California ISO
Shaping a Renewed Future

California Independent System Operator Corporation

July 29, 2011

VIA ELECTRONIC MAIL

Mr. R. Thomas Beach
Crossborder Energy
2560 Ninth Street
Suite 213A
Berkeley, CA 94710

Re: ISO Response to the California Wind Energy Association Data Request No. 2

Dear Mr. Beach:

Enclosed please find the ISO response to the California Wind Energy Association Data Request No. 2 propounded in the Long Term Procurement Proceeding, CPUC Docket R.10-05-006.

Please do not hesitate to contact me if you have any questions.

Sincerely,

Judith B. Sanders
Senior Counsel
California Independent System Operator

cc: Service List R.10-05-006

BEFORE
THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Integrate	**)**	
And Refine Procurement Policies and	**)**	**R.10-05-006**
Consider Long-Term Procurement Plans	**)**	

RESPONSE OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION TO THE SECOND SET OF DATA REQUESTS OF THE CALIFORNIA WIND ENERGY ASSOCIATION

Below are responses by the California Independent System Operator Corporation (ISO) to the Second Set of Data Requests of the California Wind Energy Association (CALWEA).

Request No. 1:

Pages 43-44 and **Slide 10** show that the Trajectory-Base Load, Environmentally Constrained, and Trajectory-High Load cases result in load-following down shortages equal to 506 MW, 539 MW, and about 830 MW, respectively. No downward load- following capacity shortages occurred in the Cost Constrained, Time Constrained, and All-Gas cases.

a. Please provide data on the number of hours of load-following down violations that were experienced in the Trajectory-Base Load, Environmentally Constrained, and Trajectory-High Load cases.

ISO RESPONSE TO No. 1a:

The need run process consists of two steps. First, a linear programming (LP) simulation (i.e., the same setup as the need run but without unit commitment decision) for the full year of 2020 is conducted to identify the months in which the highest load following-down shortfall may occur. The LP run, however, cannot accurately determine the magnitude of the shortage. Second, a need run (i.e., with unit commitment decision and monthly maximum regulation and load following requirements for each hour) is conducted only for the months identified in the LP run to determine the actual load following-down shortage. The purpose of taking this approach is to avoid unnecessarily long simulation times.

For the Trajectory-Base and Environment cases, the need run was done for only February and March. B Trajectory High Load case the need run was done for February, March, and July (the latter was for the purpose to identify capacity need to meet upward ancillary service and load following-up requirements). The maximum load following-down shortage of the three cases are 506, 539, and 856 MW respectively. Hourly shortage data are presented in the "LFD Shortage" sheet in the attached spreadsheet file ("CalWEA Data Request 2_Data Sheets.xlsx").

b. Please provide data on the distribution of the magnitude of the load-following down violations that were experienced in the Trajectory-Base Load, Environmentally Constrained, and Trajectory-High Load cases.

ISO RESPONSE TO No. 1b:

See answer to Data Request No. 1.a.

c. Please provide data that will allow CalWEA to understand the distribution across the months of the year and the hours of the day of the load-following down violations that were experienced in the Trajectory-Base Load, Environmentally Constrained, and Trajectory-High Load cases.

ISO RESPONSE TO No. 1c:

See answer to Data Request No. 1.a.

d. Please confirm that the statement on page 43-33 is incorrect that "No downward load following shortfalls or needs were observed in the All Gas or Trajectory High Load scenarios." Also, please indicate the exact amount of capacity in MW that is shown for the Trajectory-High Load case on Slide 10.

ISO RESPONSE TO NO. 1d:

The All Gas case has no load following-down shortfall but does have capacity need. The Trajectory High Load case has load following-down shortfall and capacity need. The statement on page 43-30 (instead of 43-33) was intended to say that the Cost Constrained and Time Constrained cases do not have any load following (down and up) or ancillary service shortfall. Therefore there is no need for additional capacity in these two cases.

The number load following-down shortfall for Trajectory High Load case on Slide 10 is 856 MW.

