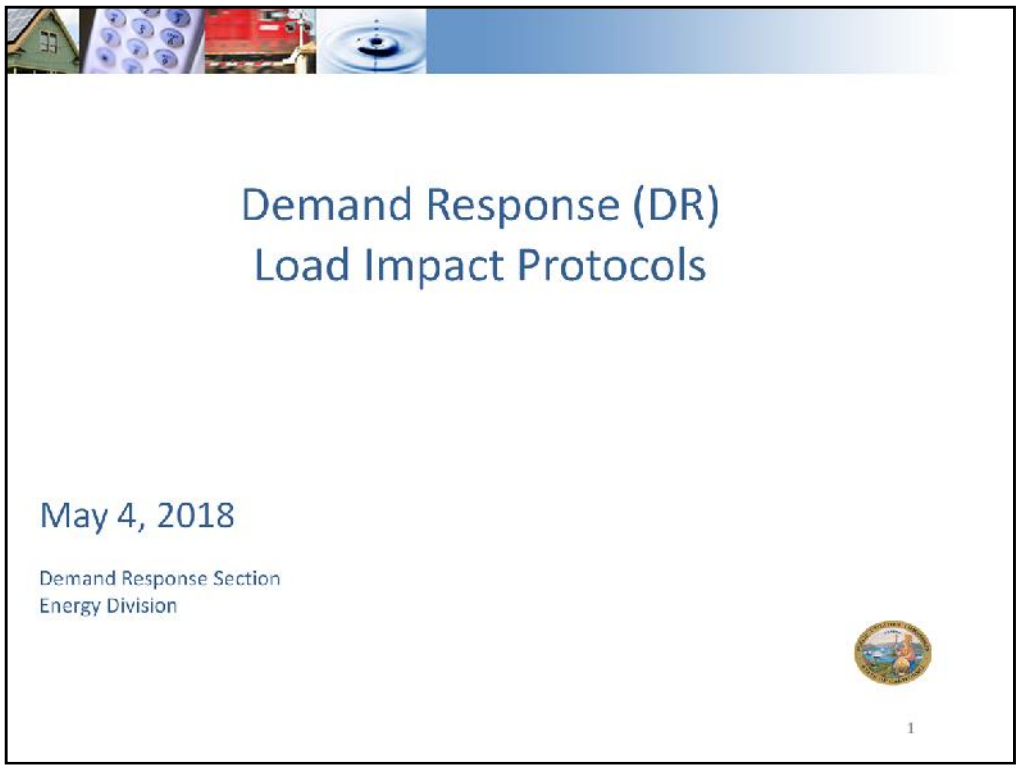
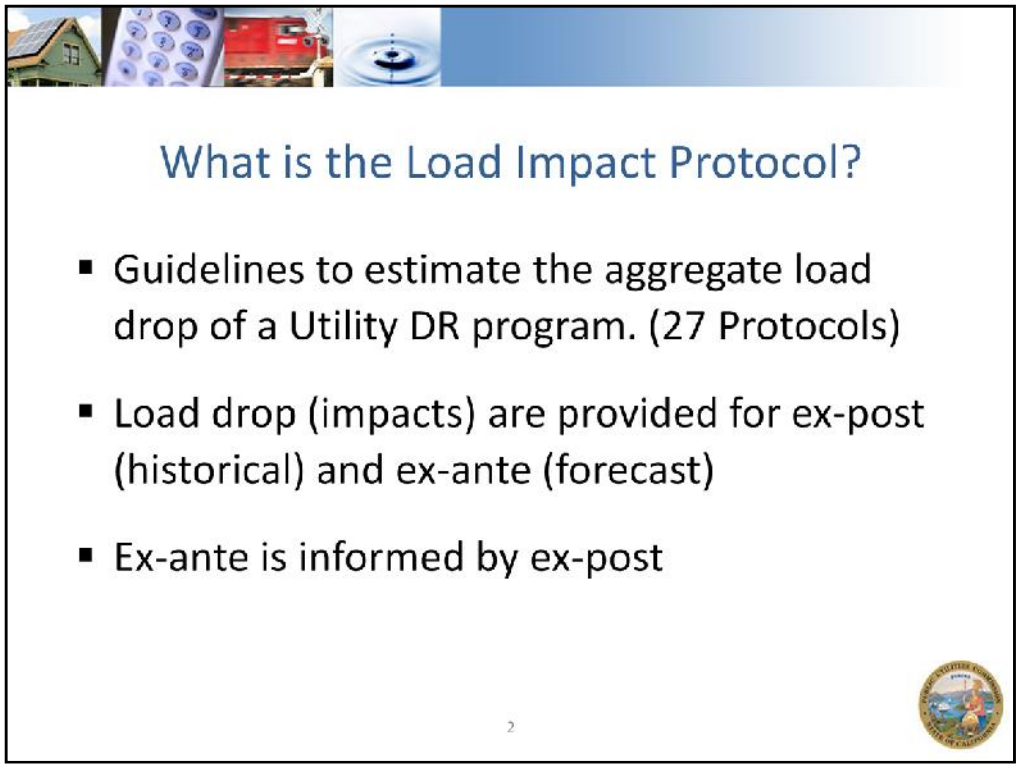


