

# ACEEE Examples for Chairman Wellinghoff

8/2/2012

# Coal Plant Example – Potential Benefits of Using DR

660 MW Coal Plant.

9,500 BTU/kWh heat rate at max output.

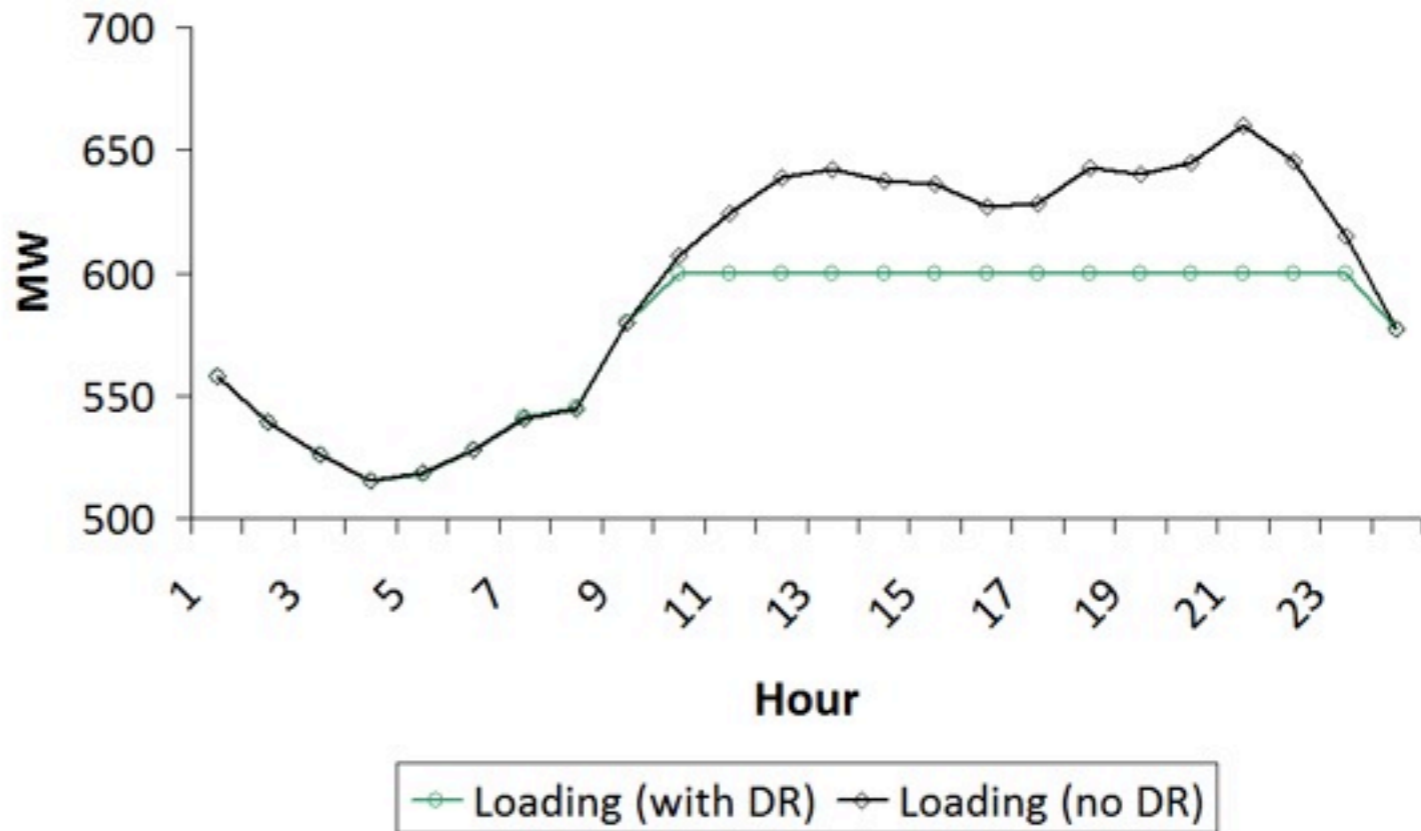
Typical heat rate curve for a coal unit.

0.35% non-steady state heat rate penalty, assumed from PJM Manual 15: Cost Development Guidelines.

