

THE SGIP GHG SIGNAL

Gavin McCormick | WattTime
May 26, 2021



Agenda

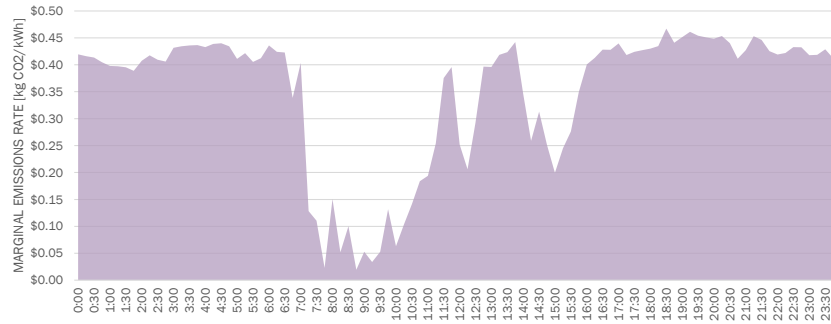
- How co-optimizing energy storage with a GHG signal works
- Overall results on costs and GHGs in the SGIP program
- How effects might vary in Wisconsin



HOW CO-OPTIMIZING WITH A GHG SIGNAL WORKS

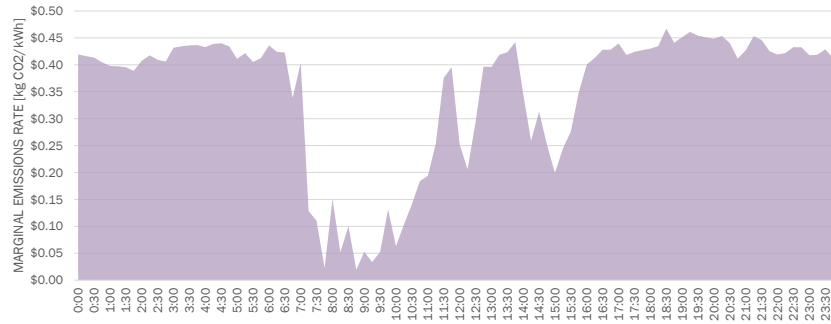
How co-optimization works

Emissions per KWh

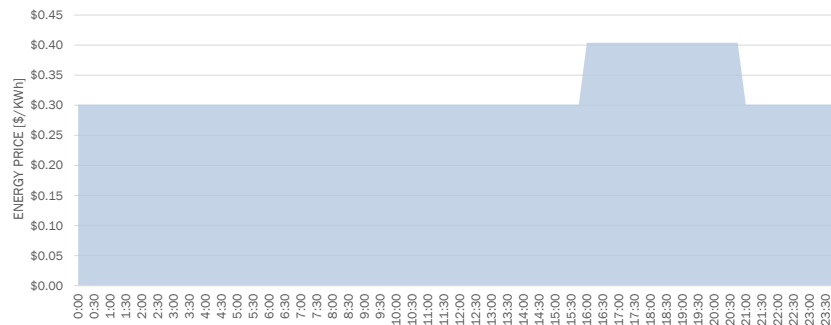


How co-optimization works

Emissions per KWh

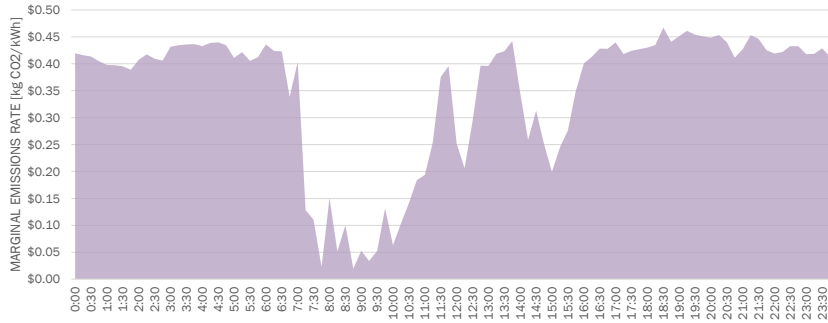


Cost per KWh



How co-optimization works

Emissions per KWh

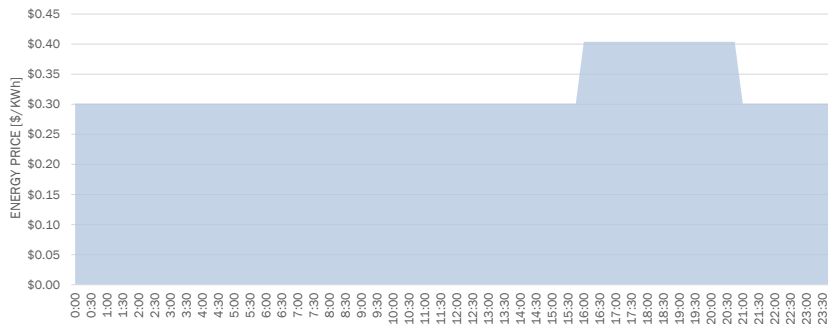


✘ CARBON PRICE

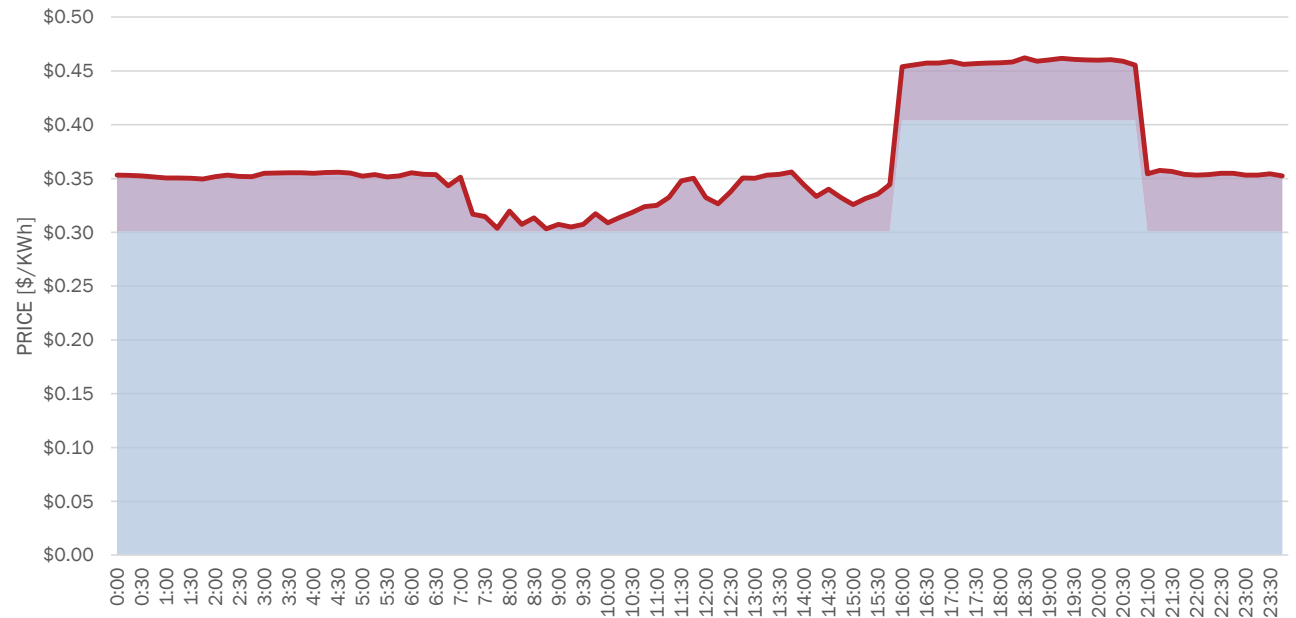
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Cost per KWh