Request No. 2:

P. 14 -- L. 21-25: "a statistical model was developed using historical ISO data from several existing wind farms to capture the 1 minute variability (compared to a 10 minute average) as a function of the size of the plant/wind farm. This statistical model captures the standard deviation of the 1 minute variability as it varies with wind farm size."

Where in California did the 1 minute wind generation variability come from?
Was the same 1 minute variability superimposed on all wind generators across the studied region (CA) in the CAISO Step 0 analysis?

ISO RESPONSE TO No. 2:

The 1 minute historical data are the 2010 real production data for four existing wind sites in California. The statistic model calculated 1 minute variability for each site and aggregated adjacent sites. A curve was developed to show the typical relationship between wind farms (or CREZ) nameplate and the standard deviation for 1-minute variability. The curve showed that the variability did not increase as fast as nameplate capacity due to geographic diversity.

No, the 1 minute variability was not superimposed on all wind generators across the studied region. The same methodology was used to superimpose 1 minute variability on the wind plants in the Western US. As indicated earlier, this methodology captures the fact that the 1 minute variability varies with the size of the wind plant. The methodology also uses a random process to determine the actual 1 minute variability to add to the profiles.

Request No. 3:

P. 14 -- L. 27-29: "Finally, using this 1 minute statistical model, variability was then added to each 1 minute splined set of data using a process that adds variability randomly as a function of the wind farm size.

How did the model distinguish the level of superimposed 1 minute variability based on the plant size? Did this mean lower variability for larger plant sizes? Were the results ever tested against the actual output plants of various sizes to ensure the accuracy of this assumption? Finally, were these simulated variabilities added to the outputs of various wind plants with a random phase shift so that all such simulated variability would not have an artificial cumulative effect?

ISO RESPONSE TO No. 3:

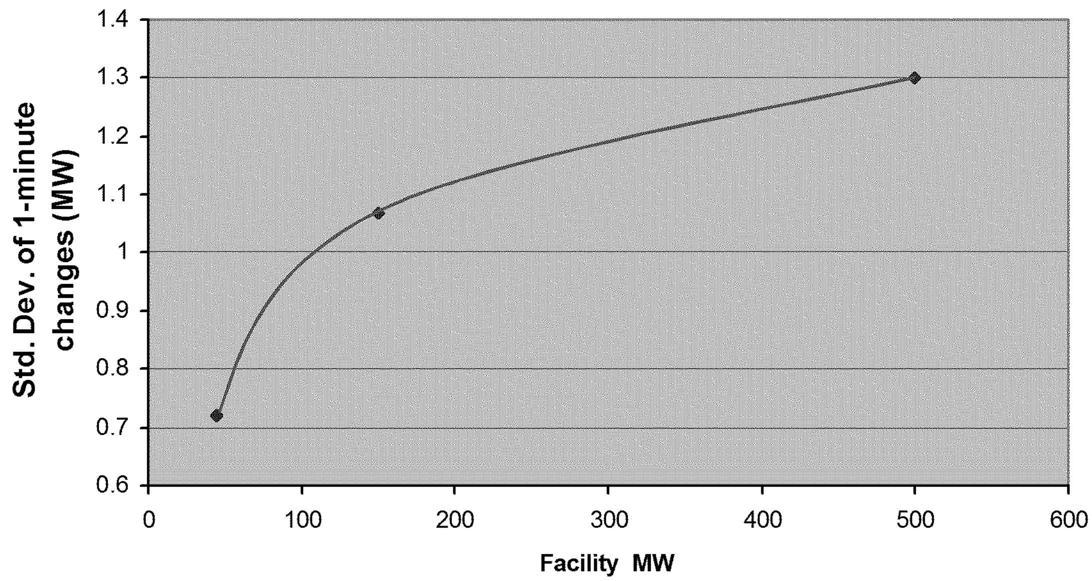
Based on the "typical" function between plant size and 1 minute variability, for different plant sizes, different 1 minute variability was applied; for the same size wind plants at different locations, the same 1 minute variability was applied. Note that the wind plant 10 minute profiles are location specific; the 1 minute variability was superimposed on the location specific wind profile.