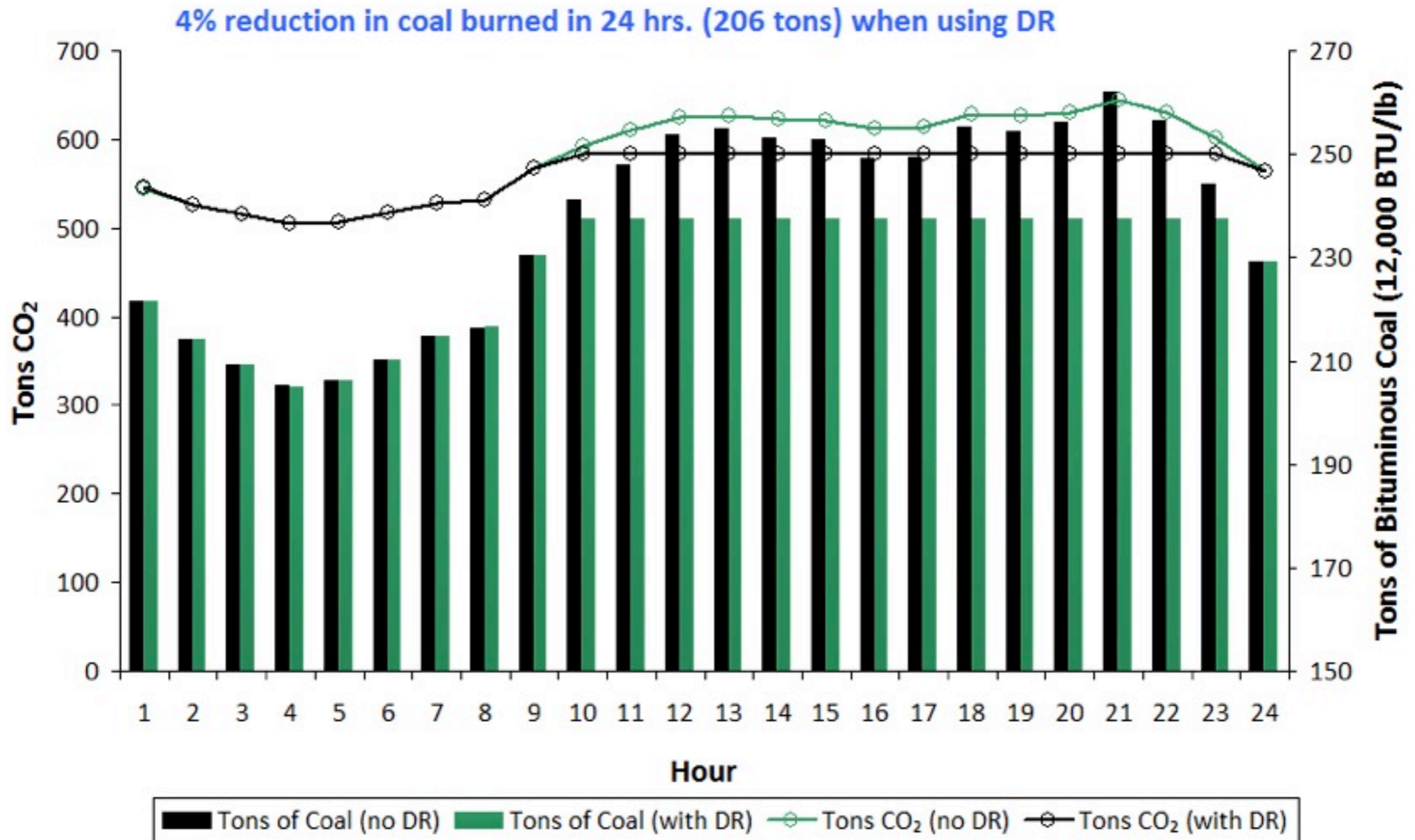
Loading pattern based on an actual day in a single PJM zone.

In one scenario, there is no DR. In the other, DR is used. The DR is assumed to be lighting reduction, eliminating load in peak hours.

660 MW coal plant loading with and without DR

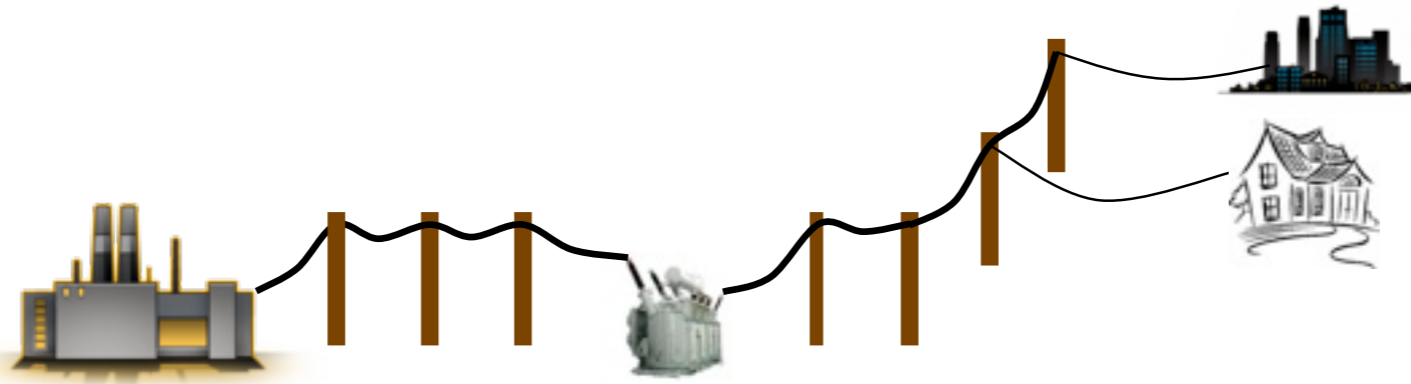


# Coal Plant Example – Fuel Usage & Emissions with and without DR



Emissions Reductions with DR: 507 tons CO<sub>2</sub>, 989 lbs SO<sub>2</sub>, 495 lbs NO<sub>x</sub>