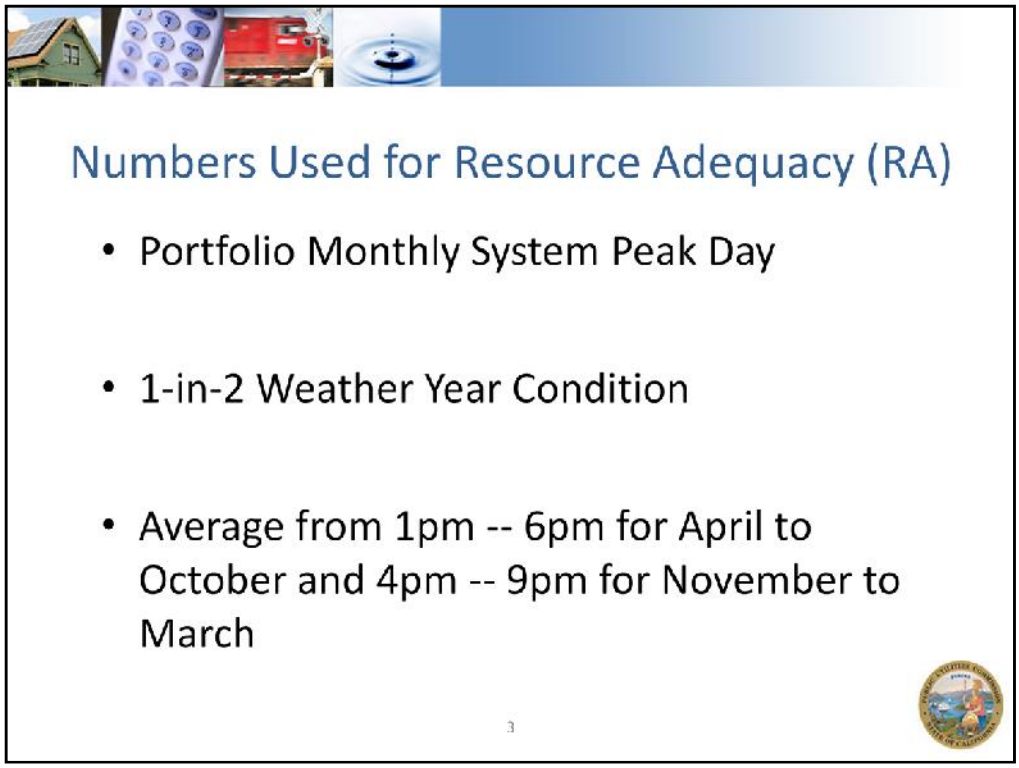
Load Impact Protocols were adopted in Decision (D.) 08-04-050 on April 24, 2008



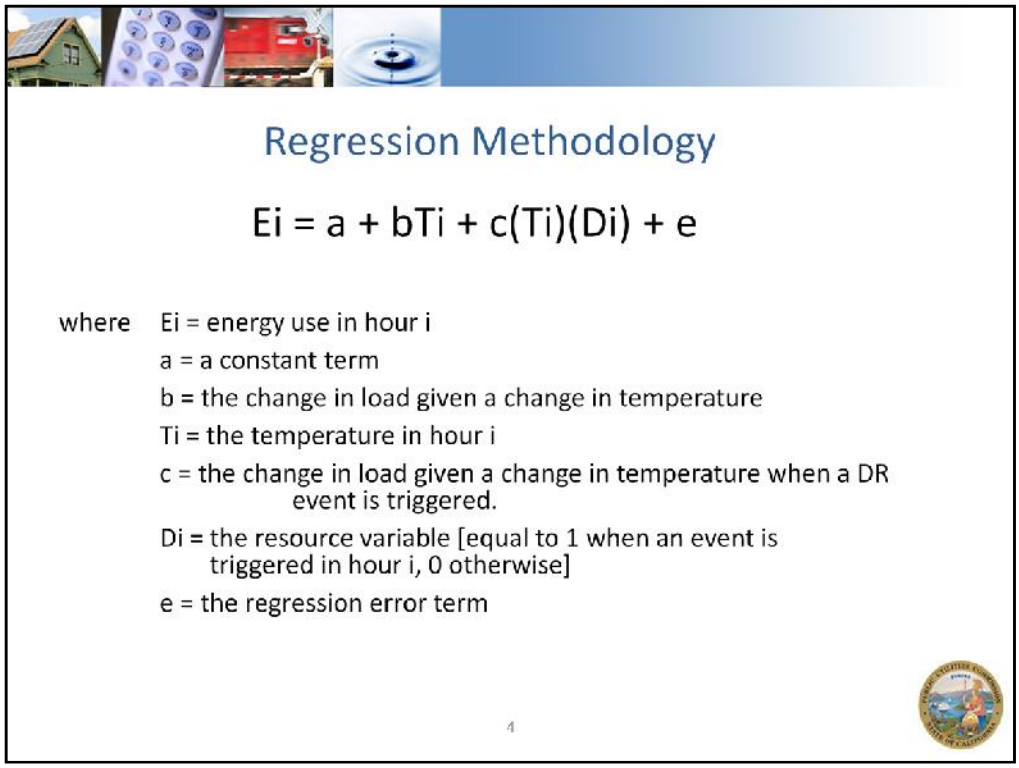
Protocols were prescribed to arrive at an accurate and consistent method of measuring program performance across the Utilities and for forecasting anticipated performance.