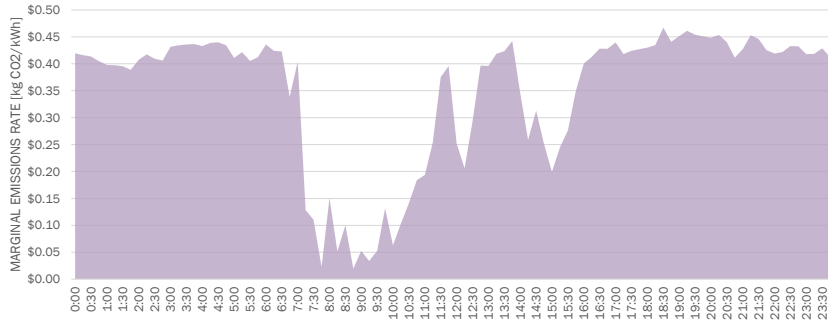


Combined value per KWh



How co-optimization works

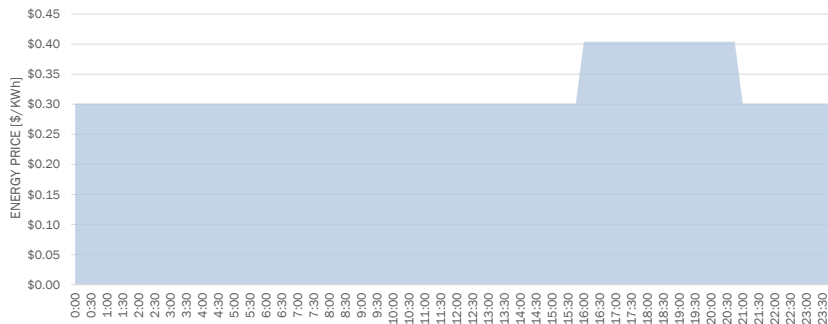
Emissions per KWh