The statistic analysis on the production data shows a relationship between facility (or CREZ) nameplate and the standard deviation for 1-minute changes, and also shows that the standard deviation did not increase as fast as nameplate capacity due to geographic diversity. The larger plant has a higher standard deviation of 1 minute variability, but the ratio of standard deviation/plant size is decreased, which means that larger plant size shows lower variability.

The results were not tested against actual plant output, however the 1 minute variability was developed using actual plant data for four sites of varying sizes.

The variability was added for each plant based upon its size using a random number generator in Matlab. It is not the case that each plant received the same "shape" of random variation when this was performed. Rather, each has its own random pattern of variation superimposed on the randomness already in the data. Hence there should be no (or very low) correlation between the randomness added in one curve and that found in any other curve.

Based on the actual observed 1 minute variability from four wind sites the, following relationship between plant size and 1 minute variability was determined. Based on the size of the plant, the ISO used the variability levels from this relationship.



Request No. 4:

Pages 43-44 and Slide 11 show that the High Load – Trajectory case has an additional A/S and load following up requirement of 4,600 MW. The All-Gas case has an additional load following up requirement of 1,400 MW.

a. In the High Load – Trajectory case, can the CAISO determine how much of the increased integration needs in this case are the result of the higher loads, and how much are the result of the additional renewables needed to reach a 33% RPS at the higher loads?

ISO RESPONSE TO REQUEST No. 4a:

The ISO is currently exploring Market enhancement options and 15-minute scheduling is an option. At this point, it is uncertain what the new market structure would look like in 2020 since there are several unknowns associated with 15-minute dispatch and the design has to go through a stakeholder process. Should the 15-minute option be adopted, it is also possible that the necessary timeline to submit 15-minute bids before the market closes could conceivably be 30 minutes or longer which means that the 15-minute wind and solar forecast would have to be done closer to 45-minutes or longer in advance of the market closing.

Thus, the ISO believes a T-1 persistence model assumption is reasonable at this time. For comparison, the mean absolute error using empirical data for 2010 for five large wind farms was approximately 7.8%. The hour ahead wind forecast errors used in the LTPP simulations were 4%, 3.8%, 3.2% and 3.1% for spring, summer, fall and winter respectively.

b. Does CAISO use the persistence method for forecasting wind output during its periods of fast ramp up and ramp down? If yes, why does CAISO not follow its own approach which abandons persistence method during fast ramp conditions for solar generation? In total, why wouldn't CAISO use a more advanced method of short-term wind/solar generation output forecasting for its analysis?

RESPONSE TO REQUEST No. 4b:

In the ISO Step 1 analysis a persistence model was used for wind production in real-time which means that the wind production was constant for a five-minute period, so fast wind ramps do not skew the regulation requirement. In the Step 1 model, the ISO also used a persistence model for the clearness index for solar resources which means that the clearness index remained constant for a five-minute period. For the hour-ahead forecast, the persistence model was not used for solar resources nor was it used for wind resources. The solar ramps during sunrise and sunset are predictable during the morning and evening hours with the exception of cloudy days. Thus, using a T-1 persistence model for solar resources during sunrise and sunset hours was not practical because of the expected ramp up and ramp down in production respectively. On the other hand, wind ramps can occur during any hour of the day so it’s not practical to exclude certain hours.

Request No. 5:

P. 34 -- L. 16-20: “Step 2 production simulation is an hourly deterministic production simulation of the WECC, including California hourly dispatch with the objective of minimizing cost while meeting the hourly load, spinning reserves, non-spinning reserves, regulation requirements and load following requirements, subject to resource and inter-regional transmission constraints.”

a. We understand that CAISO treats all reliability requirements, namely spinning reserve, non-spinning reserve, and regulation for every time interval (one hour) as capacity requirements across the time interval both in practice and as part of its Step 2 studies here. However, load following has never been treated as a capacity requirement by the CAISO in practice. Why would CAISO then model load following requirement as a capacity requirement as part of its Step 2 studies?