There are complexities to consider, some of which include:

- Impact persistence: This is the period of time over which impacts associated with a Demand Response (DR) resource are expected to last. For example, is it possible that DR will increase over time as customers learn new ways to adjust load or is it possible that it may decrease over time if customers decide that the economic savings are worthwhile. For example, in AC cycling, customers can either elect to go to the shopping mall when events are called or they can instead choose to drop off the program altogether.
- Geographic specificity: Additional variables may need to be included in the estimation model in order to determine how impacts differ with variation in climate or population characteristics across geographic regions. For example, SDG&E customers may respond differently to geographic-specific weather impacts.
- Customer segmentation: For large Commercial and Industrial (C & I) customers, there is a possibility that load impacts from a few large customers can dominate the load impact, thus increasing uncertainty about what the resource will produce on any given day.



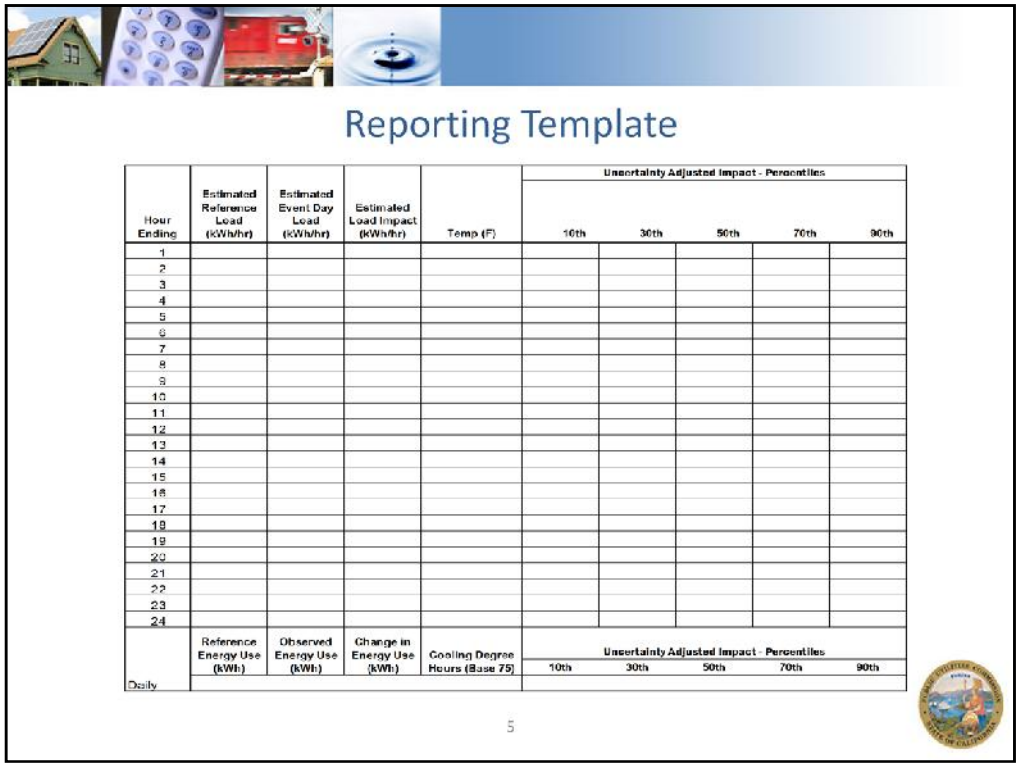
Protocol 22 requires the use of 1-in-2 weather year for the monthly system peak day. [The 1-in-10 weather year, typical event day, or an average weekday for each month are ***not*** needed for a (Qualifying Capacity) calculation.]