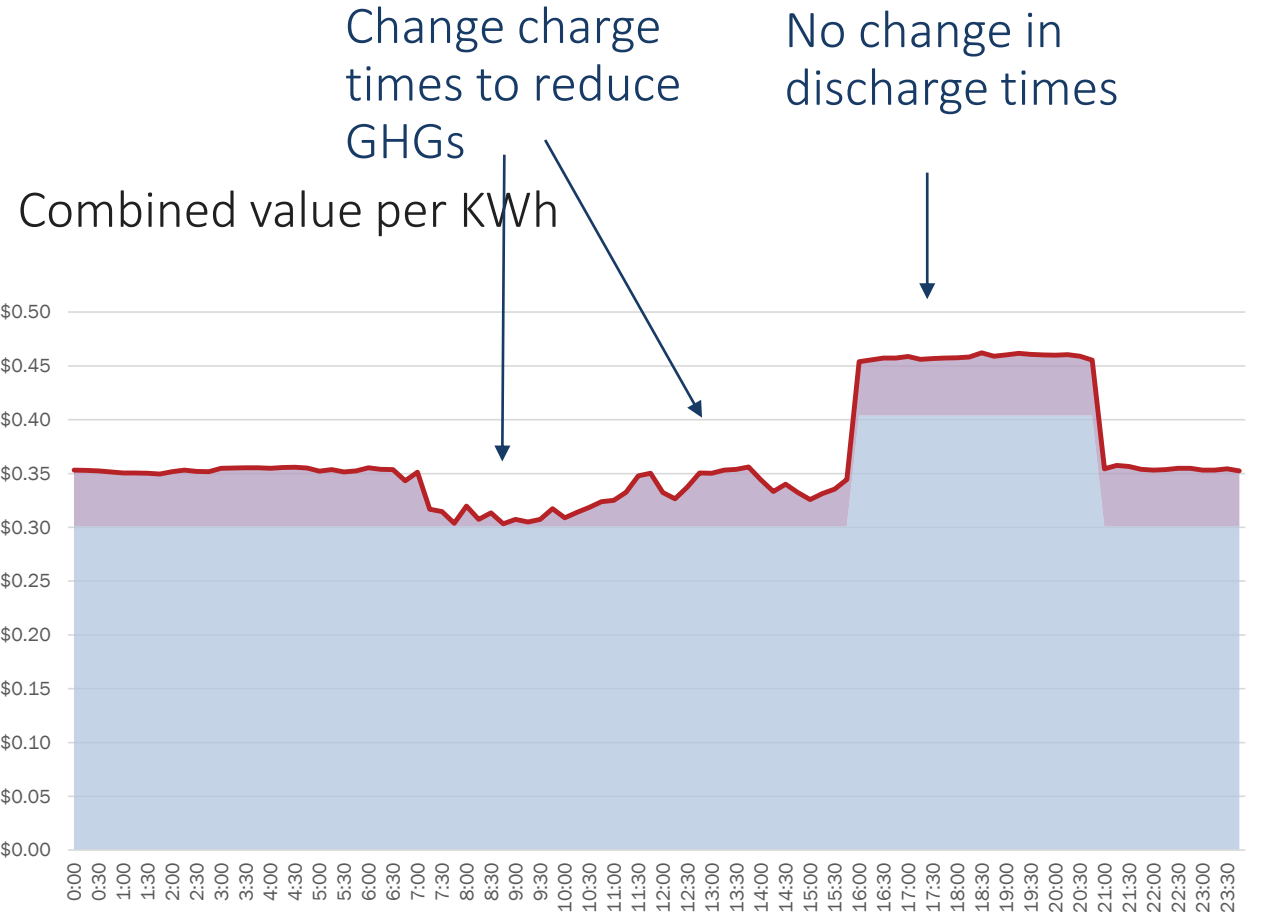
✖ CARBON PRICE

+

Cost per KWh



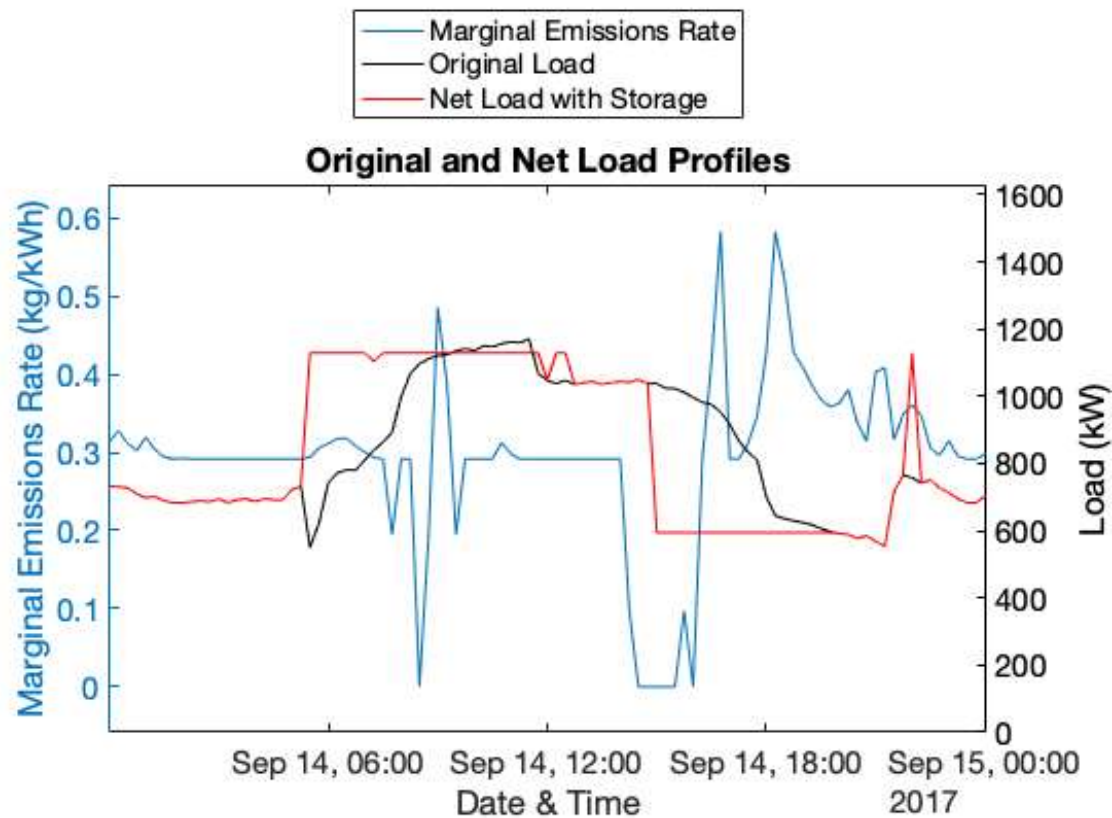
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Example: Enel X



