PART OF BURNS McDONNELL

SHADOW FLICKER ANALYSIS

BASIN ELECTRIC POWER COOPERATIVE

PRAIRIE WINDS SOUTH DAKOTA

204056

REVISION 0

OCTOBER 22, 2026

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
Developer	Basin Electric Power Cooperative
GE	General Electric
hr	Hour
kg/m^3	Kilograms per cubic meter
m	Meter
m/s	Meters per second
MW	Megawatt
Project	Pairie Winds South Dakota
Project Site	Location of the Project in Aurora County, South Dakota
Study	Shadow Flicker Analysis
yr	Year

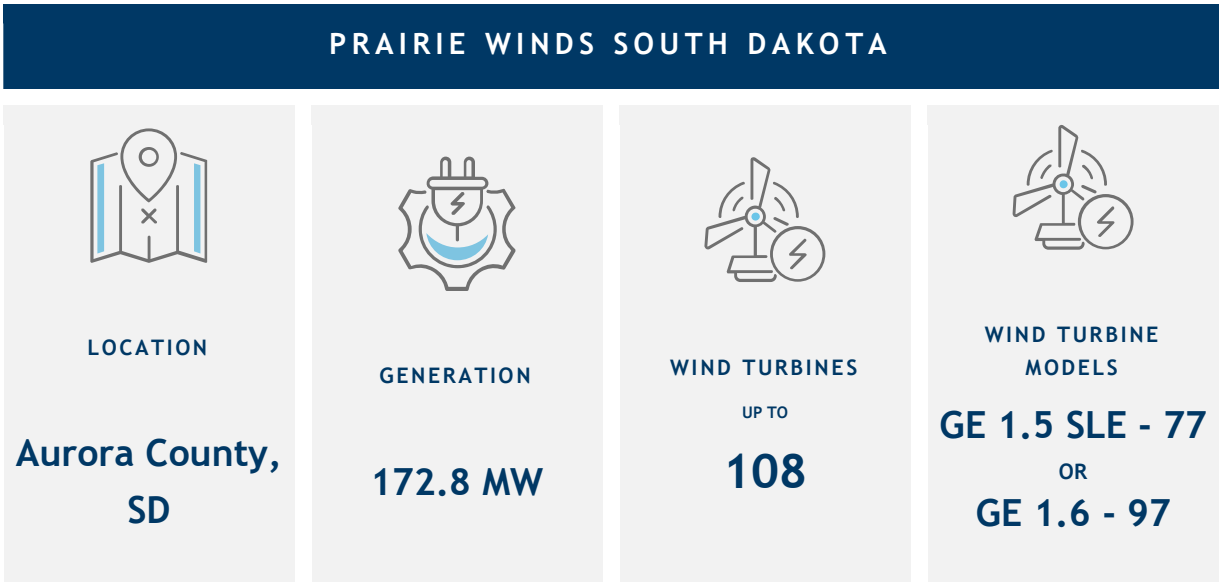
1.0 Introduction

1.1 Study Overview

1898 & Co., a part of Burns & McDonnell Engineering Company, Inc., was retained by Basin Electric Power Cooperative ("Developer") to conduct a shadow flicker analysis (the "Study") for the proposed Prairie Winds South Dakota (the "Project"). The objective of the Study was to estimate the annual frequency of shadow flicker on occupied residences caused by Project wind turbines.

1.2 Project Overview

The Prairie Winds South Dakota project is located in Aurora County, South Dakota, approximately 24 miles southwest of the city of Wessington Springs, South Dakota. The existing Project includes 108 General Electric ("GE") 1.5 SLE-77 wind turbine generators. When repowered, the Project will include a quantity of 108 GE 1.6-97 wind turbine generators with a nameplate capacity of 1.6 megawatts (MWs) per wind turbine, as summarized in Section 2.2 below.



1.3 Shadow Flicker Overview

Shadow flicker occurs when wind turbine blades pass in front of the sun to create recurring shadows on an object. Such shadows occur only under very specific conditions, including sun position, wind speed and direction, relative position of the wind turbine to the residence or sensitive receptor, and other similar factors.

The intensity of shadow flicker varies significantly with distance, and as separation between a wind turbine and receptor (e.g., residence or community building) increases, shadow flicker intensity correspondingly diminishes. Shadow flicker intensity for distances greater than ten (10) rotor diameters is generally considered imperceptible. At such distances, shadow flicker most commonly occurs at sunrise or sunset, when cast shadows are sufficiently long and diffused.

1.4 Applicable Regulations

Shadow flicker impacts are not currently regulated in applicable state or federal law, nor are there requirements in the current Aurora County, South Dakota ordinances with regard to limitations on shadow flicker durations. This report identifies those receptors that may experience shadow flicker more than 30 hours per year, although it is noted that this threshold is presented as a typical industry benchmark for similar studies and not as a suggested limitation.

1.5 Site Visit

1898 & Co. did not visit the Project Site as part of this Study. The contents of this evaluation are based exclusively upon desktop analysis by 1898 & Co.

2.0 Modeling Parameters and Inputs

2.1 Modeling Overview

Shadow flicker was modeled for the Project Site using WindPRO, an industry-leading software package for the design and planning of wind energy projects. This software models the sun's path with respect to every wind turbine location during every minute over a complete year. Any shadow flicker caused by each wind turbine is then aggregated for each receptor for the entire year.

The following sections are summaries of the inputs utilized in the WindPRO model for this Study.

2.2 Wind Turbines

The Project will retain the location of the 108 existing wind turbines when repowered. A summary of the existing and proposed wind turbine models and their respective dimensions that were modeled as part of this Study is included Table 2-1.

Table 2-1: Wind Turbine Model Dimensions

Wind Turbine Model	Quantity	Hub Height [m]	Rotor Diameter [m]
Existing - GE 1.5 SLE - 77	108	80	77
Proposed - GE 1.6 - 97	108	80	97

Shadow flicker intensity is partially dependent upon the distance from a receptor to the wind turbine causing the shadow. The Developer-provided coordinates of each wind turbine are presented in Appendix A and the location of each wind turbine is presented graphically in Appendix C.

2.3 Receptors

A receptor is used to designate a specific location, such as a residence or public building, where the impact of shadow flicker is assessed. A quantity of 87 receptors were modeled at the Project Site. The Developer-provided coordinates of each receptor are presented in Appendix A and the location of each receptor is presented graphically in Appendix C. 1898 & Co. did not provide an independent verification of the location or occupied status of these receptors.

Each receptor was modeled in "greenhouse" mode within the WindPRO model. This approach provides a conservative estimate of the amount of time when shadow flicker could occur by modeling each receptor as having windows on all sides and effectively causing the home to be susceptible to flicker effects in all directions.

2.4 Terrain

The WindPRO model utilizes topography data to model wind turbines and receptors at the proper elevations. This information is also used by the model to consider any natural land features between a wind turbine and a receptor that may block shadows from being seen at a receptor.

Publicly-available terrain data was downloaded from the 3D Elevation Program, a product of the United States Geological Survey. The 1/3 arc-second resolution digital elevation model was exported as a grid for use in the WindPRO model. The WindPRO model uses the provided elevation data to determine the elevation of each wind turbine and receptor.

2.5 Obstacles

Obstacles located between a receptor and a wind turbine, such as trees or buildings, may significantly reduce or eliminate the duration and/or intensity of shadow flicker. However, to provide a more conservative estimate of the amount of time when shadow flicker could occur, no attempt was made to model the presence of potential obstacles.

2.6 Wind Turbine Operation

Shadow flicker is contingent upon the movement of the wind turbine blades. Shadow flicker can only occur when the wind turbine is in operation (i.e., when the blades are rotating). Moreover, shadow flicker is generally most notable when a wind turbine is facing a receptor, as this results in the widest-possible shadow being cast. To more accurately reflect the periods of operation of each Project wind turbine, on-site hub-height wind data was provided by Developer and used to indicate the periods when the wind turbines are inactive due to wind speeds below the wind turbine cut-in speed or above the wind turbine cut-out speed, at which time the wind turbine rotor is not in motion and no shadow flicker will occur.

Project Site-specific wind data was also utilized to model the orientation of the wind turbines relative to each receptor. The Developer-provided wind data includes data collected by an on-site meteorological mast.

Power curves for the proposed wind turbines were provided by Developer. The power curves were added to the WindPRO model to more accurately reflect the wind turbine's operational characteristics. The assumed cut-in wind speed of both the existing and proposed wind turbines was 3.0 m/s and the assumed cut-out wind speed was 25.0 m/s.

2.7 Shadow Flicker Relevance

At distances beyond ten (10) rotor diameters, shadow flicker effects are generally considered low, as shadows diffuse and become imperceptible. Thus, a distance equal to 10 times the rotor diameter of each wind turbine (i.e., 770 meters for the existing wind turbines and 970 meters for the proposed wind turbines) was modeled as the maximum distance at which shadow flicker was considered relevant. The proximity of this buffer relative to each receptor is presented graphically in Appendix C.

2.8 Sun Angle

The sun's path with respect to each wind turbine location is calculated by the WindPRO model to determine the cast shadow paths during every minute over a complete year. However, at very low sun angles, the light must pass through more atmosphere and becomes too diffused to form a coherent shadow. Thus, a value of three (3) degrees or less was utilized for the height at which the sun would not cause noticeable shadow flicker.

2.9 Sunshine Probability

Shadow flicker is only caused when the sun is shining. Sunshine probability data was obtained by 1898 & Co. from the National Oceanic and Atmospheric Adminitration (NOAA), as shown in Table 2-2. This data represents the percentage of hours each month that the sun is expected to be shining during daylight hours, with consideration given for cloud cover, rainy days, fog, or other similar occurrences that may diminish the potential occurrence or severity of shadow flicker.

Table 2-2: Monthly Sunshine Probability for Huron, SD

Month	Sunshine Probability
January	62%
February	62%
March	62%
April	59%
May	66%
June	69%
July	76%
August	74%
September	69%
October	59%
November	51%
December	51%

Notes:
[1] Data source: NOAA Sunshine Probability by City
[2] Data location: Huron, South Dakota

3.0 Results

Using the inputs and parameters defined in Section 2.0, the WindPRO model was used to calculate shadow flicker for the identified receptors at the Project Site for the existing wind turbines and proposed repower wind turbines. Table 3-1 presents a summary of these results, while detailed tables are included within Appendix B that present shadow flicker durations by receptor, including estimated hours per year. Additionally, maps are provided in Appendix C that illustrate the shadow flicker contours (in hours per year) caused by the Project wind turbines.