ISO RESPONSE TO No. 5a:

Currently, the variability and uncertainty in operating the grid is primarily based on load since the level of wind and solar does not have a significant impact on operations. Thus, load-following was never treated as a capacity requirement because the load demand curve is predictable for each season. For example, during the summer months the load gradually increases from about 0400 hours through 1700 hours and then drops off so conventional resources can be dispatched to follow this predictable pattern.

With wind and solar resources making up a significant portion of the supply by 2020, the variability and uncertainty associated with the expected variable supply has to be mitigated with conventional resources within the operating hour. For example, conventional resources may have to be dispatched upwards even though load demand is decreasing from one hour to the next if wind and/or solar production drops off. As more and more renewable resources are integrated into the supply mix, the dispatch pattern of conventional resources is not expected to follow the predictable load curve patterns of today. Therefore, a load-following capacity requirement has to be made available for the CAISO's real-time 5-minute economic dispatch application in order to meet the anticipated increase in load and any expected loss of supply from wind and solar resources during the operating hour.

b. Based on its approach which treats load following as a fixed capacity requirement across each one hour time interval in the Step 2 annual production simulation studies, why does CAISO assume that all the resources that provide load following at the end of each hourly time interval are incapable of (or have been disallowed from) providing load following during the hour?

ISO RESPONSE TO No. 5b:

The four priority CPUC scenarios did not identify any load following up shortfalls and needs. Each operating hour is independent and a certain level of load following capacity is needed to meet the expected variability and uncertainty associated with wind and solar production during an operating hour. The ISO does not preclude the use of the load-following capacity requirement from being used in any hour. The load-following capacity requirement is not intended to cover the expected increase in load demand from one hour to the next. The load following requirement for each hour is determined through Step 1 and is intended to cover the uncertainty of load forecast errors and the uncertainty and variability of the supply from wind and solar resources which would have to be made up by conventional resources during an operating hour.

c. We understand that the actual CAISO process which determines the load following requirement is the CAISO Real Time Market, correct? In that case, why didn't CAISO use a simulation of its Real-Time market in its Step 1 and/or Step 2 studies during a few critical time periods of the year to determine the load following requirement as well as the resources needed to meet such requirements?

ISO RESPONSE TO No. 5c:

The assumption "…the actual CAISO process which determines the load following requirement is the CAISO Real Time Market" is incorrect. The load-following capacity requirement is not intended to cover the expected increase in load demand from one hour to the next. The load following requirement for each hour is determined through Step 1 and is intended to cover the uncertainty of load forecast errors and the uncertainty and variability of the supply from wind and solar resources which would have to be made up by conventional resources during an operating hour.

The question suggested that, "….CAISO use a simulation of its Real-Time market in its Step 1 and/or Step 2 studies during a few critical time periods of the year to determine the load following requirement as well as the resources needed to meet such requirements." While the suggestion makes sense, it is not a simple task to identify a few critical periods, since, as stated above, the load following requirement is determined by several critical input parameters associated with load, wind and solar. In addition, the ISO Real Time market system is not able to perform stochastic simulations at this time.

d. We understand that when modeling load following and regulation as capacity requirement in its Step 2 studies, CAISO uses the maximum of the maximum hourly capacity requirements determined in Step 1 for all the like hours of that month. Since CAISO does have the maximum capacity requirement for every hour of the month, why does it not use the relevant capacity value of each hour when performing its production simulation runs rather than smearing the maximum of the maximum hourly capacity requirement across all the like hours of the month?

ISO RESPONSE TO No. 5d:

The monthly load following and regulation up and down requirements were used in production simulation to determine if there are any capacity shortfalls and determining any additional capacity needed to meet A/S and load following up requirement (this is referred to as the "need run"). The hourly load following and regulation up and down requirements for the entire year were used for a production simulation run for purpose of determining cost, fuel utilization and emissions.

Request No. 6:

P. 35 – L. 17-18: "The load pattern in California was modified to reflect assumptions in the scoping memo including accounting for energy efficiency and demand response."

How were energy efficiency and demand response modeled in modifying the load pattern used for in the CAISO studies?