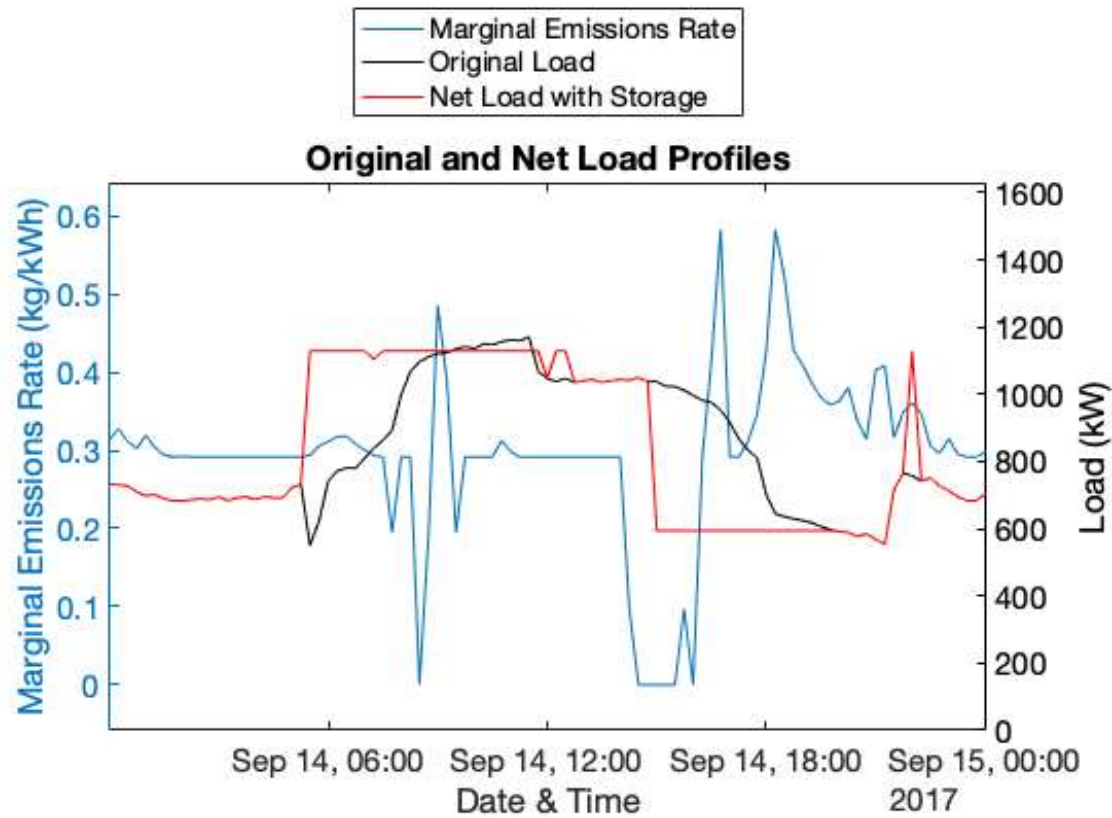
Without Emissions Co-Optimization



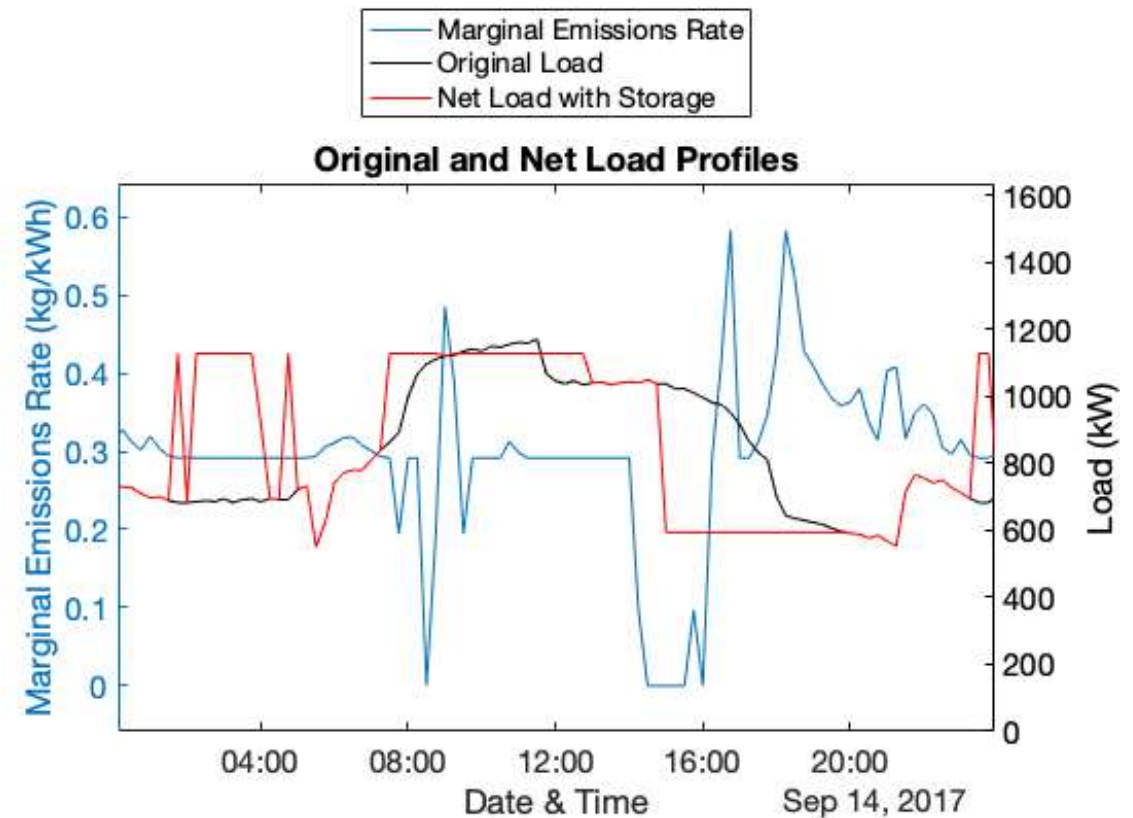
Example: Enel X



Without Emissions Co-Optimization