# Line Loss Savings with 408 MWh of Demand Response

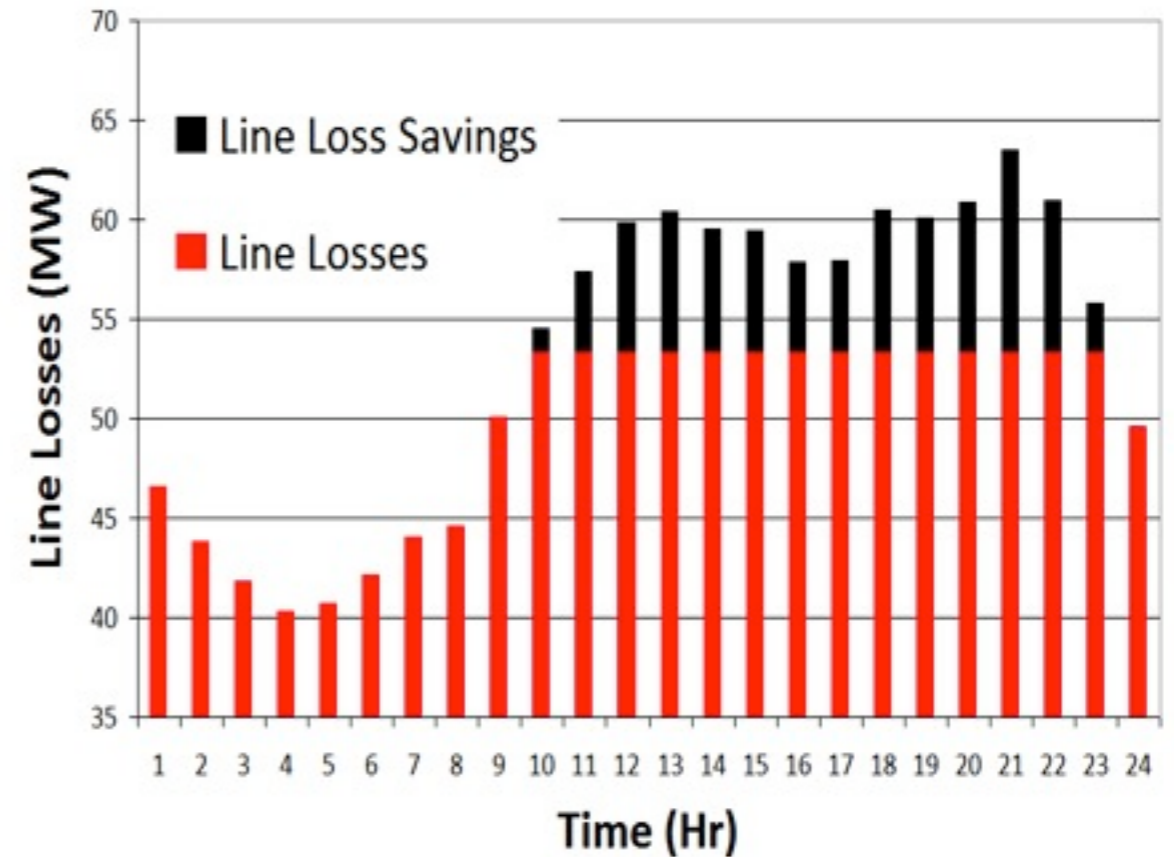
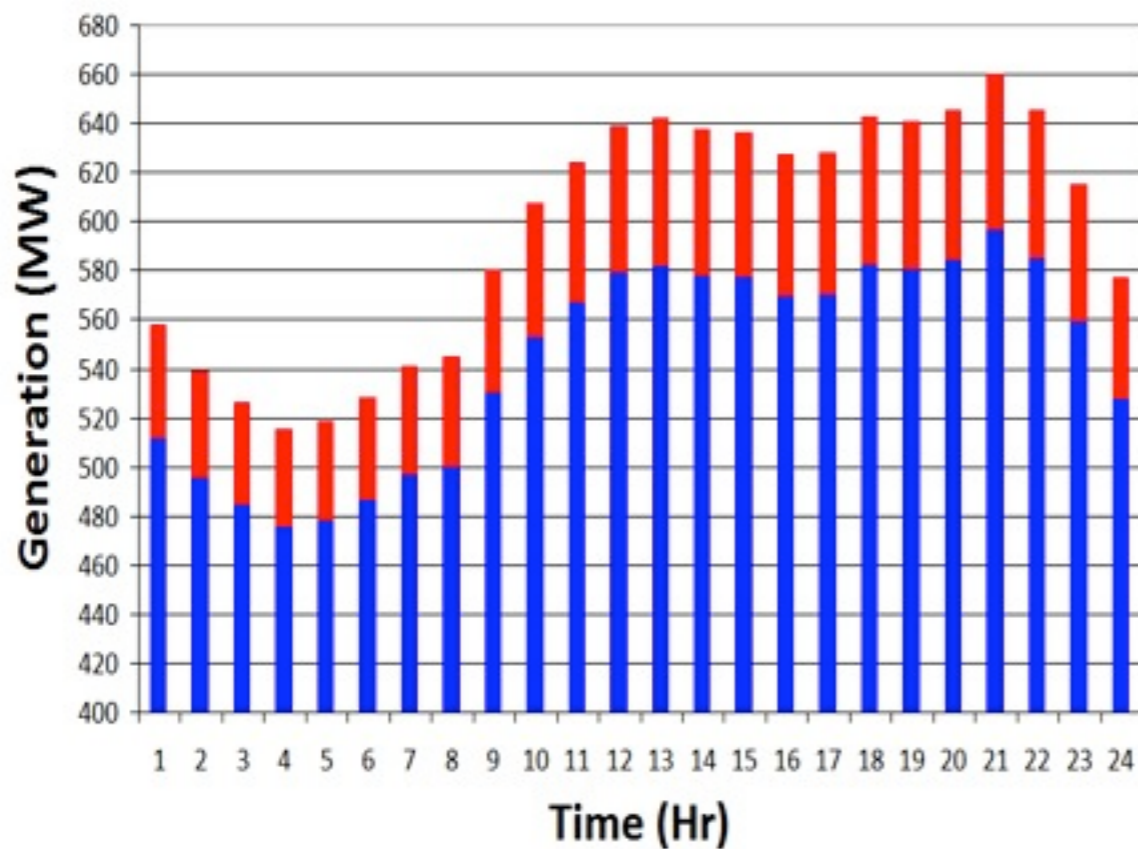