Table 3-1: Summary of Results

Wind Turbine Layout	No. of Wind Turbines	No. of Receptors	No. of Receptors, Flicker ≥ 30 hr/yr	
			Participating Residences	Non-Participating Residences
Existing - GE 1.5 SLE - 77	108	87	0	0
Proposed - GE 1.6 - 97	108	87	2	0

The following is a set of key observations from the results of the Study:

- With the existing wind turbines, none of the 87 known receptors are anticipated to exceed 30 hours per year of shadow flicker. With the proposed repower wind turibnes, 2 of the 87 known receptors are anticipated to exceed 30 hours per year of shadow flicker, both of which are participating residences. Refer to Appendix B for a complete listing of results.
- The majority of observed shadow flicker on each receptor occurs during early morning and/or late afternoon and evening hours, as shown in Appendix D.
- The Study was performed using a conservative modeling approach with Project Site-specific conditions. For example, the Study modeled each receptor as a “greenhouse”, meaning each

receptor was modeled as having windows on all sides and effectively causing the home to be susceptible to shadow flicker effects in all directions. Further, the Project Site was modeled as if no obstacles were present, including trees or buildings, which may significantly reduce or eliminate the duration and/or intensity of shadow flicker at a receptor. Due to the conservative approach of the Study, the actual duration and intensity of shadow flicker experienced at each receptor could be less than those reported in the Study.

- Notwithstanding any shadow flicker which may occur at the Project Site, mitigation techniques may be utilized to reduce these effects. Common techniques include planting vegetation, awning installation, and/or reduced wind turbine operation.

APPENDIX A – WIND TURBINE COORDINATES

Table A-1: Wind Turbine Coordinates

Wind Turbine ID	Easting [m]	Northing [m]	Existing Wind Turbine Model	Proposed Wind Turbine Model
A01	518,909	4,863,440	GE 1.5 SLE-77	GE 1.6-97
A02	519,297	4,863,769	GE 1.5 SLE-77	GE 1.6-97
A03	517,883	4,864,054	GE 1.5 SLE-77	GE 1.6-97
A04	518,454	4,864,223	GE 1.5 SLE-77	GE 1.6-97
A05	518,271	4,864,832	GE 1.5 SLE-77	GE 1.6-97
A06	518,940	4,865,225	GE 1.5 SLE-77	GE 1.6-97
A07	519,592	4,864,927	GE 1.5 SLE-77	GE 1.6-97
A08	519,534	4,865,325	GE 1.5 SLE-77	GE 1.6-97
A09	519,574	4,865,742	GE 1.5 SLE-77	GE 1.6-97
A10	518,793	4,866,211	GE 1.5 SLE-77	GE 1.6-97
A11	520,709	4,865,158	GE 1.5 SLE-77	GE 1.6-97
A12	520,836	4,865,576	GE 1.5 SLE-77	GE 1.6-97
A13	522,467	4,865,812	GE 1.5 SLE-77	GE 1.6-97
A14	523,140	4,866,101	GE 1.5 SLE-77	GE 1.6-97
A15	524,141	4,865,705	GE 1.5 SLE-77	GE 1.6-97
B16	517,724	4,863,393	GE 1.5 SLE-77	GE 1.6-97
B17	517,301	4,863,706	GE 1.5 SLE-77	GE 1.6-97
B18	516,908	4,863,410	GE 1.5 SLE-77	GE 1.6-97
B19	514,738	4,863,440	GE 1.5 SLE-77	GE 1.6-97
B20	514,794	4,864,765	GE 1.5 SLE-77	GE 1.6-97
B21	514,295	4,865,622	GE 1.5 SLE-77	GE 1.6-97
B22	514,014	4,865,925	GE 1.5 SLE-77	GE 1.6-97
B23	514,112	4,865,245	GE 1.5 SLE-77	GE 1.6-97
B24	513,589	4,865,336	GE 1.5 SLE-77	GE 1.6-97
B25	514,137	4,863,251	GE 1.5 SLE-77	GE 1.6-97
B26	513,553	4,863,230	GE 1.5 SLE-77	GE 1.6-97
B27	512,940	4,863,684	GE 1.5 SLE-77	GE 1.6-97
B28	512,066	4,863,783	GE 1.5 SLE-77	GE 1.6-97
B29	513,252	4,862,974	GE 1.5 SLE-77	GE 1.6-97
B30	512,790	4,862,791	GE 1.5 SLE-77	GE 1.6-97
C31	517,685	4,862,556	GE 1.5 SLE-77	GE 1.6-97
C32	516,875	4,862,285	GE 1.5 SLE-77	GE 1.6-97
C33	515,634	4,862,534	GE 1.5 SLE-77	GE 1.6-97
C34	518,222	4,861,810	GE 1.5 SLE-77	GE 1.6-97
C35	517,619	4,861,228	GE 1.5 SLE-77	GE 1.6-97
C36	517,469	4,861,002	GE 1.5 SLE-77	GE 1.6-97
C37	516,839	4,860,574	GE 1.5 SLE-77	GE 1.6-97
C38	516,373	4,860,371	GE 1.5 SLE-77	GE 1.6-97
C39	517,621	4,860,573	GE 1.5 SLE-77	GE 1.6-97

Wind Turbine ID	Easting [m]	Northing [m]	Existing Wind Turbine Model	Proposed Wind Turbine Model
C40	517,460	4,860,251	GE 1.5 SLE-77	GE 1.6-97
C41	518,198	4,860,214	GE 1.5 SLE-77	GE 1.6-97
C42	517,796	4,859,727	GE 1.5 SLE-77	GE 1.6-97
C43	516,905	4,859,671	GE 1.5 SLE-77	GE 1.6-97
C44	516,585	4,859,308	GE 1.5 SLE-77	GE 1.6-97
C45	517,585	4,859,091	GE 1.5 SLE-77	GE 1.6-97
D46	518,363	4,861,010	GE 1.5 SLE-77	GE 1.6-97
D47	515,240	4,857,045	GE 1.5 SLE-77	GE 1.6-97
D48	514,984	4,856,809	GE 1.5 SLE-77	GE 1.6-97
D49	514,539	4,856,467	GE 1.5 SLE-77	GE 1.6-97
D50	513,598	4,856,346	GE 1.5 SLE-77	GE 1.6-97
D51	513,295	4,855,704	GE 1.5 SLE-77	GE 1.6-97
D52	513,064	4,855,293	GE 1.5 SLE-77	GE 1.6-97
D53	512,520	4,855,281	GE 1.5 SLE-77	GE 1.6-97
D54	511,675	4,855,608	GE 1.5 SLE-77	GE 1.6-97
D55	512,923	4,854,865	GE 1.5 SLE-77	GE 1.6-97
D56	512,536	4,854,706	GE 1.5 SLE-77	GE 1.6-97
D57	512,161	4,854,610	GE 1.5 SLE-77	GE 1.6-97
D58	511,802	4,854,114	GE 1.5 SLE-77	GE 1.6-97
D59	511,061	4,854,261	GE 1.5 SLE-77	GE 1.6-97
E60	518,819	4,860,374	GE 1.5 SLE-77	GE 1.6-97
E61	516,913	4,857,535	GE 1.5 SLE-77	GE 1.6-97
E62	516,605	4,857,280	GE 1.5 SLE-77	GE 1.6-97
E63	516,451	4,857,036	GE 1.5 SLE-77	GE 1.6-97
E64	516,168	4,856,879	GE 1.5 SLE-77	GE 1.6-97
E65	515,749	4,856,882	GE 1.5 SLE-77	GE 1.6-97
E66	515,315	4,855,970	GE 1.5 SLE-77	GE 1.6-97
E67	514,816	4,855,637	GE 1.5 SLE-77	GE 1.6-97
E68	514,187	4,855,584	GE 1.5 SLE-77	GE 1.6-97
E69	514,852	4,854,898	GE 1.5 SLE-77	GE 1.6-97
E70	514,408	4,854,466	GE 1.5 SLE-77	GE 1.6-97
E71	513,985	4,854,282	GE 1.5 SLE-77	GE 1.6-97
E72	513,654	4,853,829	GE 1.5 SLE-77	GE 1.6-97
E73	512,484	4,853,749	GE 1.5 SLE-77	GE 1.6-97
F74	519,386	4,861,032	GE 1.5 SLE-77	GE 1.6-97
F75	519,271	4,860,337	GE 1.5 SLE-77	GE 1.6-97
F76	519,983	4,859,698	GE 1.5 SLE-77	GE 1.6-97
F77	519,549	4,859,568	GE 1.5 SLE-77	GE 1.6-97
F78	519,417	4,859,373	GE 1.5 SLE-77	GE 1.6-97
F79	519,064	4,859,058	GE 1.5 SLE-77	GE 1.6-97

Wind Turbine ID	Easting [m]	Northing [m]	Existing Wind Turbine Model	Proposed Wind Turbine Model
F80	518,804	4,858,803	GE 1.5 SLE-77	GE 1.6-97
F81	518,437	4,858,717	GE 1.5 SLE-77	GE 1.6-97
F82	518,507	4,858,129	GE 1.5 SLE-77	GE 1.6-97
F83	518,114	4,858,036	GE 1.5 SLE-77	GE 1.6-97
F84	517,930	4,857,649	GE 1.5 SLE-77	GE 1.6-97
F85	518,061	4,857,307	GE 1.5 SLE-77	GE 1.6-97
F86	517,583	4,857,475	GE 1.5 SLE-77	GE 1.6-97
F87	517,403	4,856,848	GE 1.5 SLE-77	GE 1.6-97
G100	525,534	4,864,961	GE 1.5 SLE-77	GE 1.6-97
G101	525,537	4,865,396	GE 1.5 SLE-77	GE 1.6-97
G88	519,913	4,862,375	GE 1.5 SLE-77	GE 1.6-97
G89	519,556	4,861,957	GE 1.5 SLE-77	GE 1.6-97
G90	520,063	4,861,066	GE 1.5 SLE-77	GE 1.6-97
G91	520,870	4,860,713	GE 1.5 SLE-77	GE 1.6-97
G92	520,875	4,861,197	GE 1.5 SLE-77	GE 1.6-97
G93	520,641	4,860,592	GE 1.5 SLE-77	GE 1.6-97
G94	520,436	4,860,199	GE 1.5 SLE-77	GE 1.6-97
G95	522,035	4,863,340	GE 1.5 SLE-77	GE 1.6-97
G96	521,606	4,864,073	GE 1.5 SLE-77	GE 1.6-97
G97	520,852	4,864,039	GE 1.5 SLE-77	GE 1.6-97
G98	522,564	4,865,155	GE 1.5 SLE-77	GE 1.6-97
G99	524,235	4,865,294	GE 1.5 SLE-77	GE 1.6-97
H102	526,390	4,865,347	GE 1.5 SLE-77	GE 1.6-97
H103	526,756	4,865,448	GE 1.5 SLE-77	GE 1.6-97
H104	526,980	4,865,872	GE 1.5 SLE-77	GE 1.6-97
H105	527,231	4,865,903	GE 1.5 SLE-77	GE 1.6-97
H106	527,403	4,866,155	GE 1.5 SLE-77	GE 1.6-97
H107	527,771	4,866,157	GE 1.5 SLE-77	GE 1.6-97
H108	527,683	4,865,974	GE 1.5 SLE-77	GE 1.6-97

Notes:
[1] Coordinates presented in UTM NAD83 Zone 14N (meters).
[2] Coordinates provided by Developer via "*Turbines.shp*" on August 18, 2026.

