, that means that impacts are already "added in" to the class load shape – it is based only on non-participants (Note that the load reduction may still need to be added into the system load)
  - If program participants are part of the sample, are they representative, and weighted appropriately?

# Know thy sample

- The bigger issue – How might we better capture the impacts and the class load with LR samples
  - New sample – draw a new sample stratified by participant vs. non participant (wishful thinking, timing problems as programs ramp up)
  - Random representative sample – a large random sample is in place that it represents the current population participation on DR programs (maybe a little less wishful, especially with AMI)
  - Separate sample – draw a sample of customers specifically to capture DR program impacts (PG&E has had to do this)
  - Oversample – augment the current sample with additional DR participants (integration will be a challenge, weighting is tricky)

# Contact Information

## Research is part of Global Energy Partners new Load Analysis Subscription service


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