Without Demand Response

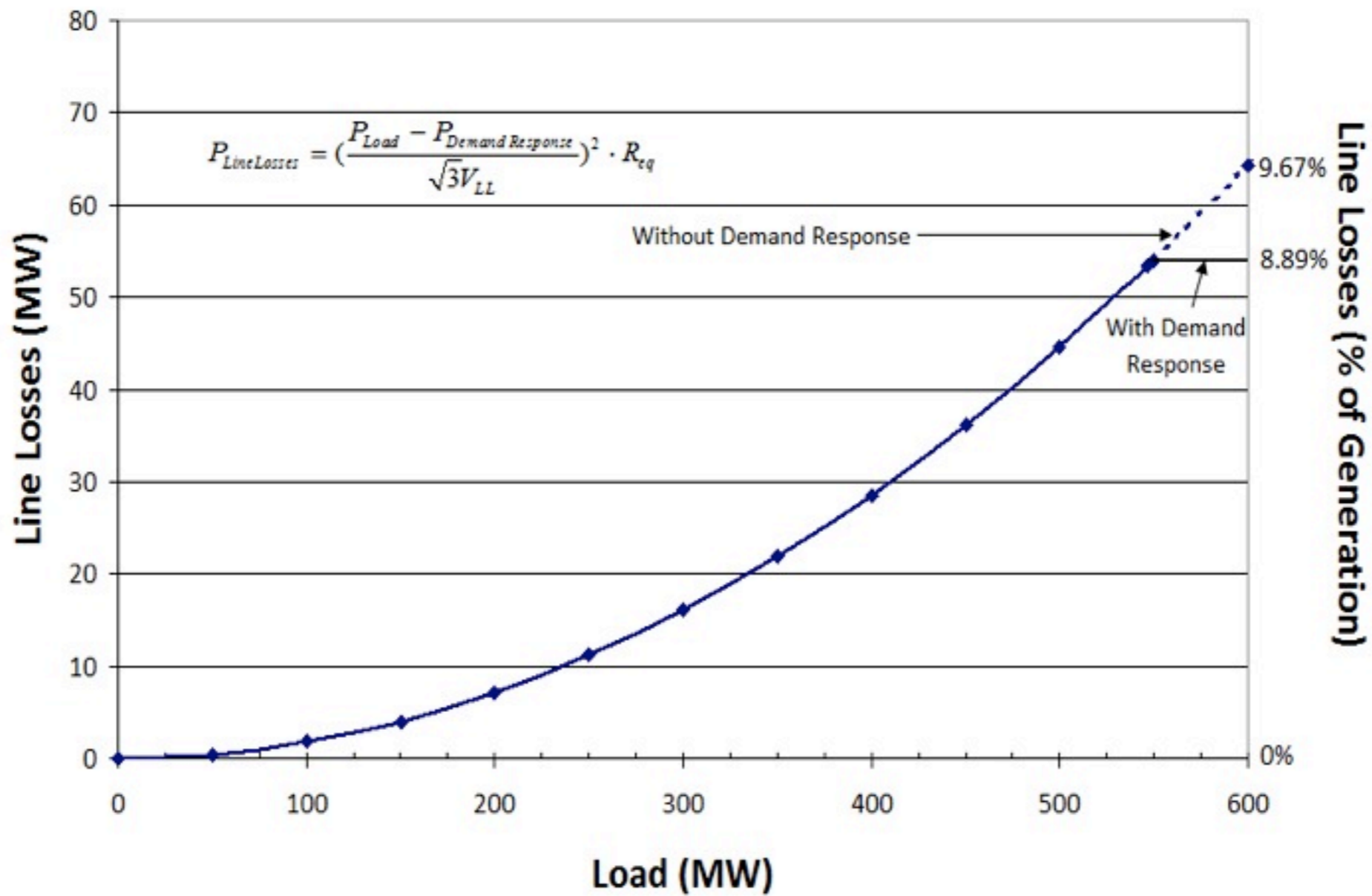
With Demand Response

Generation = Line Losses(1,272 MWh) + Load (13,044 MWh)

Line Losses(1,190.5 MWh)