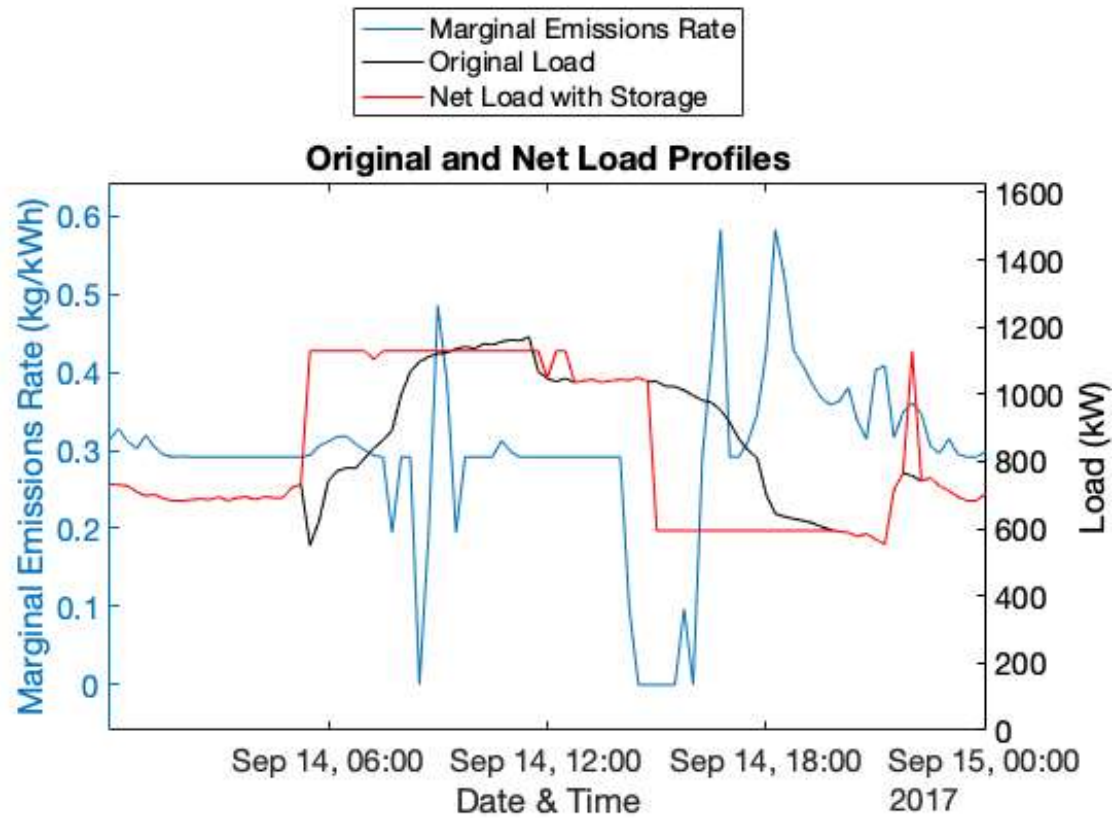
With Emissions Co-Optimization



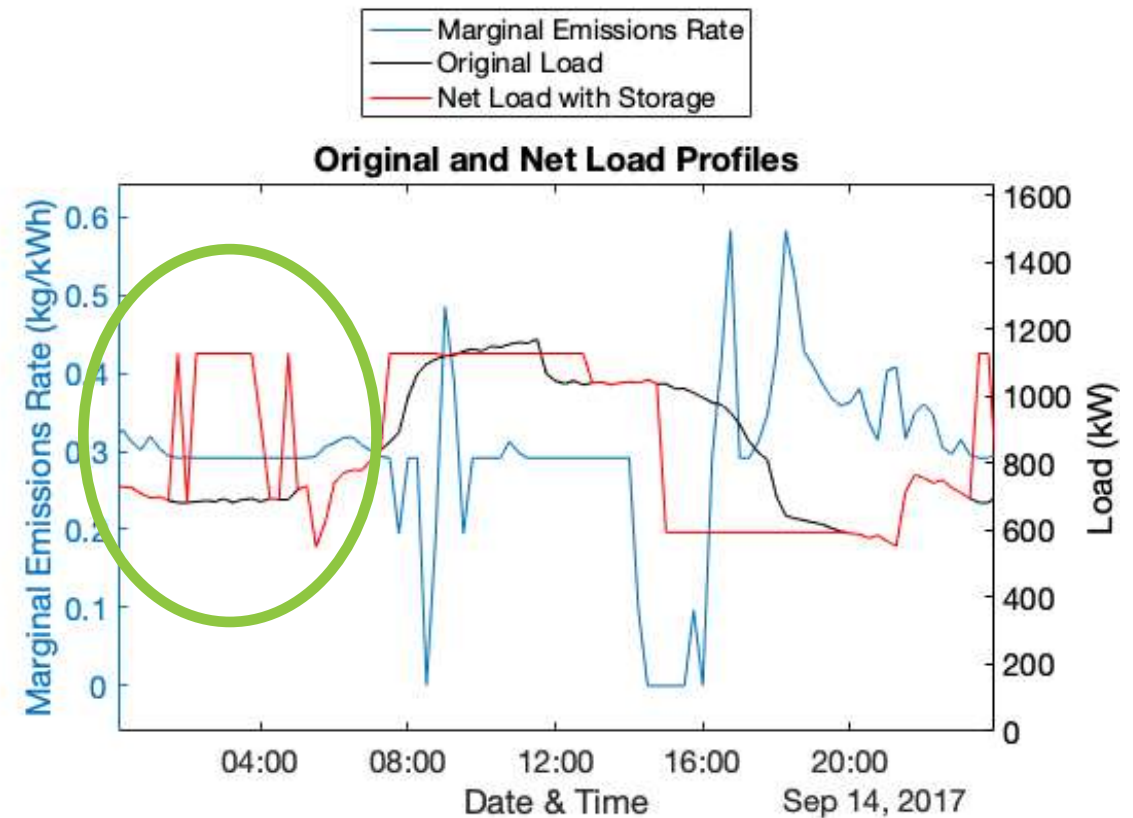
Example: Enel X



Without Emissions Co-Optimization



With Emissions Co-Optimization



