COVID-19 Impacts to California ISO Load & Markets: March 17 – April 26, 2020

Market Analysis and Forecasting

May 5, 2020
Background

• Between March 17-19, various California counties started requiring non-essential businesses to close or limit activity, including restaurants and some commercial stores, and directed companies to have their employees work from home if possible.

• Beginning Friday, March 20, the state implemented an executive order for all individuals living in California to stay home except as needed to maintain continuity of operations of critical infrastructure sectors, along with other exceptions such as leaving home to obtain food, prescriptions, and health care.
Summary

• Since the first full week of the statewide stay-at-home order, the ISO has observed:

  ➢ **Weekday** average load reductions of 4.9%, and up to 7.5% reductions during peak hours.

  ➢ **Weekend** average load reductions of 1.1%, and up to 3% reductions during peak hours.

• Because ISO’s forecasting process allows us to perform a backcast analysis given the underlying weather conditions and type of day, these reductions compare actual load to expected loads if no order were in place.

• While the sophisticated load forecast models could not have anticipated the stay-at-home order, the ISO continues to fine-tune its models to improve forecast accuracy in day-ahead and real-time markets as conditions evolve.

• Energy prices have declined by $9 and $10 in the day-ahead and real-time markets, respectively.

• There have been no impacts to grid reliability from the stay-at-home order.
System load impact

Partial Stay-at-Home  
(March 17-19)  
Weekday: 2.7-5.8%  
Weekend: 0-1%

Full Stay-at-Home  
(March 23 – April 26)  
Weekday: 4.9-7.5%  
Weekend: 1.1-3.1%

Note: Largest reductions occur over the morning peak hours.
Removing weather errors to isolate stay-at-home order’s impact

Backcast Analysis
Methodology for removing weather errors to isolate stay-at-home order’s impact

• CAISO is using a backcast model, which removes the largest known sources of weather error to isolate the stay-at-home order’s impact.

• The difference between the expected load model and what actually occurred is referred to as model error.
  – COVID-19 is a component of model error. There is a normal range for model errors and what is seen in this analysis is outside the normal range, allowing the ability to isolate the COVID-19 Impact.
Weather Adjusted: System impact March 9 - March 19
Weather Adjusted: System impact March 20 - March 29
Weather Adjusted: System impact March 30 – April 12
Weather Adjusted: System impact April 13 – April 26
### Summary of system impact: March 23 - April 26

<table>
<thead>
<tr>
<th>Day Type</th>
<th>Peak</th>
<th>MW Impact</th>
<th>MW Percent Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday</td>
<td>Morning</td>
<td>1,906</td>
<td>7.5%</td>
</tr>
<tr>
<td>Weekday</td>
<td>Evening</td>
<td>1,596</td>
<td>6.5%</td>
</tr>
<tr>
<td>Weekend</td>
<td>Morning</td>
<td>641</td>
<td>3.1%</td>
</tr>
<tr>
<td>Weekend</td>
<td>Evening</td>
<td>186</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day Type</th>
<th>MWhs Impact</th>
<th>MWhs Percent Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday</td>
<td>27,420</td>
<td>4.9%</td>
</tr>
<tr>
<td>Weekend</td>
<td>5,692</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

Numbers Show an Overall Reduction

The stay-at-home order began on Friday, March 20; our summary begins at the first full week beginning Monday, March 23. For details of impact during the partial stay-at-home orders, see slide 12.
Average daily energy system impact due to COVID-19

Numbers Show an Overall Reduction

The stay-at-home order began on Friday, March 20; our summary begins at the first full week beginning Monday, March 23.
Market analysis and forecasting

Price impact: COVID-19
Energy prices trended downward in the first two weeks of the shelter-in-place provisions.
Day-ahead energy prices reduced on average about $9/MWh in the period of the shelter-in-place provisions.
Fifteen-minute energy prices reduced on average about $10/MWh in the period of the shelter-in-place provisions.