ISO RESPONSE TO No. 6:

Based on the CPUC scoping memo (LTPP Technical Attachment v.5), energy efficiency (7,005 MW) was modeled as a deduction from the load forecast.

The CPUC scoping memo has four types of demand response: Non-Emergency DR, Emergency DR, Total AMI Enabled DR, and Non-Event Based DR. Non-Event Based DR was also modeled as a deduction to the load forecast. The other three types of DR were modeled as supply-side resources, each has a different cost.

Request No. 7:

P. 35 – L. 21-22: "The maximum import capability into California was modified to reflect expected condition." Please explain how the maximum import capability was modeled in the CAISO Step 2 studies.

ISO RESPONSE TO No. 7:

The Step 2 model has a California maximum simultaneous import limit. The total import into California at any hour cannot exceed the limit. The flow on each transmission path connecting California and an outside region is also subject to the maximum transfer capability limit of the path.

Request No. 8:

P. 36 – L. 5-6: "Southern California Import Transmission (SCIT) and Path 26 interface limits were modified."

a. Please explain the SCIT limit and explain whether CAISO is considering whether the concept behind the SCIT limit, which sets the import limit based on the inertia within the SCIT region basin, will be relevant in the long-term.

ISO RESPONSE TO No. 8a:

The SCIT limit is basically a simultaneous import limit for the southern California load pocket. The ISO long-term studies of future transmission scenarios include transient stability analysis of the southern California system and detailed modeling of system parameters including inertia. Observations from various long-term studies were utilized in determining the interface limits. Detailed long-term transmission analysis was not performed to establish future SCIT limit.

b. Please explain how SCIT and Path 26 interface limits were modified in the CAISO Step 2 studies.

ISO RESPONSE TO No. 8b:

The SCIT limit was adjusted based on the potential changes on the system inertia. The impact of both the OTC unit retirement and the incremental renewable generation were considered in determining inertia change hence potential change on SCIT limit. Path 26 limit was not changed.

c. Please explain whether CAISO believes that the addition of several new and approved major transmission projects such as the Devers Palo Verde Line No. 2 (aka Valley -Colorado River 500 kV project), Tehachapi Renewable Transmission Project, and the Sunrise Powerlink will have an impact on SCIT limit.

ISO RESPONSE TO No. 8c:

Observations from various long-term studies, which included these transmission projects, were utilized in determining the interface limits. No detailed long-term transmission analysis was conducted for this purpose.

d. Please explain whether CAISO considered the impact of changes in the SCIT limit due to the addition of the major transmission lines mentioned above in its Step 2 studies as part of the basecase or any of the sensitivity runs. If the impact was studied as part of a sensitivity run, what were the results?

ISO RESPONSE TO No. 8d:

The impact of the new additions was considered in SCIT calculation for all the cases. It is not treated as a sensitivity.

Request No. 9:

P. 42 – L. 14-16: "There are three pumps that can operate simultaneously from January to May and from October to December. There will be only one pump available for the rest of year 2020."

There are numerous efforts underway, including specific proposals by PG&E, to make sure that all Helms units can pump and generate at all times during the year. Why has the CAISO assumed that only one pump is available for system operation from June to September?

ISO RESPONSE TO No. 9:

The ISO's annual transmission planning process approves transmission upgrades that we demonstrate to be needed and constructed. The need for transmission upgrades that would result in the ability to allow all Helms units to pump and generate at all times during the year that this operability is desired has not been established through the transmission planning process yet. The ISO has assessed the need for these upgrades in past transmission planning cycles, and will do so again in the ongoing 2011/12 planning cycle. However, until such upgrades are approved by the ISO, we must continue to assume that they will not be in-service during the ten year planning horizon. Without such upgrades, the ability to pump with Helms can be limited by the transmission system to less than two or three pumps, depending on typical system conditions such as Fresno customer demand level and summer versus winter conductor ratings.