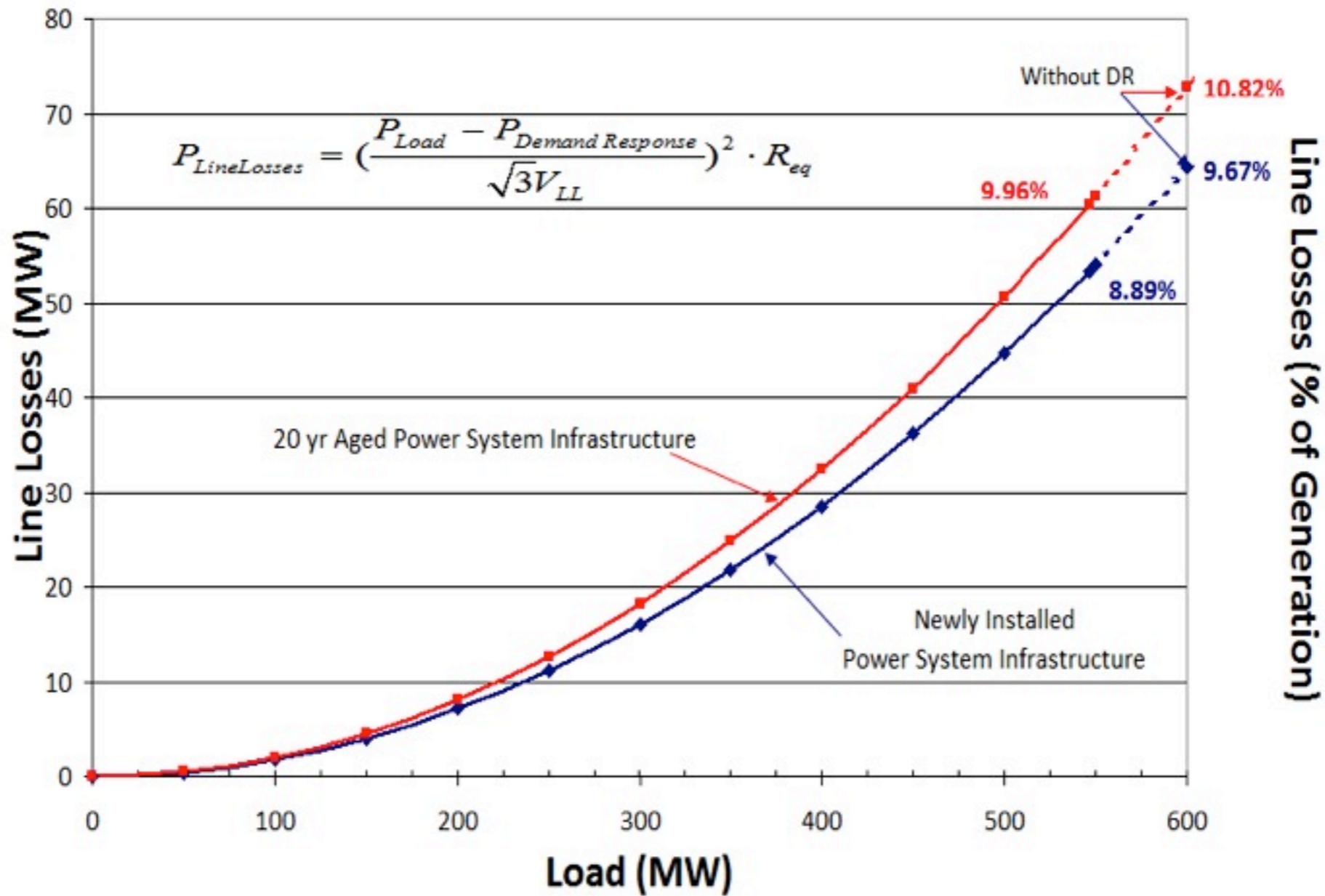


# Line Losses with and without Demand Response





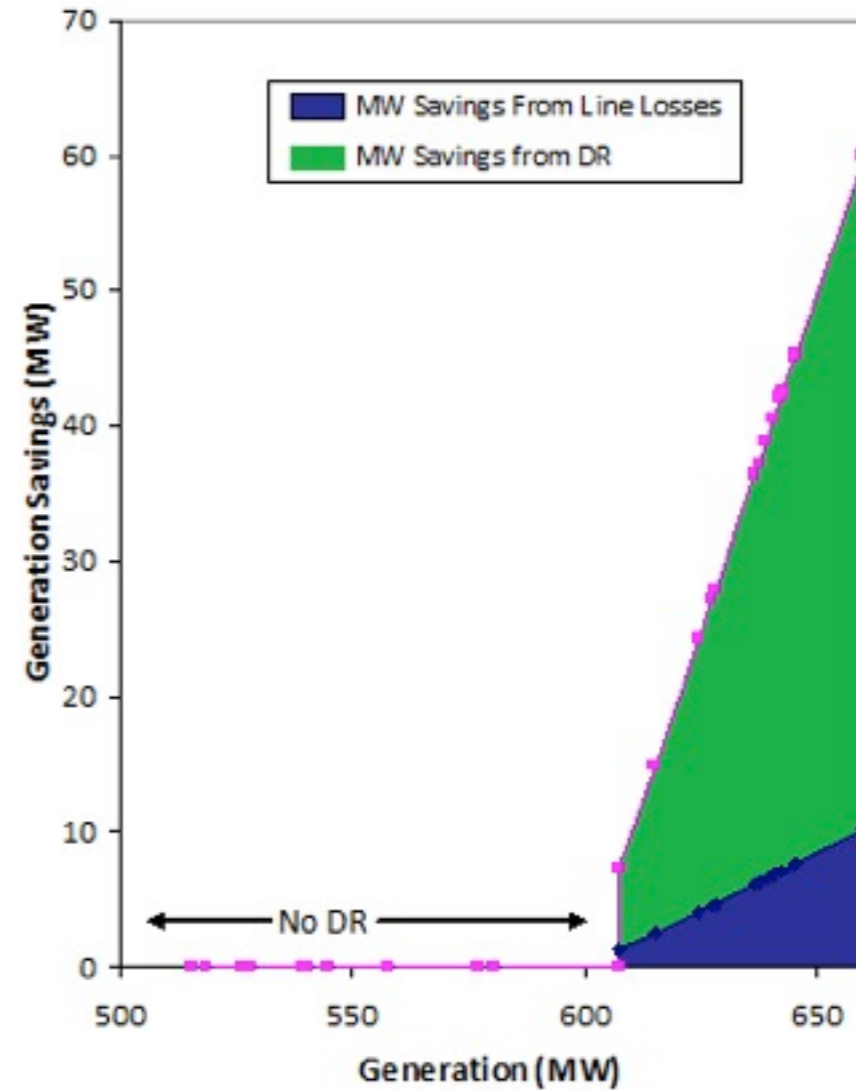
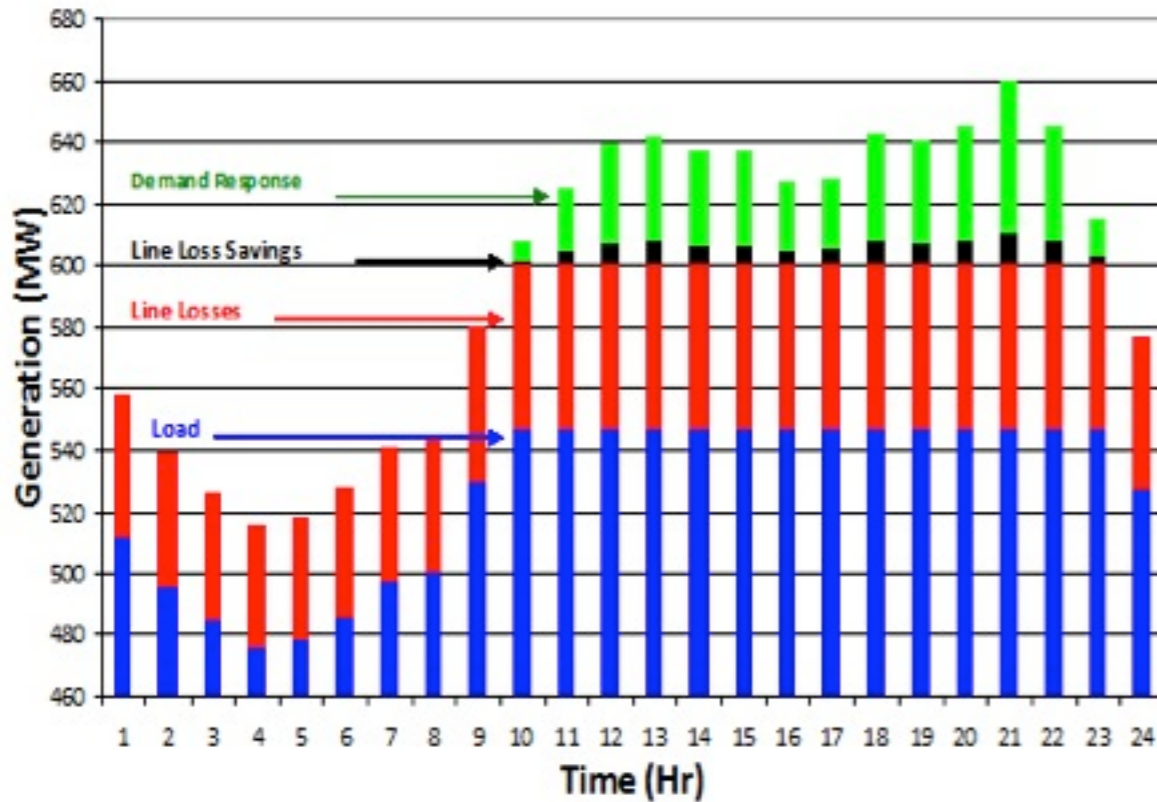
# Line Losses with and without Demand Response