APPENDIX B – FLICKER RESULTS BY RECEPTOR

SHADOW FLICKER DURATION RESULTS

Receptor ID	Participation Status	Easting [m]	Northing [m]	County	Existing Shadow Flicker Duration [hours/year]	Repower Shadow Flicker Duration [hours/year]
REC-01	Participating	522,146	4,866,313	Jerauld	0.00	0.00
REC-02	Non-Participating	531,011	4,866,419	Jerauld	0.00	0.00
REC-03	Non-Participating	516,137	4,869,632	Jerauld	0.00	0.00
REC-04	Non-Participating	523,440	4,867,894	Jerauld	0.00	0.00
REC-05	Participating	518,386	4,866,751	Jerauld	0.00	0.02
REC-06	Non-Participating	534,425	4,868,063	Jerauld	0.00	0.00
REC-07	Participating	527,450	4,865,559	Jerauld	4.25	6.83
REC-08	Non-Participating	530,610	4,871,188	Jerauld	0.00	0.00
REC-09	Non-Participating	508,911	4,867,334	Jerauld	0.00	0.00
REC-10	Non-Participating	527,928	4,871,930	Jerauld	0.00	0.00
REC-11	Non-Participating	532,703	4,870,410	Jerauld	0.00	0.00
REC-12	Non-Participating	531,695	4,868,049	Jerauld	0.00	0.00
REC-13	Non-Participating	531,459	4,866,416	Jerauld	0.00	0.00
REC-14	Non-Participating	508,999	4,866,596	Jerauld	0.00	0.00
REC-15	Non-Participating	529,792	4,871,119	Jerauld	0.00	0.00
REC-16	Non-Participating	520,979	4,867,206	Jerauld	0.00	0.00
REC-17	Non-Participating	528,813	4,872,771	Jerauld	0.00	0.00
REC-18	Non-Participating	520,622	4,869,641	Jerauld	0.00	0.00
REC-19	Non-Participating	525,059	4,869,781	Jerauld	0.00	0.00
REC-20	Non-Participating	508,848	4,867,187	Jerauld	0.00	0.00
REC-21	Participating	512,470	4,866,340	Jerauld	0.00	0.00
REC-22	Non-Participating	513,630	4,869,951	Jerauld	0.00	0.00
REC-23	Non-Participating	521,044	4,867,206	Jerauld	0.00	0.00
REC-24	Non-Participating	521,091	4,867,323	Jerauld	0.00	0.00
REC-25	Non-Participating	533,610	4,868,403	Jerauld	0.00	0.00
REC-26	Non-Participating	508,736	4,861,530	Brule	0.00	0.00
REC-27	Non-Participating	515,101	4,858,120	Brule	0.00	0.00
REC-28	Non-Participating	512,485	4,858,255	Brule	0.00	0.00
REC-29	Participating	511,502	4,855,077	Brule	0.00	10.40
REC-30	Non-Participating	511,167	4,853,110	Brule	0.00	0.00
REC-31	Non-Participating	509,731	4,853,228	Brule	0.00	0.00
REC-32	Participating	513,817	4,853,254	Brule	0.00	0.00
REC-33	Non-Participating	508,605	4,857,070	Brule	0.00	0.00
REC-34	Non-Participating	510,693	4,861,921	Brule	0.00	0.00
REC-35	Non-Participating	510,696	4,861,891	Brule	0.00	0.00
REC-36	Non-Participating	509,821	4,851,980	Brule	0.00	0.00
REC-37	Non-Participating	509,805	4,851,929	Brule	0.00	0.00
REC-38	Non-Participating	509,898	4,851,868	Brule	0.00	0.00
REC-39	Non-Participating	512,115	4,858,357	Brule	0.00	0.00
REC-40	Participating	512,319	4,855,883	Brule	4.30	16.23
REC-41	Participating	512,295	4,863,546	Brule	6.37	10.40
REC-42	Participating	513,031	4,854,294	Brule	0.00	27.00
REC-42A	Participating	513,071	4,854,437	Brule	12.35	26.55
REC-43	Non-Participating	513,198	4,853,125	Brule	0.00	0.00
REC-44	Non-Participating	513,230	4,850,274	Brule	0.00	0.00
REC-45	Non-Participating	513,145	4,850,211	Brule	0.00	0.00
REC-46	Non-Participating	515,824	4,853,287	Brule	0.00	0.00
REC-47	Non-Participating	515,410	4,850,115	Brule	0.00	0.00
REC-48	Non-Participating	516,338	4,851,880	Brule	0.00	0.00
REC-49	Non-Participating	509,161	4,855,546	Brule	0.00	0.00
REC-50	Non-Participating	508,346	4,855,072	Brule	0.00	0.00
REC-51	Non-Participating	506,903	4,853,387	Brule	0.00	0.00
REC-52	Non-Participating	507,395	4,853,114	Brule	0.00	0.00
REC-53	Non-Participating	507,823	4,850,010	Brule	0.00	0.00
REC-54	Participating	519,932	4,861,587	Aurora	0.00	2.90
REC-55	Participating	522,920	4,863,190	Aurora	0.00	5.60
REC-56	Participating	515,781	4,864,298	Aurora	0.00	0.00

SHADOW FLICKER DURATION RESULTS

REC-57	Participating	516,320	4,859,818	Aurora	6.07	9.83
REC-58	Participating	516,189	4,855,277	Aurora	0.00	0.00
REC-59	Non-Participating	526,680	4,861,587	Aurora	0.00	0.00
REC-60	Non-Participating	526,166	4,863,193	Aurora	0.00	0.00
REC-61	Participating	521,024	4,859,851	Aurora	0.00	0.00
REC-62	Non-Participating	523,803	4,859,978	Aurora	0.00	0.00
REC-63	Non-Participating	521,816	4,858,237	Aurora	0.00	0.00
REC-64	Non-Participating	525,022	4,859,726	Aurora	0.00	0.00
REC-65	Non-Participating	520,334	4,855,491	Aurora	0.00	0.00
REC-66	Non-Participating	518,074	4,855,139	Aurora	0.00	0.00
REC-67	Participating	519,514	4,858,174	Aurora	0.00	0.00
REC-68	Non-Participating	519,859	4,856,762	Aurora	0.00	0.00
REC-69	Non-Participating	521,035	4,857,053	Aurora	0.00	0.00
REC-70	Non-Participating	520,380	4,854,954	Aurora	0.00	0.00
REC-71	Non-Participating	518,068	4,851,283	Aurora	0.00	0.00
REC-72	Non-Participating	516,394	4,852,977	Aurora	0.00	0.00
REC-73	Non-Participating	523,215	4,859,990	Aurora	0.00	0.00
REC-74	Non-Participating	521,912	4,858,573	Aurora	0.00	0.00
REC-75	Participating	520,212	4,859,951	Aurora	27.57	39.95
REC-76	Non-Participating	518,512	4,855,166	Aurora	0.00	0.00
REC-77	Participating	520,191	4,859,196	Aurora	0.00	8.55
REC-78	Participating	520,209	4,859,039	Aurora	0.00	15.33
REC-79	participating	522,909	4,863,227	Aurora	0.00	5.50
REC-80	Non-Participating	526,146	4,863,195	Aurora	0.00	0.00
REC-81	Non-Participating	518,640	4,853,152	Aurora	0.00	0.00
REC-82	Non-Participating	516,469	4,850,894	Aurora	0.00	0.00
REC-83	Participating	517,239	4,859,953	Aurora	24.23	48.83
REC-84	Non-Participating	523,475	4,863,426	Aurora	0.00	0.00
REC-85	Non-Participating	516,167	4,869,653	Jerauld	0.00	0.00
REC-86	Non-Participating	508,355	4,855,217	Brule	0.00	0.00

Notes:

[1] Coordinates presented in UTM NAD 83 Zone 14N (meters)