Request No. 10:

P. 43 – L. 28-30: "We observed 1400MW of upward load following need in the All Gas scenario. 4600MW of incremental upward load following need was observed in the High Load Trajectory scenario to resolve the load following upward shortfalls."

a. How often did the CAISO observe the need for incremental upward load following need in the High Load Trajectory scenario? We understand that the maximum amount of the incremental upward load following need in the High Load Trajectory scenario was calculated to be 4600 MW. Did CAISO develop a distribution curve for the incremental upward load following need in the High Load Trajectory scenario? Could CAISO share that distribution with us?

ISO RESPONSE TO No. 10a:

Please refer to the ISO response to the first set of CALWEA data requests, Request 4c.

b. We also understand that the additional resources to meet the 4600 MW of incremental upward load following need (we assume to be 4600 MW of new CT resources and we call them "integration resources") are on top of all the planned (new) resources needed to meet the system PRM needs (we assume them to be mainly CCGT resources). Has CAISO considered that the addition of this 4600 MW of integration resources should result in a reduction of PRM resources of certain amount – up to 4600 MW?

ISO RESPONSE TO No. 10b:

The ISO has not considered the 4600MW in any of the reserve margin values presented. The ISO expects that if resources were added to meet integration needs would contribute to meeting planning reserve margin.

Request No. 11:

P. 48 -- L. 27-30: "the ISO performed a sensitivity run on the Trajectory Base Load scenario assuming Helms could pump with 3 pumps year round. The total annual production costs to meet California load was reduced by $2.3 million when Helms was not restricted."

We understand that the sensitivity case that removed restriction on Helms units operation resulted in lower annual production cost without any violation of operating conditions – i.e., the need for 506 MW of incremental downward load following for this scenario was also fully mitigated. In light of such results, why would CAISO restrict the operation of the two Helms unit during the summer months in 2020 based on a general and unsubstantiated claim that (P. 43 – L. 2-3): "the ISO determined that the Helms pumping window would be restricted to one pump due to the load level in the Fresno area"? After all, unless the production simulation model and the associated runs are suspect, they should capture any real operating infeasibilities such as the one loosely used here to restrict the operation of the Helms units in 2020!!

ISO RESPONSE TO No. 11:

See answer to Data Request No. 9.

Request No. 12:

Did CAISO model the flexibility of Hydro Resources in its Step 0, Step 1 and/or Step 2 studies or did the CAISO assume Hydro resources have a fixed generation profile?

ISO RESPONSE TO No. 12:

The ISO models two types of hydro resources in Step2. The first type has fixed generation profiles. It is for run-of-river hydro resources and hydro resources that do not have much operation flexibility due to regulatory restrictions. The other type is dispatchable hydro, subject to total energy limit. The generation schedules of this type of hydro resources are optimized.

Step 0 and Step 1 do not need to consider flexibility of hydro generation.

Request No. 13:

Did CAISO account for maintenance/fueling outage of nuclear resources in its Step 0, Step 1 and/or Step 2 studies or did the CAISO assume that nuclear resources will be up and running at all times?

ISO RESPONSE TO No. 13:

The model does account for maintenance/fueling outage of nuclear resources.

Request No. 14:

Did CAISO allow for the import of any of the ancillary services (Regulation, Spinning Reserve, and/or Non-spinning Reserve) from outside BAs in its Step 0, Step 1 and/or Step 2 studies? If yes, has the CAISO modeled any limits on such imports?

ISO RESPONSE TO No. 14:

In the model there are a few resources providing ancillary service and load following to the ISO located outside the CAISO balancing area. There resources are: HOOVER, APEX_2_MIRDYN, MRCHNT_2_MELDYN, MSQUIT 5 SERDYN, and SUTTER 2 PL1X3. This is because these resources are dynamically scheduling with the ISO and are capable of providing ancillary service currently.

In the model the import of ancillary service is not subject any limit other than the physical capability to provide ancillary service (capacity and ramp rates) of these resources.