# Total MW Generation Savings

Total MW Generation Savings(489.5 MWh, 3.42%)  
**Demand Response(408 MWh)** + Line Loss Savings(81.5 MWh)

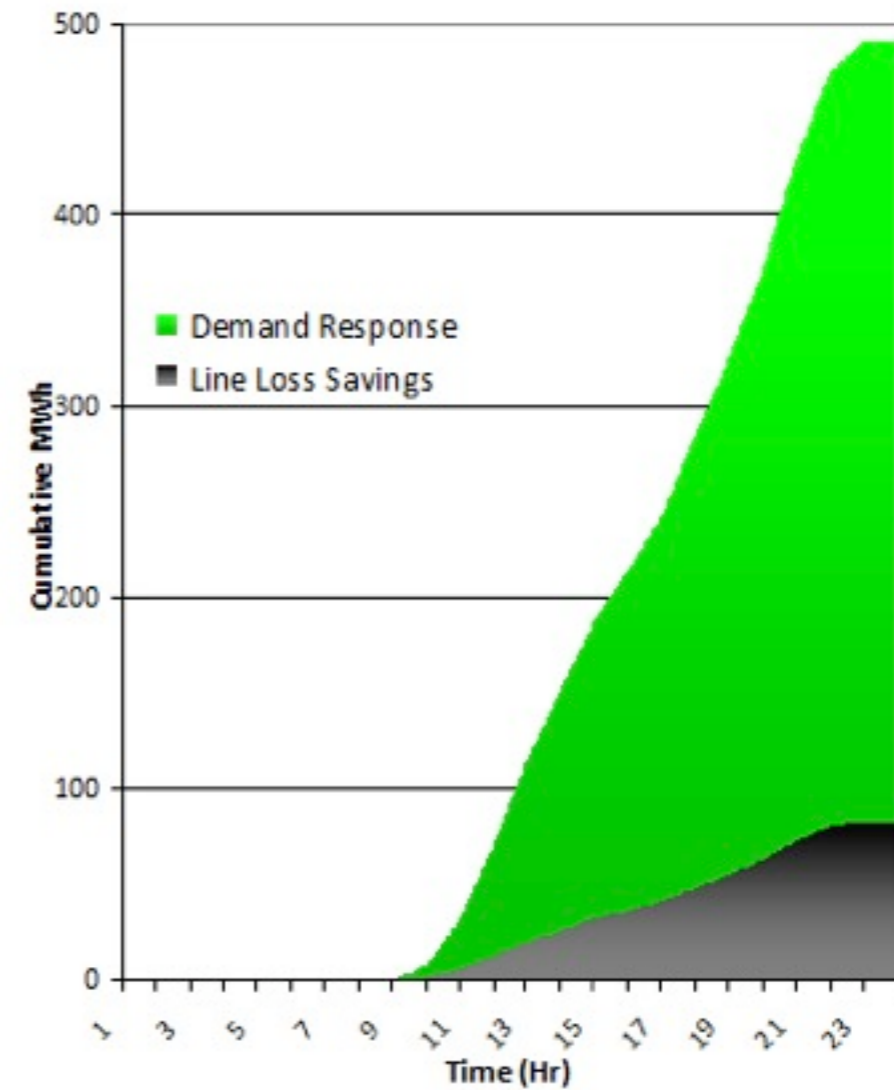
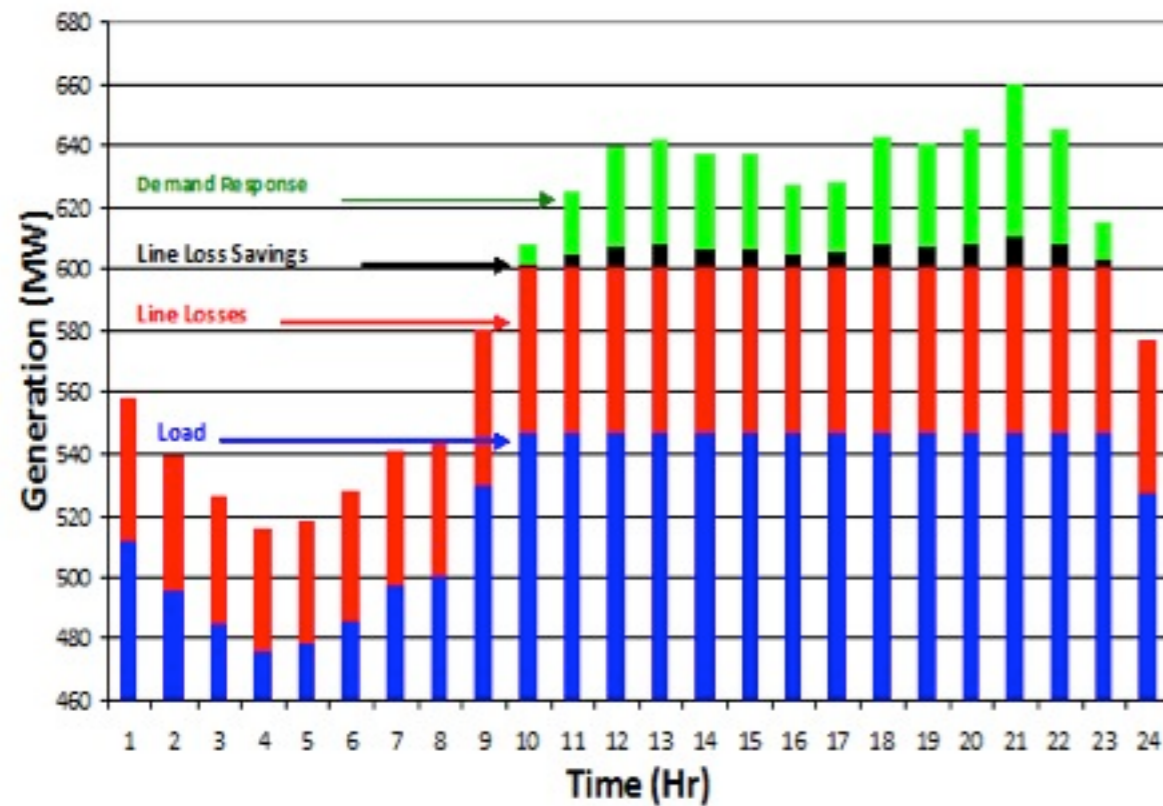
Total MW Generation Savings is shown in the chart below. The height of the area is the cumulative total of MW savings from DR reductions, and avoided line losses due to DR.