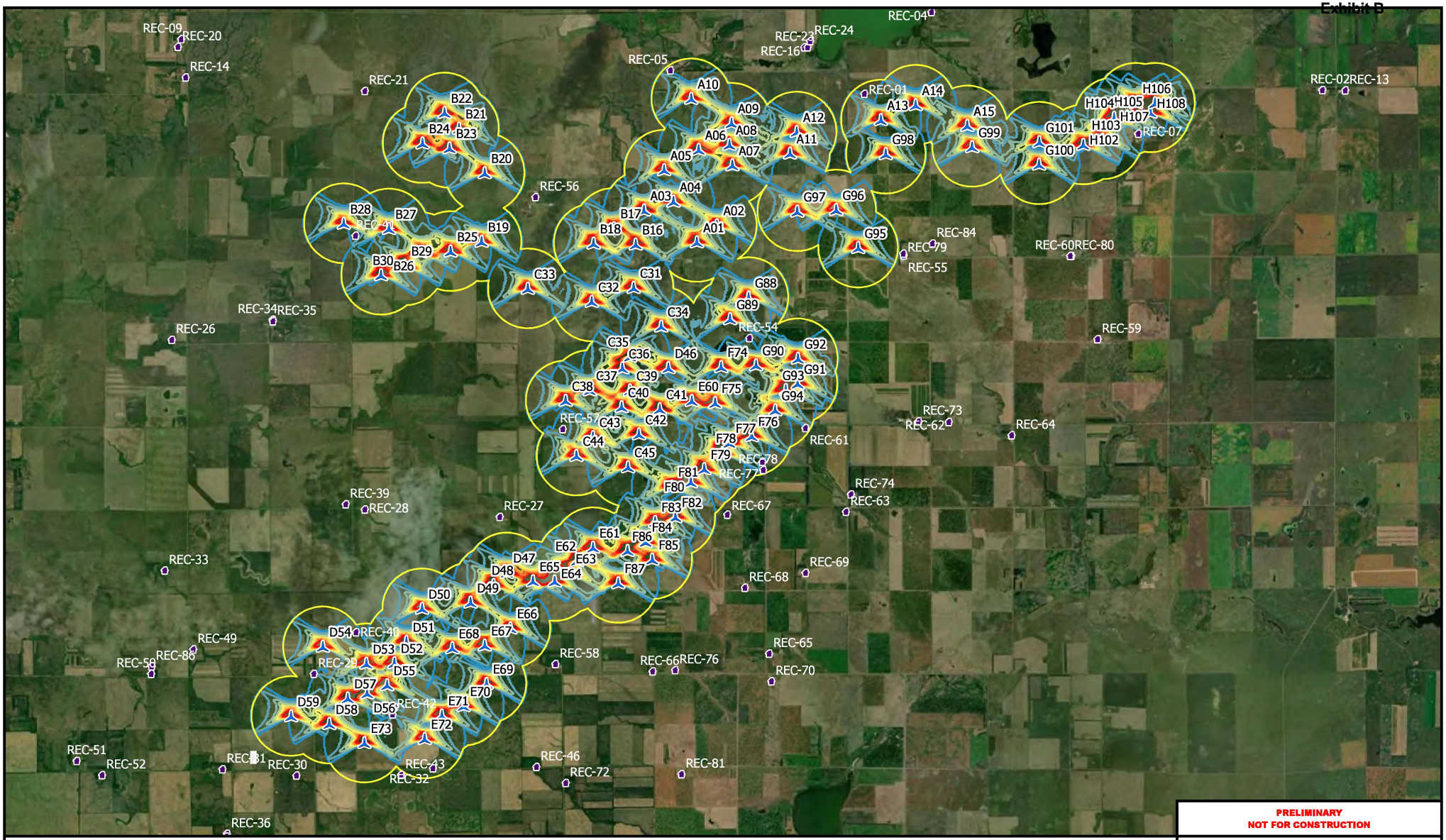
[2] Receptor coordinates provided by Basin Electric via "AURORA.shp", "Brule.shp" and "Jerauld.shp"on August 18th 2026.

[3] All results based on turbine layouts in "ProjectTurbines.v0" tab

[4] No existing wind projects were within 2 miles of the Project, so no existing wind projects were considered in the analysis.

APPENDIX C – SHADOW FLICKER DURATION MAP

Exhibit B



LEGEND

- Existing Turbines - GE 1.5 SLE - 77
- Receptors
- Turbine Buffer (10 x RD - 770m)

Shadow Flicker Vectors [hours per year]

0 10 20 30 40 50 60 70 80 90 100

REFERENCE

0 1 Miles

0 1 Kilometers

N

PRELIMINARY
NOT FOR CONSTRUCTION

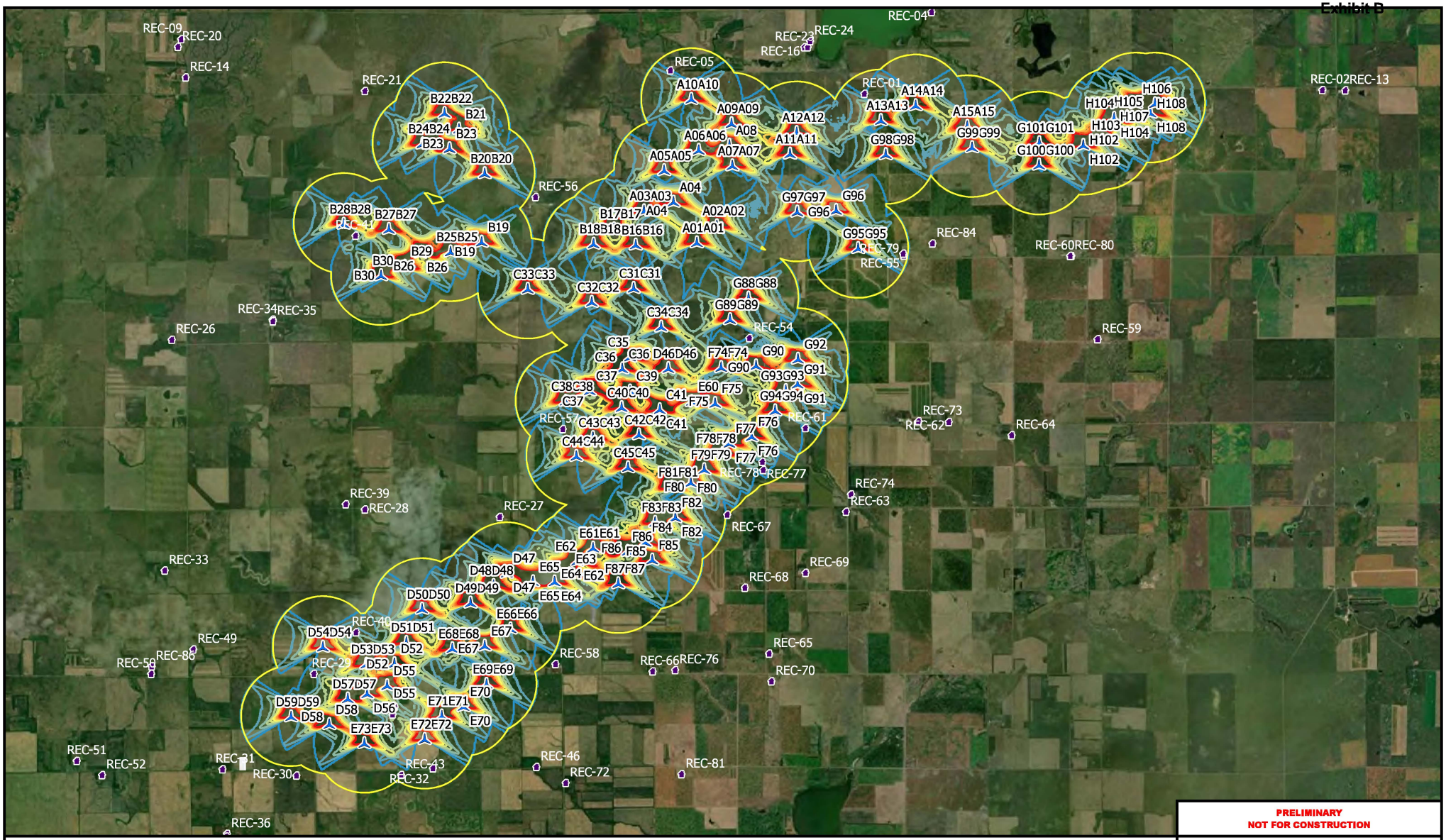
Prairie Winds South Dakota - Existing Turbines
Shadow Flicker Duration [Hr/Yr]

LOCATION:	Aurora County, South Dakota
CLIENT:	Basin Electric Power Cooperative
PROJ. NO.:	204056
CREATED:	10/22/2026

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Exhibit B



LEGEND

- Proposed Turbines - GE 1.6-97
- Receptors
- Turbine Buffer (10 x RD - 970m)

Shadow Flicker Vectors [hours per year]

0 10 20 30 40 50 60 70 80 90 100

REFERENCE

0 1 Miles

0 1 Kilometers

N

PRELIMINARY
NOT FOR CONSTRUCTION

Prairie Winds South Dakota - Proposed Turbines
Shadow Flicker Duration [Hr/Yr]

LOCATION:	Aurora County, South Dakota
CLIENT:	Basin Electric Power Cooperative
PROJ. NO.:	204056
CREATED:	10/22/2026

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APPENDIX D – SHADOW FLICKER CALENDAR

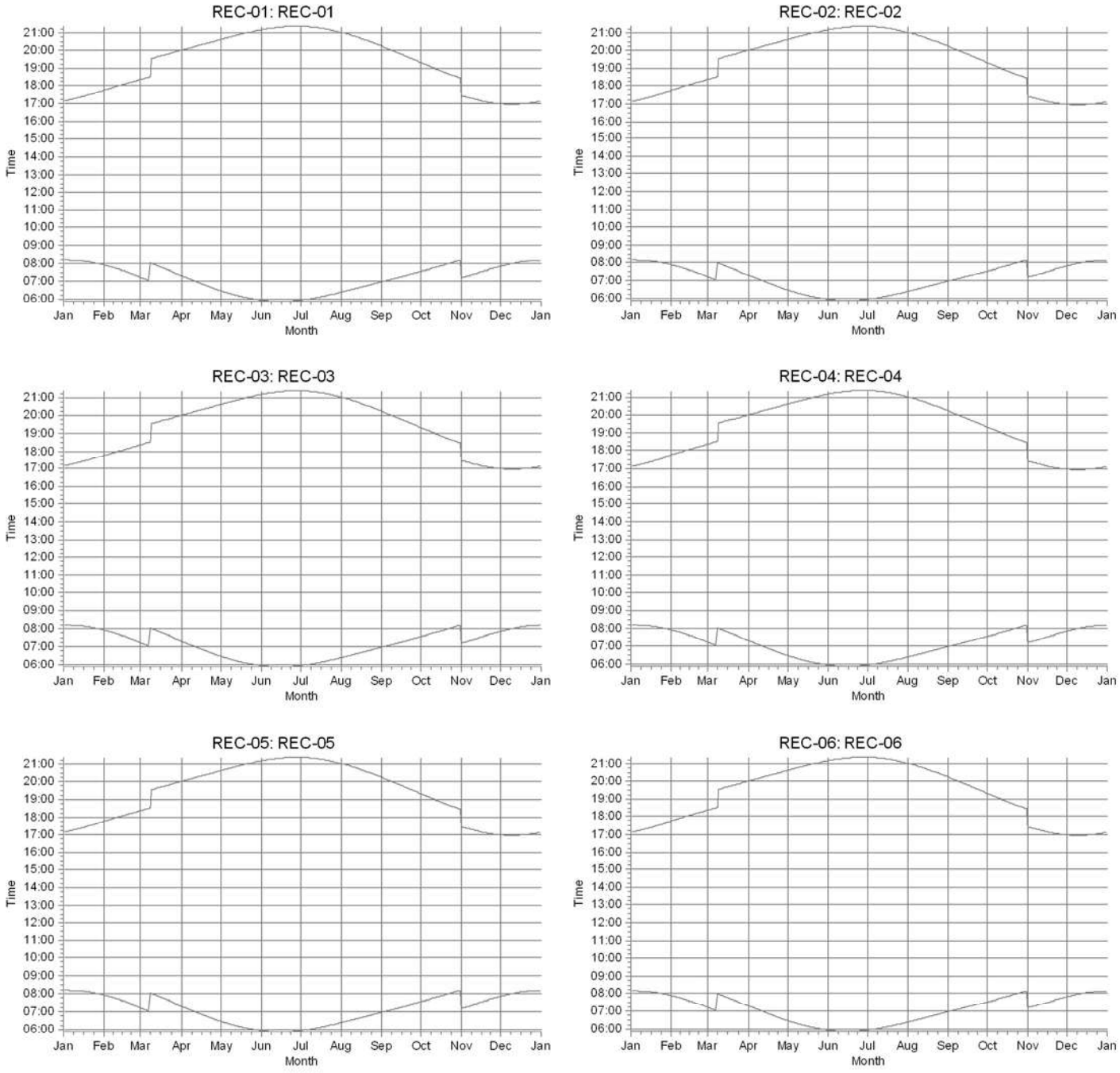
Project:
Prairie Wind (South Dakota)_Basin electric

Description:
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SHADOW - Calendar, graphical

Calculation: Basin electric_Prairie Wind (SD)_Turbines.shp_GE 1.5sle -77_80mHH_points_v1



WTGs

Graphical calendar shows worst-case shadow occurrences. Real-case reductions (sun probability, operational time, wind direction) are not applied to the graph.