ATTACHMENT A

Case	Year	Month	Day	period_of_day	name	Value
Trajectory	2020	2	1	18	LoadFollowingDown	0
Trajectory	2020	2	2	5	LoadFollowingDown	1
Trajectory	2020	2	2	12	LoadFollowingDown	1
Trajectory	2020	2	4	17	LoadFollowingDown	0
Trajectory	2020	2	16	17	LoadFollowingDown	2
Trajectory	2020	2	16	18	LoadFollowingDown	0
Trajectory	2020	2	17	17	LoadFollowingDown	1
Trajectory	2020	2	20	17	LoadFollowingDown	257
Trajectory	2020	2	20	18	LoadFollowingDown	21
Trajectory	2020	2	25	17	LoadFollowingDown	1
Trajectory	2020	3	2	15	LoadFollowingDown	2
Trajectory	2020	3	5	5	LoadFollowingDown	1
Trajectory	2020	3	5	8	LoadFollowingDown	0
Trajectory	2020	3	5	10	LoadFollowingDown	0
Trajectory	2020	3	5	15	LoadFollowingDown	0
Trajectory	2020	3	5	18	LoadFollowingDown	244
Trajectory	2020	3	6	12	LoadFollowingDown	1
Trajectory	2020	3	10	18	LoadFollowingDown	16
Trajectory	2020	3	12	18	LoadFollowingDown	0
Trajectory	2020	3	17	18	LoadFollowingDown	26
Trajectory	2020	3	18	18	LoadFollowingDown	69
Trajectory	2020	3	19	3	LoadFollowingDown	0
Trajectory	2020	3	19	6	LoadFollowingDown	1
Trajectory	2020	3	19	10	LoadFollowingDown	0
Trajectory	2020	3	19	11	LoadFollowingDown	0
Trajectory	2020	3	21	18	LoadFollowingDown	1
Trajectory	2020	3	27	11	LoadFollowingDown	1
Trajectory	2020	3	27	18	LoadFollowingDown	57
Trajectory	2020	3	29	9	LoadFollowingDown	0
Trajectory	2020	3	30	18	LoadFollowingDown	506
Envir	2020	2	1	7	LoadFollowingDown	0
Envir	2020	2	2	18	LoadFollowingDown	72
Envir	2020	2	3	4	LoadFollowingDown	1
Envir	2020	2	4	15	LoadFollowingDown	1
Envir	2020	2	5	9	LoadFollowingDown	0
Envir	2020	2	6	14	LoadFollowingDown	0
Envir	2020	2	6	17	LoadFollowingDown	50
Envir	2020	2	6	18	LoadFollowingDown	386
Envir	2020	2	7	7	LoadFollowingDown	0
Envir	2020	2	9	7	LoadFollowingDown	0
Envir	2020	2	11	18	LoadFollowingDown	120
Envir	2020	2	11	22	LoadFollowingDown	1
Envir	2020	2	12	18	LoadFollowingDown	1
Envir	2020	2	13	18	LoadFollowingDown	1
Envir	2020	2	15	9	LoadFollowingDown	0
Envir	2020	2	15	14	LoadFollowingDown	0