# Cumulative Generation Savings

Total MW Generation Savings (489.5 MWh, 3.42%)  
 Demand Response(408 MWh)

Cumulative MWh Generation Savings Savings due to





# Combustion Turbine Example

Two CT System

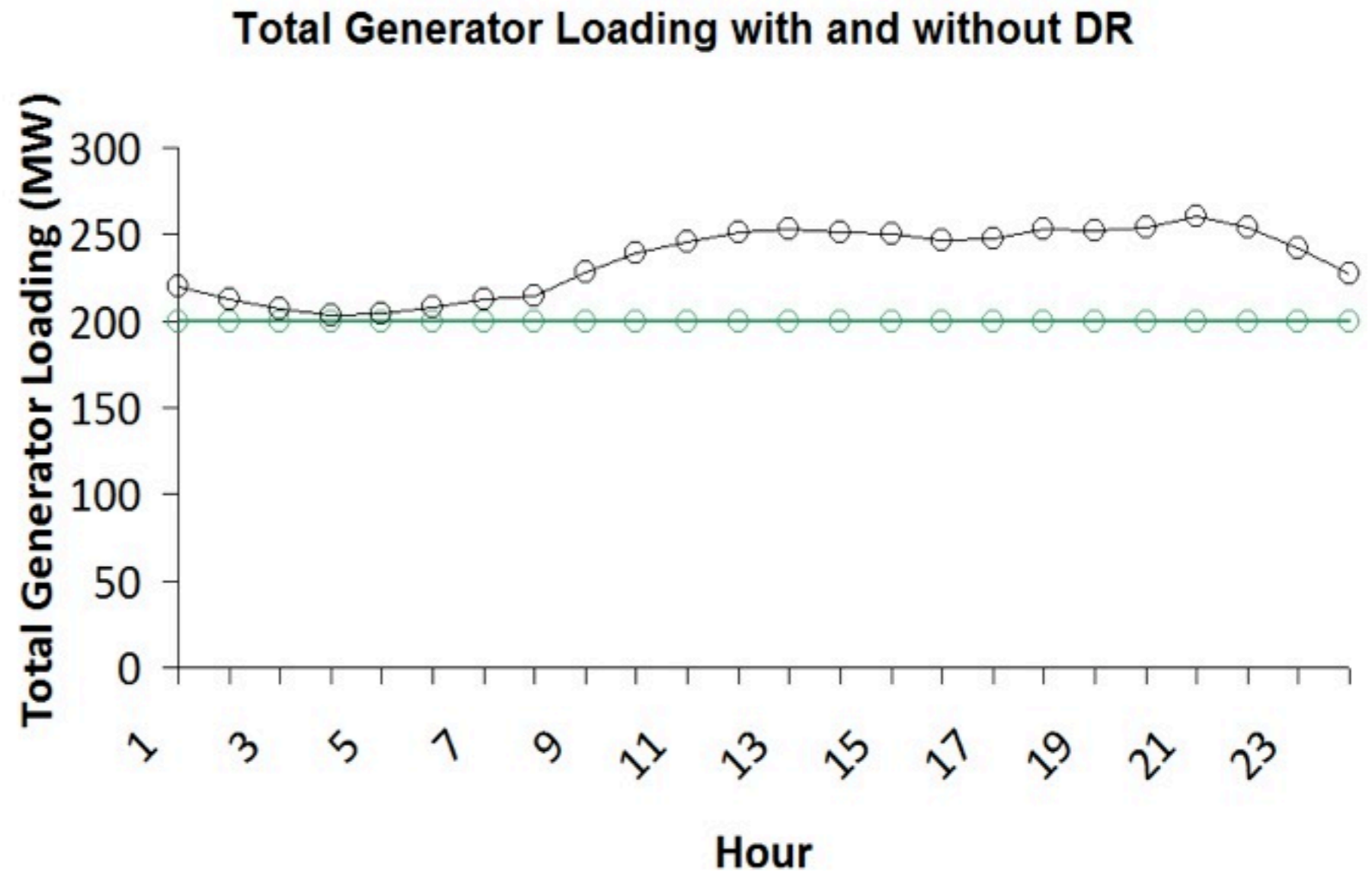
CT1: 200 MW

CT2: 50 MW

In scenario 1, no DR.  
In scenario 2, DR  
reduces demand  
above 200 MW

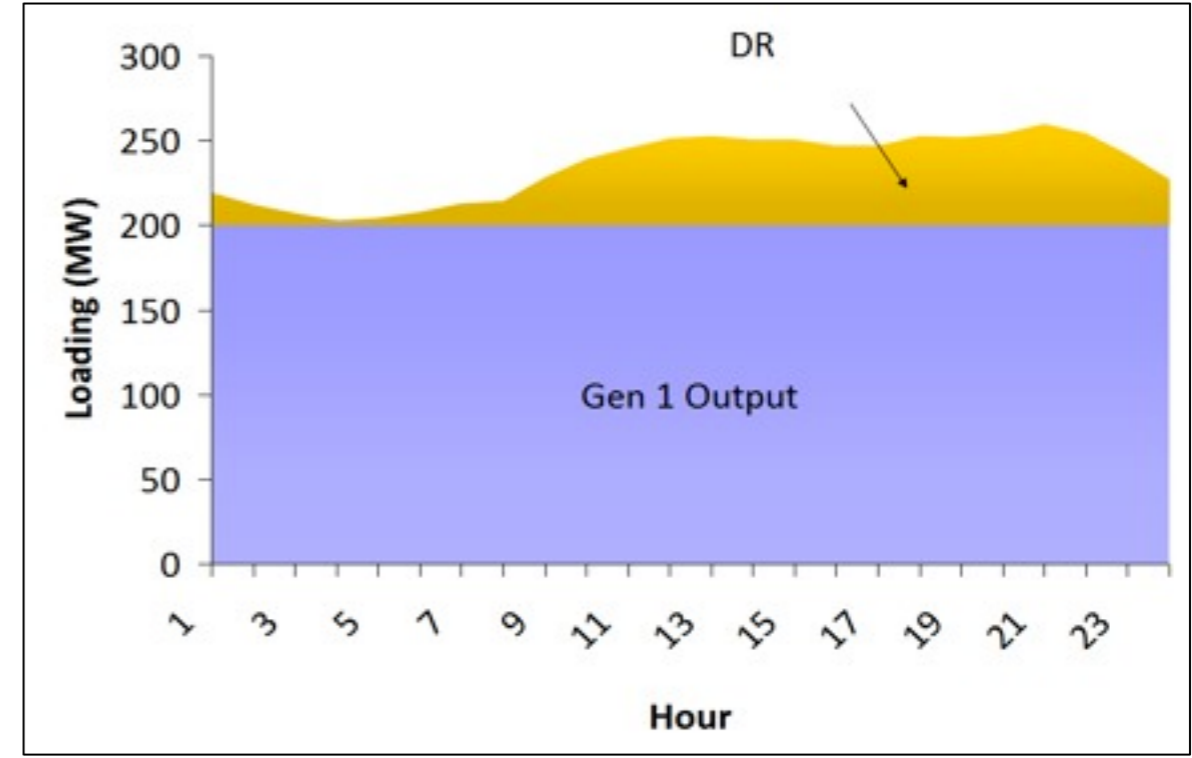
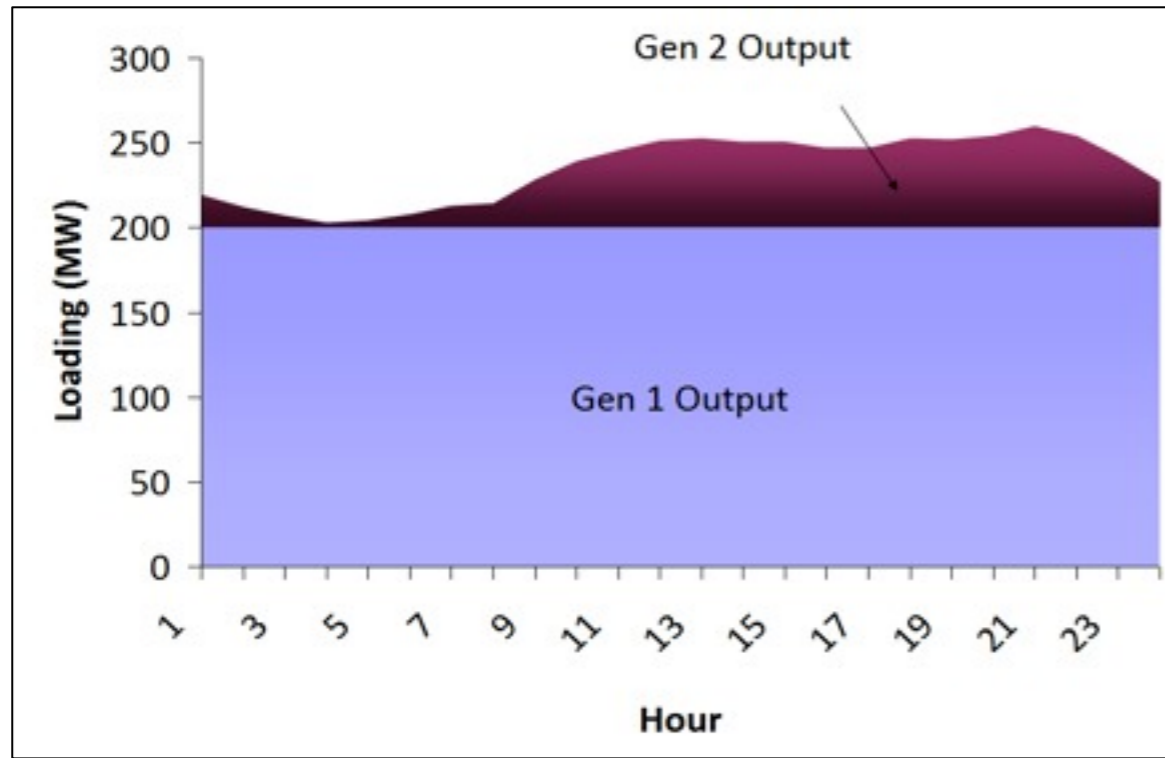
Heat rate  
assumptions for  
typical CT units

Same loading pattern  
as previous example



# Combustion Turbine Example – Fuel Usage with and without DR

Note: Assumed that Gen 2 can be dispatched at very low levels for the example, a more realistic scenario would place a



More total MWh reduced than in the coal example.

Emissions Reduction ~ 511 tons CO<sub>2</sub>, 827 lbs NO<sub>x</sub>