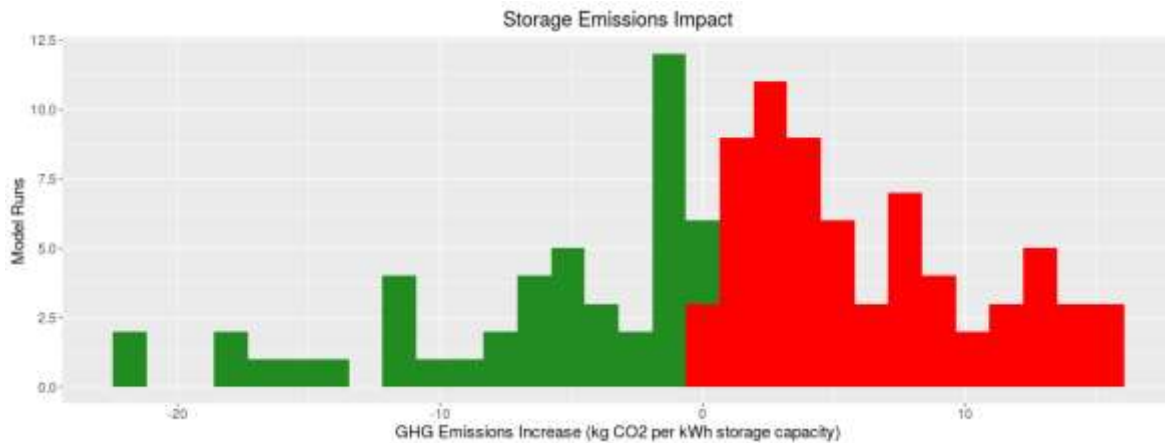


EFFECTS ON COST AND GHGS

SGIP's GHG signal is effective in eliminating emissions. Some reduction is possible at very low cost