Regression analysis relies on historical information about customer loads, but instead of predicting loads using the average observed over a given number of previous days. This analysis is focused on understanding the relationship between load during the hours of interest and other variables. This is an example of a simple regression model that relates to energy use to temperature and a variable representing the presence or absence of a DR resource event.

Regression methods rely on statistical analysis to develop a mathematical model summarizing the relationship between a variable of interest, known as the dependent variable, in this case energy use and other variables known as independent variables. In this case, the independent variables can include a range of influencing factors such as weather and *when* a DR event is triggered.

A coefficient is a constant multiplication factor for a specific object. For example, in the expression 9*x*2, the coefficient of *x*2 is 9.



The impact estimates can be determined directly from the regression model, which is run in SAP to create the impact. The final tables generated are then converted into an Excel table for their filing.

To predict the hourly aggregated reference loads, and the load impacts associated with those enrolled customers on that event day:

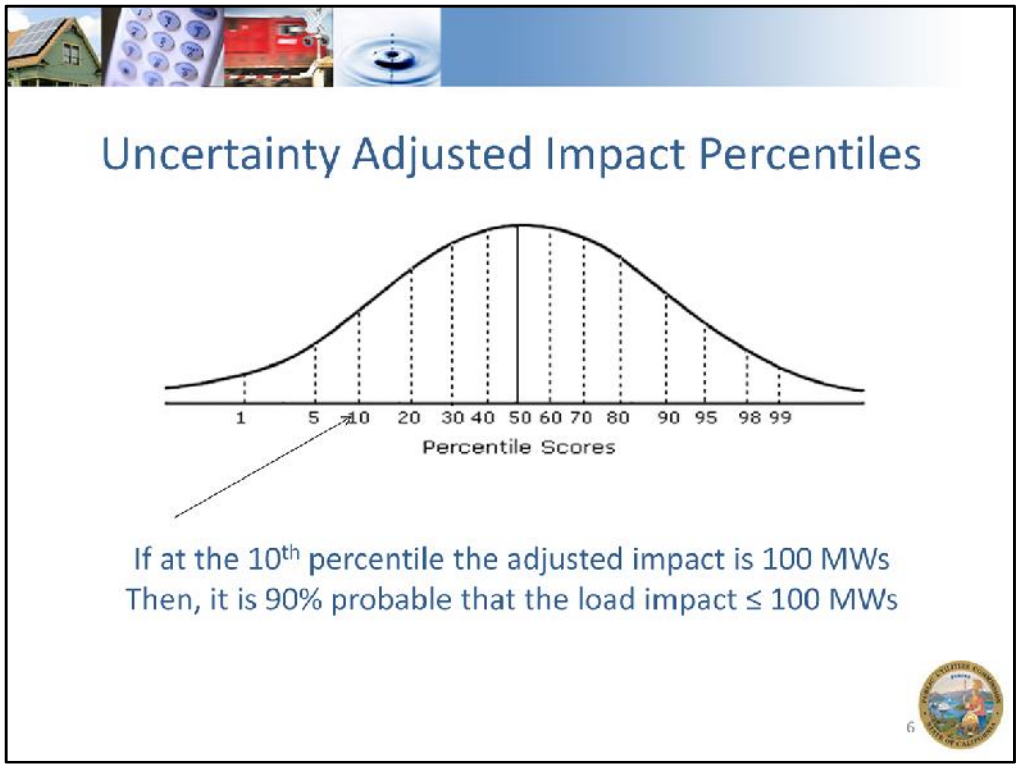
- The Utilities apply the estimated coefficients of the regression models to event day values to predict per enrolled customers hourly reference load, hourly event day loads and load impacts; then, they
- Multiply the predicted per enrolled customers hourly reference loads, event day loads, and load impacts, by forecasts of the number of such customers that would be enrolled in the program on that event day.

The probability distribution reflect the uncertainty associated with the statistical estimates of the coefficients of the regression models that were used to predict the hourly loads of each customers that is expected to be enrolled in that program on the day covered by that table.

- This does ***not*** reflect the uncertainty associated with the forecasts of the number.

Terms at the bottom of template:

- Reference Load (Energy Use): An estimate of load (average demand) in an hour that would have occurred
- Observed Load: Metered usage in an hour for load over a specified period of time
- Uncertainty of Adjusted load (Energy) impacts, which is explained in the next slide.



More on Uncertainty of Adjusted load (Energy) impacts. Example: If the uncertainty adjusted load impact at the 10th percentile equals 100 MWs, it means that there is a 90% probability that the load impact will equal or exceed 100 MWs (it also means that there is a 10% probability that the impact will be less than 100 MWs).

Factors Used to Rate (or De-Rate) MWs

- Number of enrolled customers
- Assumptions
- Saturation
- Change in rates
- Drop out rate
- Deployment Schedule

Thank you

May 4, 2018

Demand Response Section
Energy Division

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