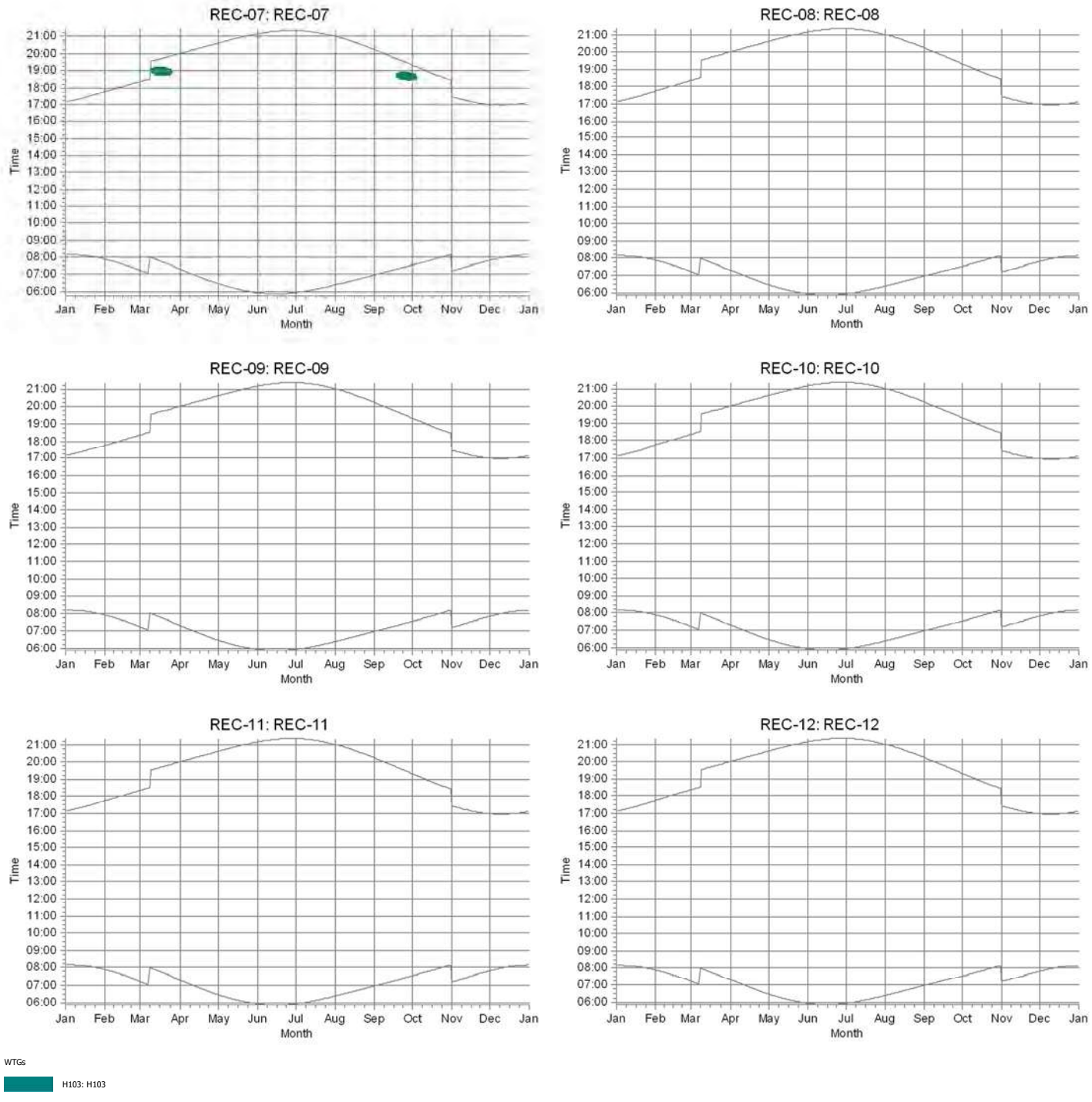
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SHADOW - Calendar, graphical

Calculation: Basin electric_Prairie Wind (SD)_Turbines.shp_GE 1.5sle -77_80mHH_points_v1



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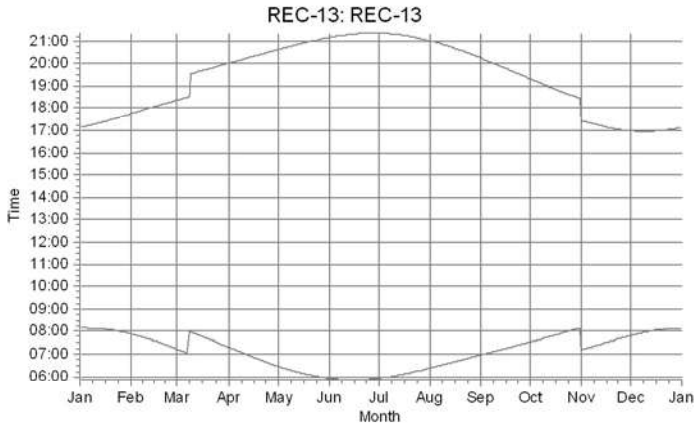
Project:
Prairie Wind (South Dakota)_Basin electric

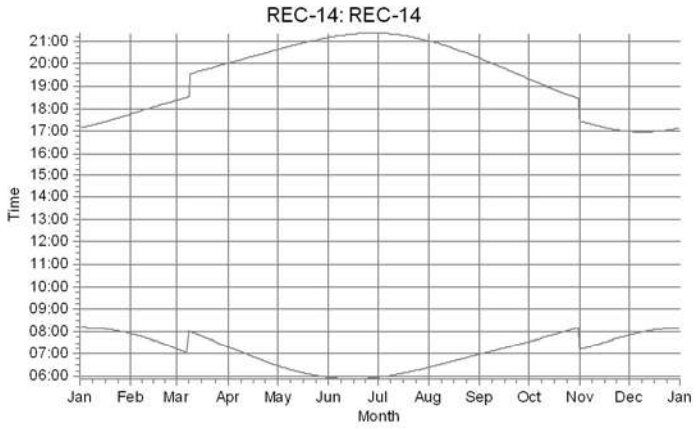
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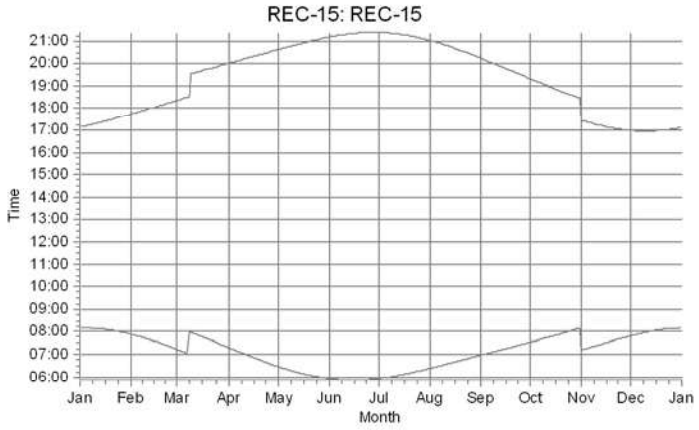
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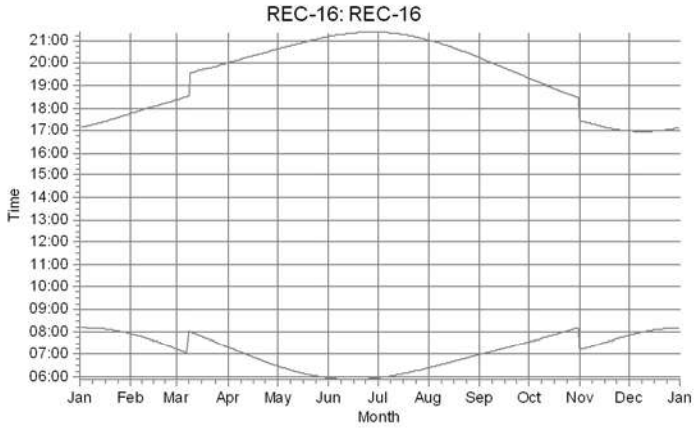
SHADOW - Calendar, graphical

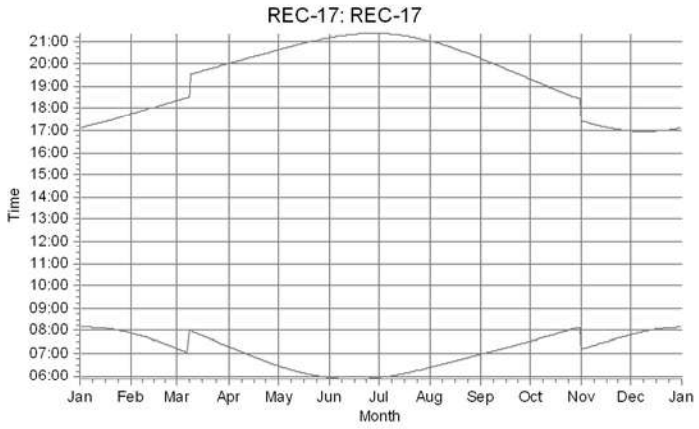
Calculation: Basin electric_Prairie Wind (SD)_Turbines.shp_GE 1.5sle -77_80mHH_points_v1

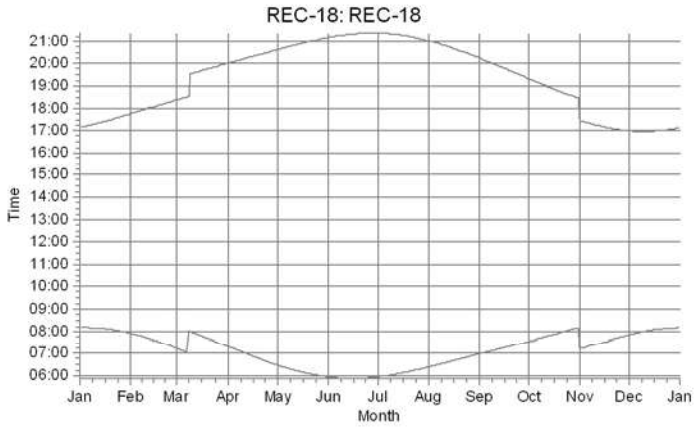












WTGs

Graphical calendar shows worst-case shadow occurrences. Real-case reductions (sun probability, operational time, wind direction) are not applied to the graph.