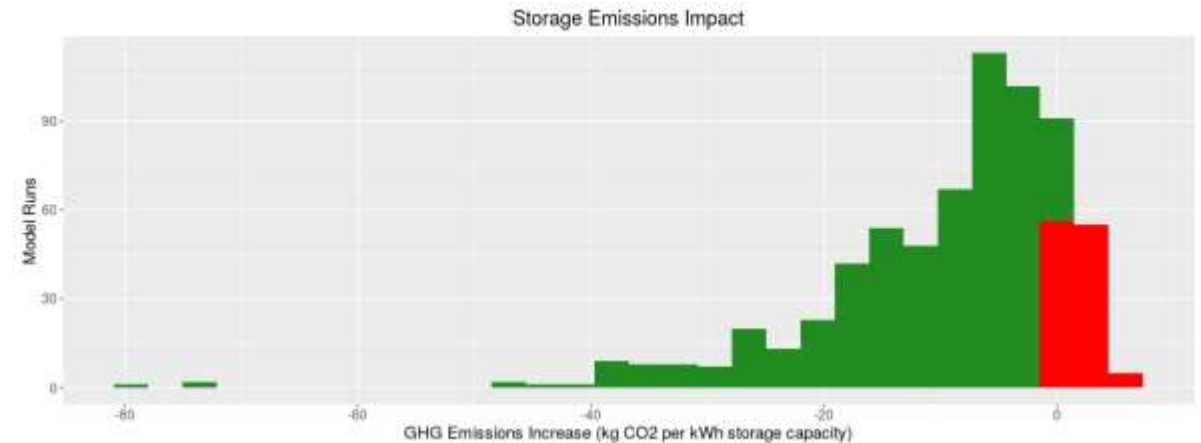
■ GHG Decrease
■ GHG Increase

No Emissions Optimization



39% of systems reduce emissions

GHG Signal Optimization – low carbon adder



83% of systems reduce emissions

Example: Enel X



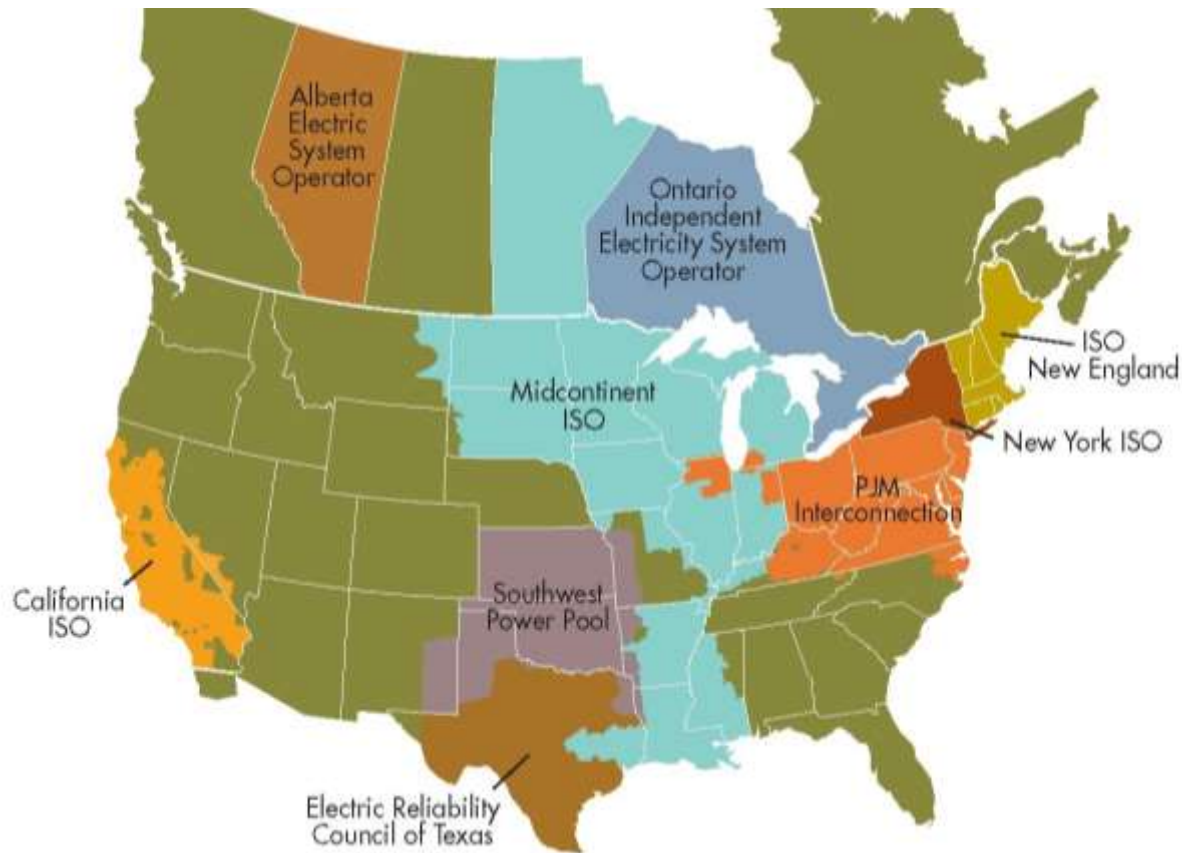
Carbon Adder Value	Annual Bill Savings	Annual Storage Cycling	GHG Emissions Reduction
\$0/metric ton	\$111,316/year	174 cycles/year	14.6 metric tons/year increase
\$1/metric ton	\$111,242/year	174 cycles/year	13.7 metric tons/year decrease

- Enel X is a highly sophisticated energy storage operator with multiple revenue streams
- Set internal carbon adder of \$1/ton
- Much lower than current RGGI carbon cost (\$7.60/ton)
- But reduced net GHG emissions by almost 200% [sic]