Case	Year	Month	Day	period_of_day	name	Value
Envir	2020	2	15	18	LoadFollowingDown	241
Envir	2020	2	20	17	LoadFollowingDown	381
Envir	2020	2	20	18	LoadFollowingDown	539
Envir	2020	2	21	2	LoadFollowingDown	0
Envir	2020	2	21	15	LoadFollowingDown	0
Envir	2020	2	21	17	LoadFollowingDown	1
Envir	2020	2	22	15	LoadFollowingDown	0
Envir	2020	2	22	18	LoadFollowingDown	15
Envir	2020	2	25	17	LoadFollowingDown	1
Envir	2020	2	26	18	LoadFollowingDown	44
Envir	2020	2	27	18	LoadFollowingDown	1
Envir	2020	2	29	11	LoadFollowingDown	0
Envir	2020	3	1	17	LoadFollowingDown	86
Envir	2020	3	1	18	LoadFollowingDown	420
Envir	2020	3	6	13	LoadFollowingDown	1
Envir	2020	3	16	18	LoadFollowingDown	0
Envir	2020	3	18	15	LoadFollowingDown	1
Envir	2020	3	27	18	LoadFollowingDown	1
Envir	2020	3	30	7	LoadFollowingDown	0
HiLoad	2020	7	17	23	LoadFollowingDown	4
HiLoad	2020	7	6	4	LoadFollowingDown	1
HiLoad	2020	7	2	22	LoadFollowingDown	0
HiLoad	2020	2	20	18	LoadFollowingDown	709
HiLoad	2020	2	20	17	LoadFollowingDown	693
HiLoad	2020	2	6	18	LoadFollowingDown	546
HiLoad	2020	2	15	18	LoadFollowingDown	420
HiLoad	2020	2	6	17	LoadFollowingDown	346
HiLoad	2020	2	15	17	LoadFollowingDown	247
HiLoad	2020	2	11	18	LoadFollowingDown	233
HiLoad	2020	2	26	17	LoadFollowingDown	211
HiLoad	2020	2	2	18	LoadFollowingDown	200
HiLoad	2020	2	12	18	LoadFollowingDown	157
HiLoad	2020	2	26	18	LoadFollowingDown	148
HiLoad	2020	2	22	18	LoadFollowingDown	145
HiLoad	2020	2	3	18	LoadFollowingDown	142
HiLoad	2020	2	19	18	LoadFollowingDown	85
HiLoad	2020	2	25	18	LoadFollowingDown	82
HiLoad	2020	2	1	18	LoadFollowingDown	72
HiLoad	2020	2	22	17	LoadFollowingDown	7
HiLoad	2020	2	8	4	LoadFollowingDown	1
HiLoad	2020	2	26	13	LoadFollowingDown	1
HiLoad	2020	2	22	9	LoadFollowingDown	1
HiLoad	2020	2	13	18	LoadFollowingDown	1
HiLoad	2020	2	8	7	LoadFollowingDown	1
HiLoad	2020	2	24	4	LoadFollowingDown	1
HiLoad	2020	2	2	1	LoadFollowingDown	1

Case	Year	Month	Day	period_of_day	name	Value
HiLoad	2020	2	1	9	LoadFollowingDown	1
HiLoad	2020	2	5	13	LoadFollowingDown	0
HiLoad	2020	2	22	6	LoadFollowingDown	0
HiLoad	2020	2	5	24	LoadFollowingDown	0
HiLoad	2020	2	17	18	LoadFollowingDown	0
HiLoad	2020	2	4	18	LoadFollowingDown	0
HiLoad	2020	2	1	11	LoadFollowingDown	0
HiLoad	2020	2	2	2	LoadFollowingDown	0
HiLoad	2020	2	23	23	LoadFollowingDown	0
HiLoad	2020	3	30	18	LoadFollowingDown	856
HiLoad	2020	3	5	18	LoadFollowingDown	607
HiLoad	2020	3	18	18	LoadFollowingDown	423
HiLoad	2020	3	27	18	LoadFollowingDown	397
HiLoad	2020	3	17	18	LoadFollowingDown	386
HiLoad	2020	3	10	18	LoadFollowingDown	331
HiLoad	2020	3	19	18	LoadFollowingDown	311
HiLoad	2020	3	1	18	LoadFollowingDown	299
HiLoad	2020	3	24	18	LoadFollowingDown	180
HiLoad	2020	3	14	18	LoadFollowingDown	41
HiLoad	2020	3	5	19	LoadFollowingDown	41
HiLoad	2020	3	22	18	LoadFollowingDown	25
HiLoad	2020	3	9	17	LoadFollowingDown	1
HiLoad	2020	3	22	12	LoadFollowingDown	1
HiLoad	2020	3	20	4	LoadFollowingDown	1
HiLoad	2020	3	27	12	LoadFollowingDown	1
HiLoad	2020	3	14	11	LoadFollowingDown	1
HiLoad	2020	3	22	7	LoadFollowingDown	0
HiLoad	2020	3	23	10	LoadFollowingDown	0
HiLoad	2020	3	25	18	LoadFollowingDown	0
HiLoad	2020	3	15	18	LoadFollowingDown	0