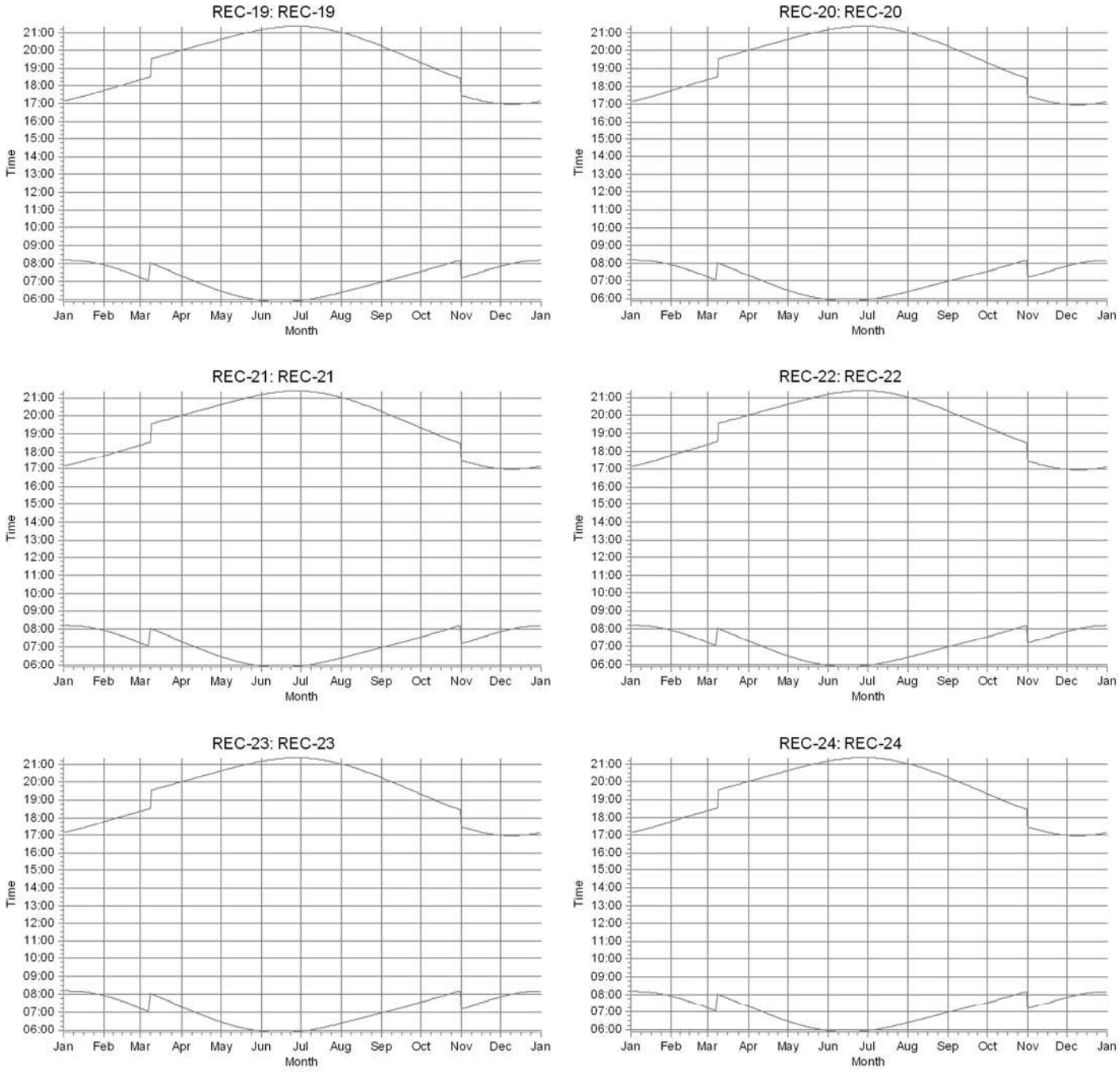
Project:
Prairie Wind (South Dakota)_Basin electric

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SHADOW - Calendar, graphical

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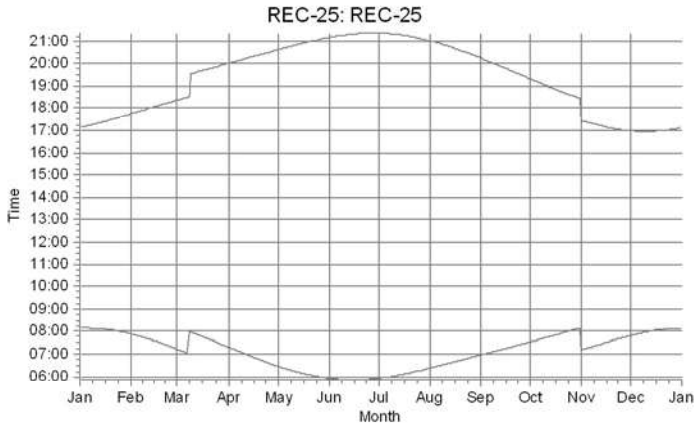
Project:
Prairie Wind (South Dakota)_Basin electric

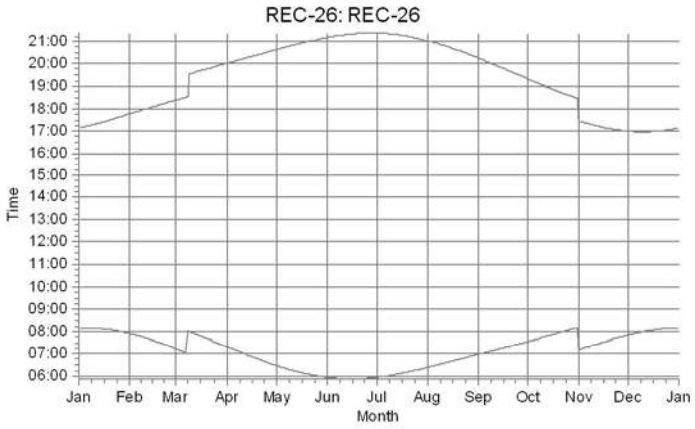
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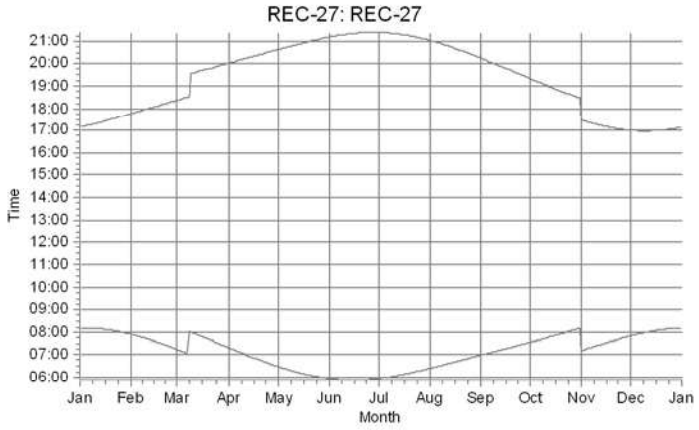
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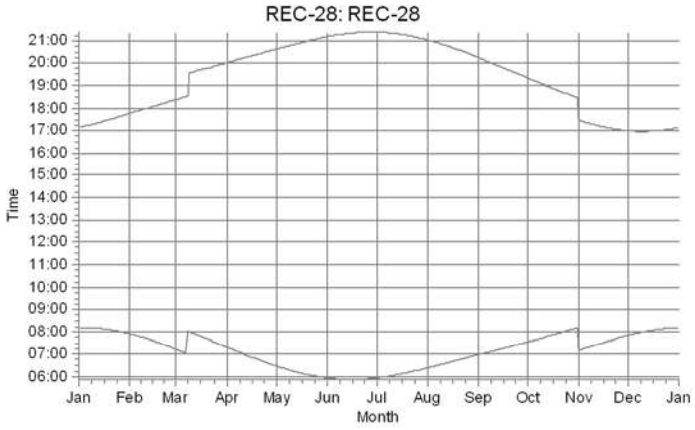
SHADOW - Calendar, graphical

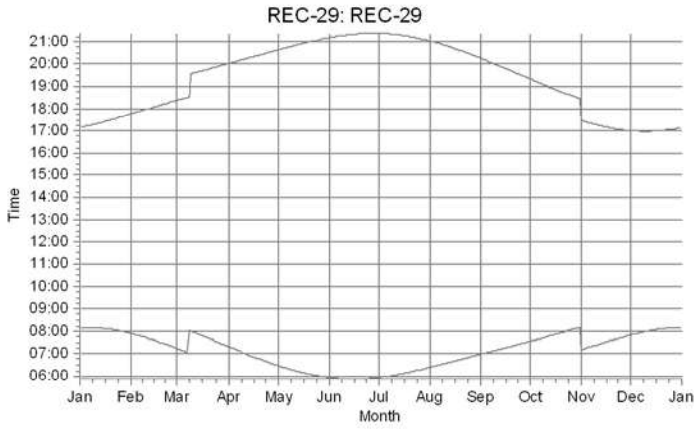
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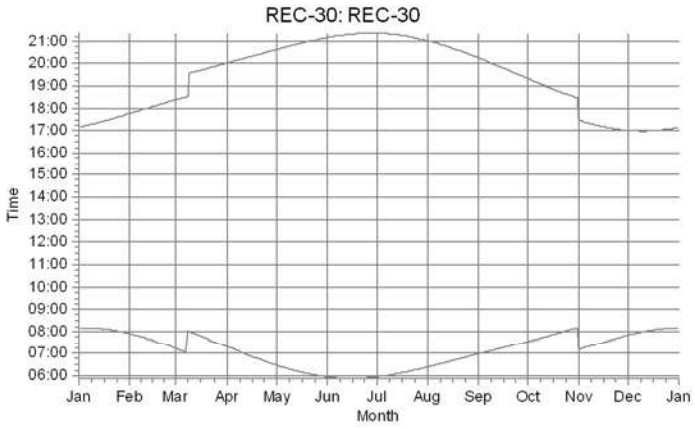