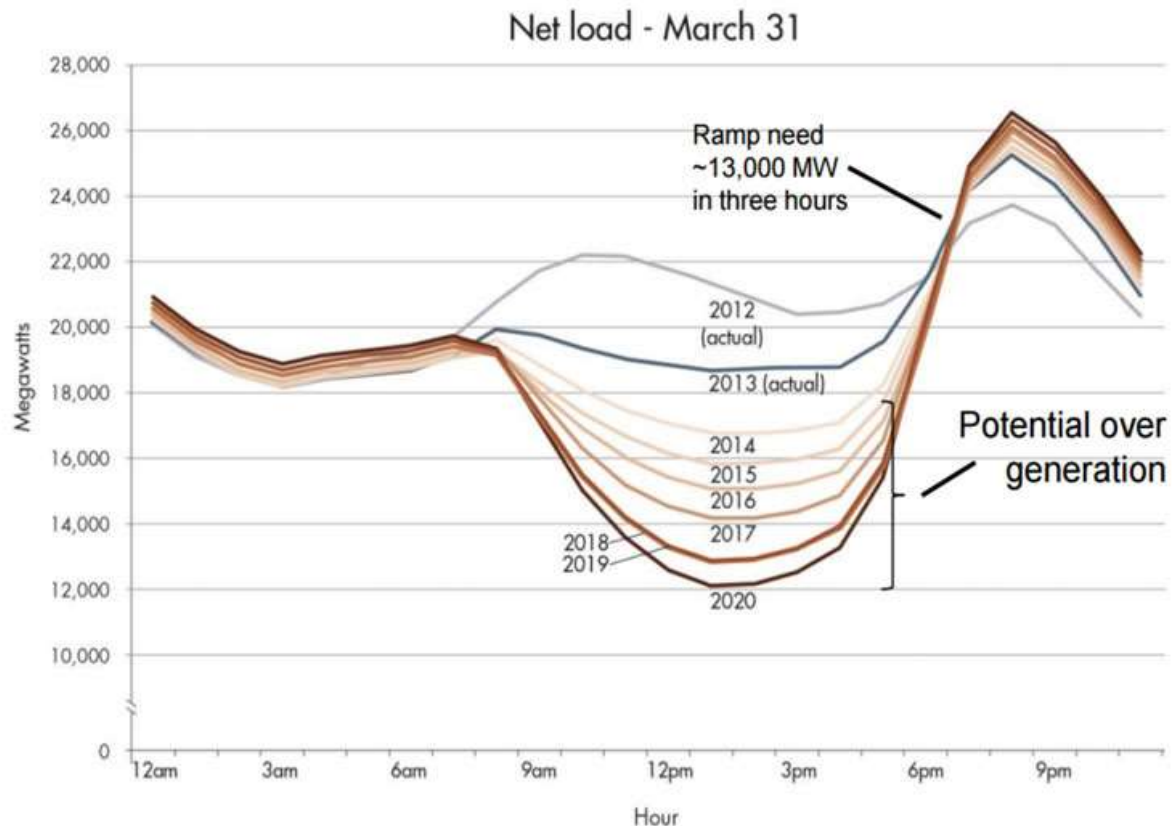
HOW EFFECTS MIGHT VARY IN WISCONSIN

Unlike California, Wisconsin is part of a larger ISO



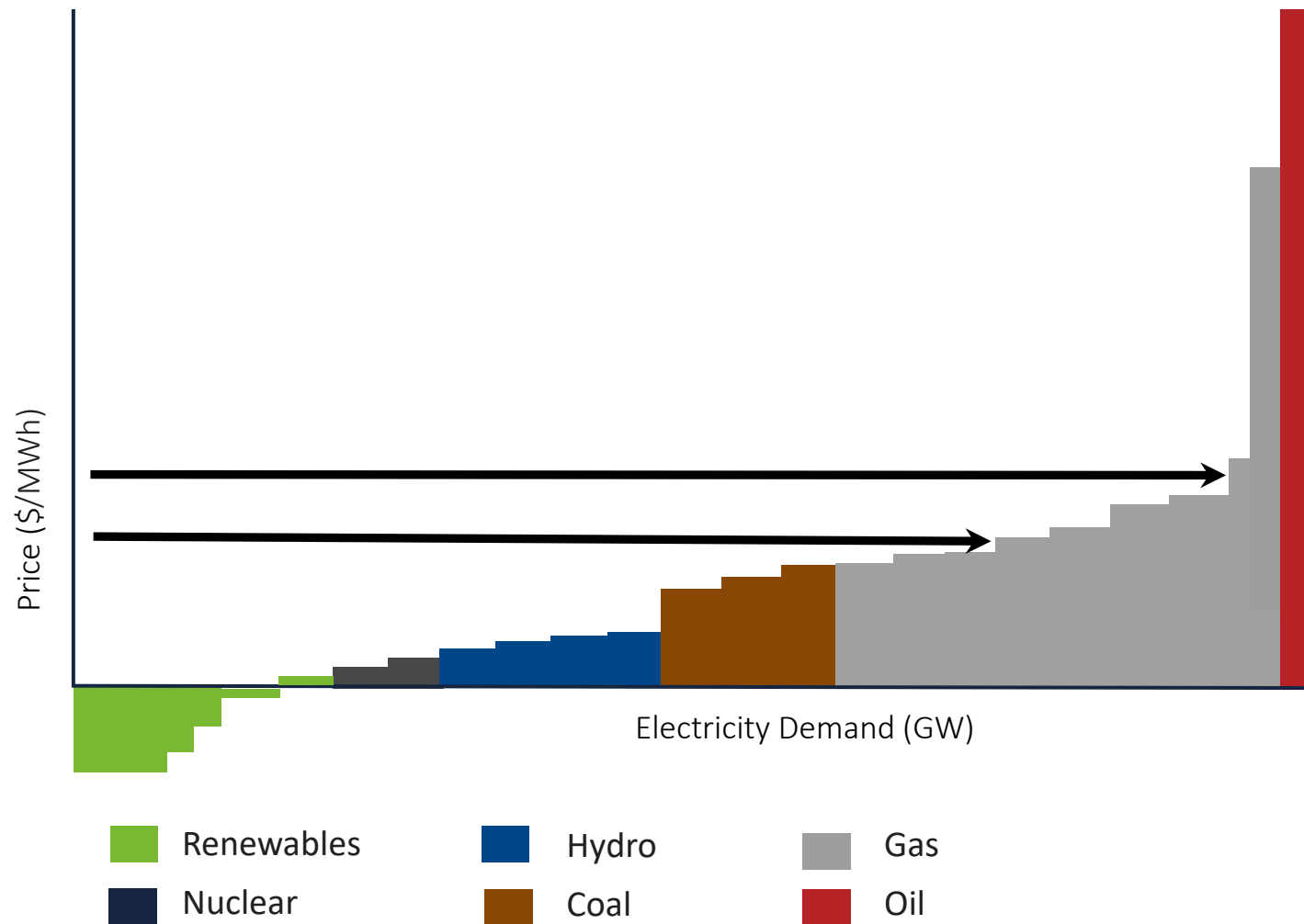
- The MISO market changes Wisconsin's marginal GHG emissions rate
- Often, using energy storage will affect emissions in *other* states

Wisconsin doesn't have California's duck curve... yet



- Large-scale solar in California creates a distinctive “duck curve”
- Thus, emissions savings from a GHG signal are currently larger in CA than WI
- But WI’s savings are growing, and likely to eventually pass CA’s
- Due to more wind
- Because wind is more intermittent, timing more helpful in reducing GHGs

Different possible emissions signals



- SGIP's signal only covers CA
- Some Wisconsin-specific models already exists
- The Great Lakes Protection Foundation funded Wisconsin mercury emissions signals
- City of Bayfield Water Utility has piloted use of Wayne State University's signal

Conclusions

- SGIP's GHG signal successfully eliminated net GHG emissions in energy storage
- Most reductions occurred at very low or no increase in cost
- A Wisconsin-specific signal has been successfully piloted
- Emissions savings potential currently smaller than California's, but growing faster

Thank You

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