WTGs

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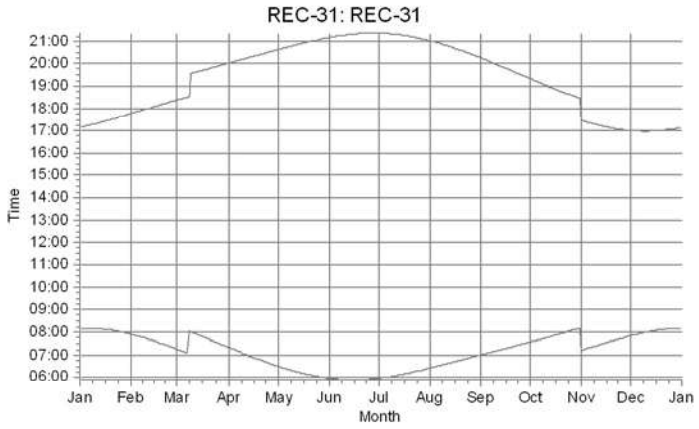
Project:
Prairie Wind (South Dakota)_Basin electric

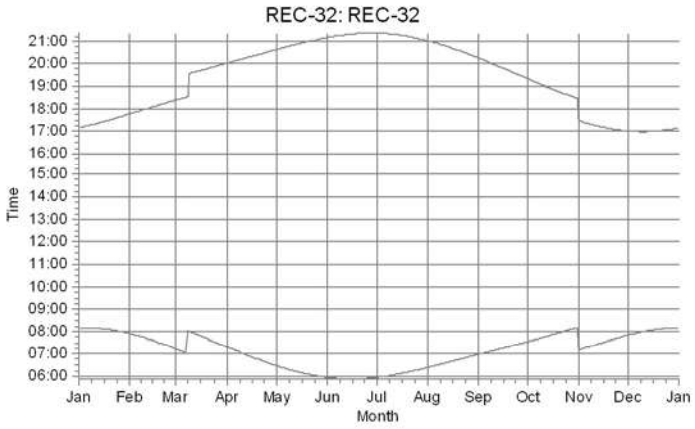
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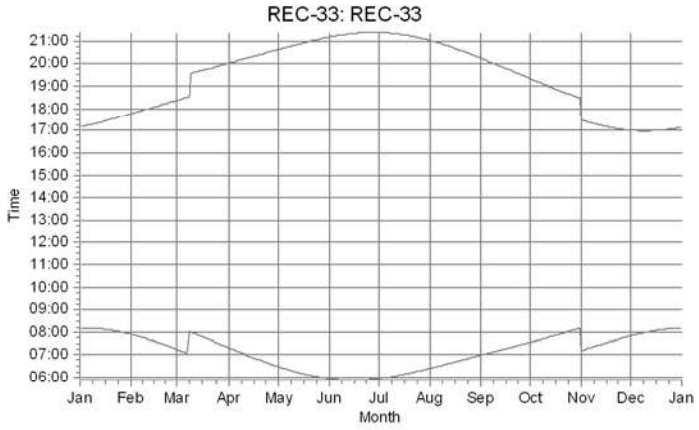
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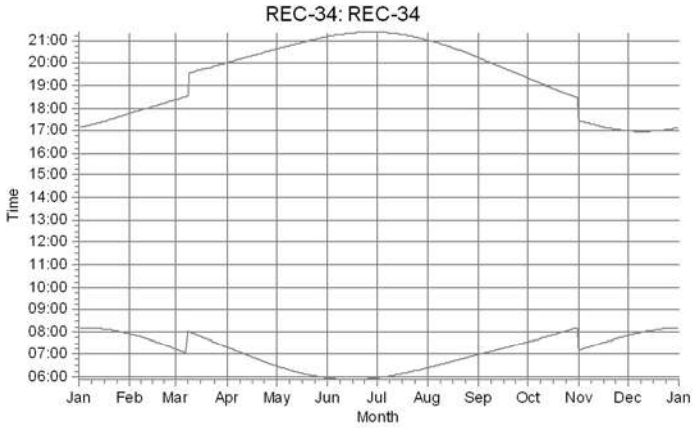
SHADOW - Calendar, graphical

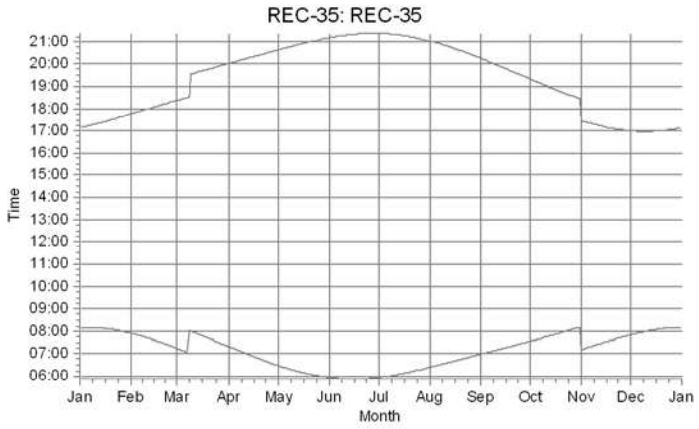
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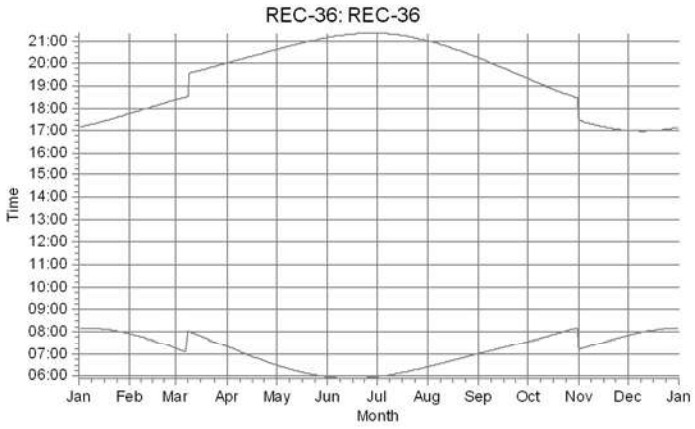












WTGs

Graphical calendar shows worst-case shadow occurrences. Real-case reductions (sun probability, operational time, wind direction) are not applied to the graph.

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SHADOW - Calendar, graphical

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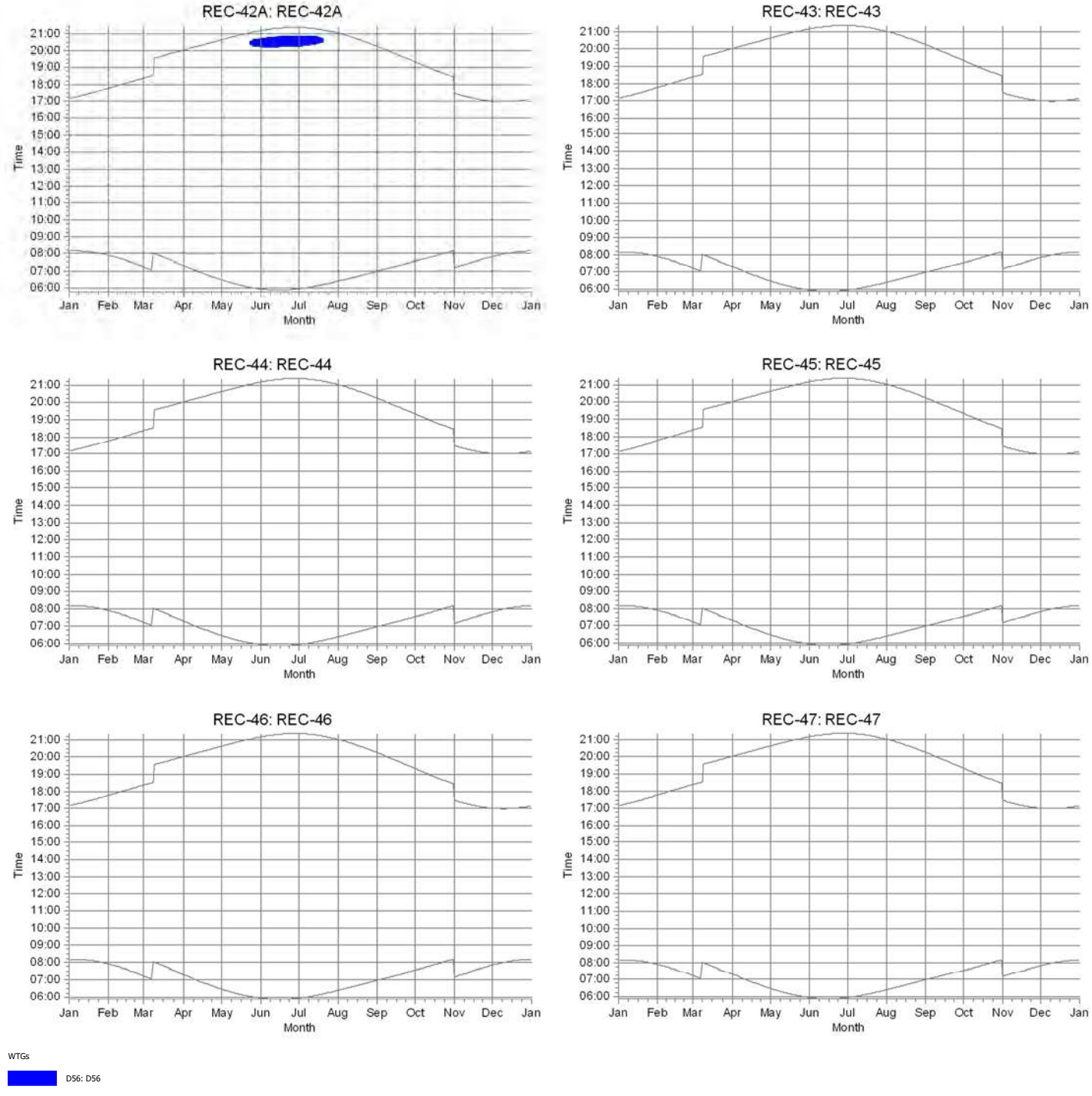
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SHADOW - Calendar, graphical

Calculation: Basin electric_Prairie Wind (SD)_Turbines.shp_GE 1.5sle -77_80mHH_points_v1



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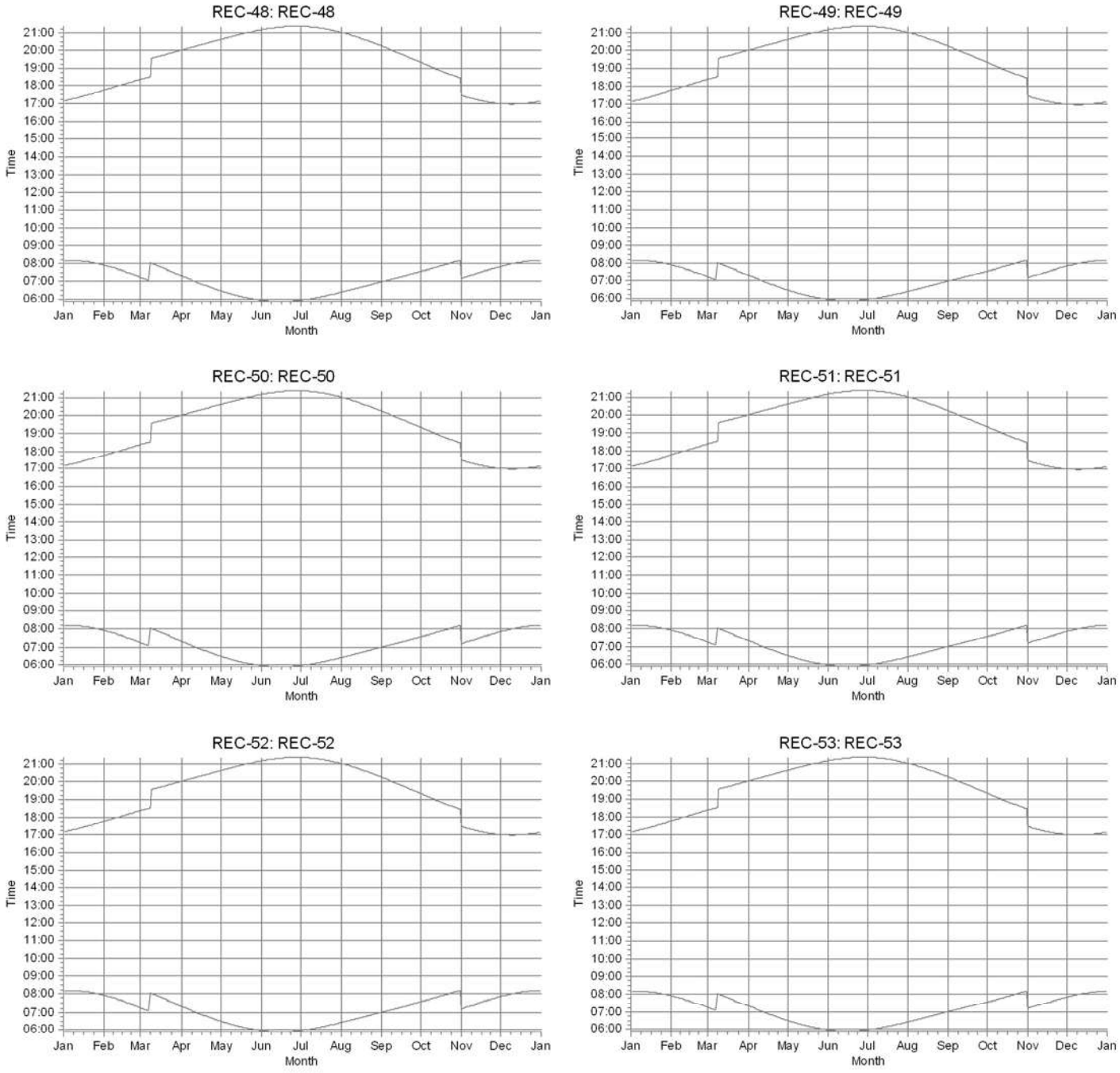
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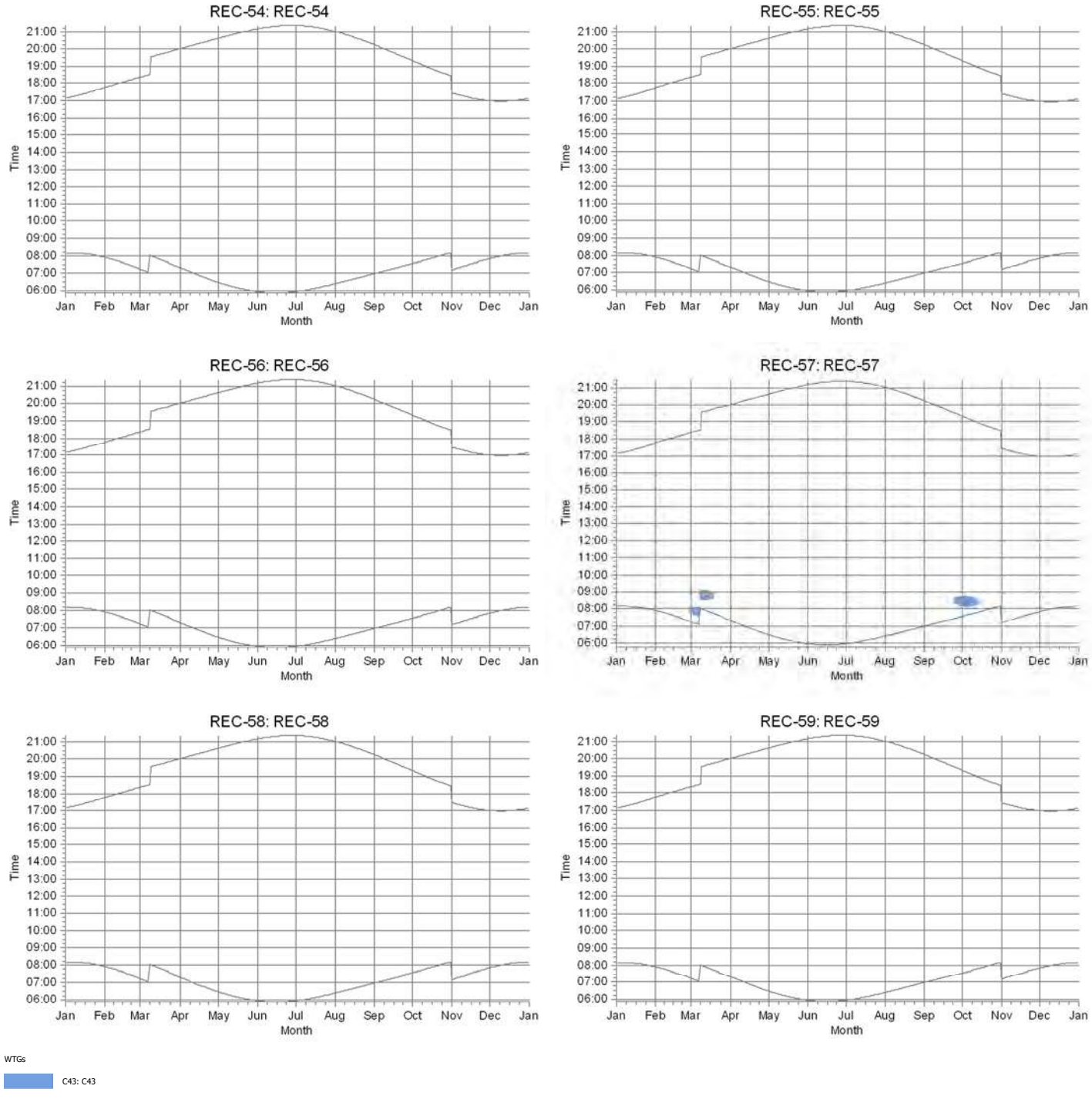
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10/22/2026 10:44 AM/4.3.250

SHADOW - Calendar, graphical

Calculation: Basin electric_Prairie Wind (SD)_Turbines.shp_GE 1.5sle -77_80mHH_points_v1



Graphical calendar shows worst-case shadow occurrences. Real-case reductions (sun probability, operational time, wind direction) are not applied to the graph.

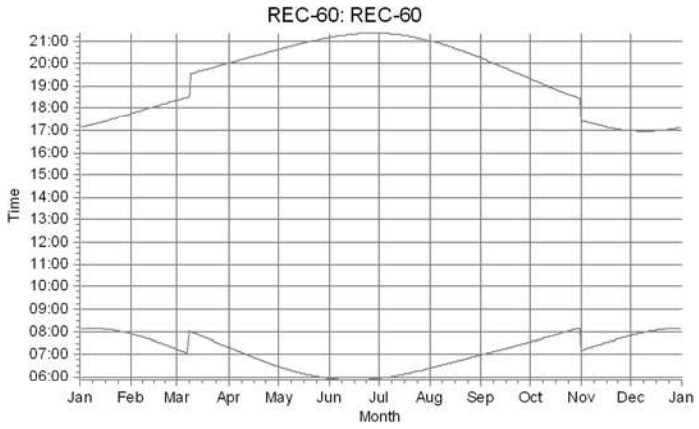
Project:
Prairie Wind (South Dakota)_Basin electric

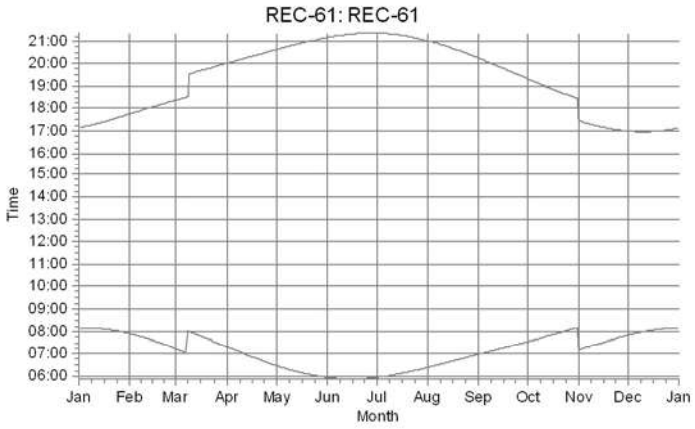
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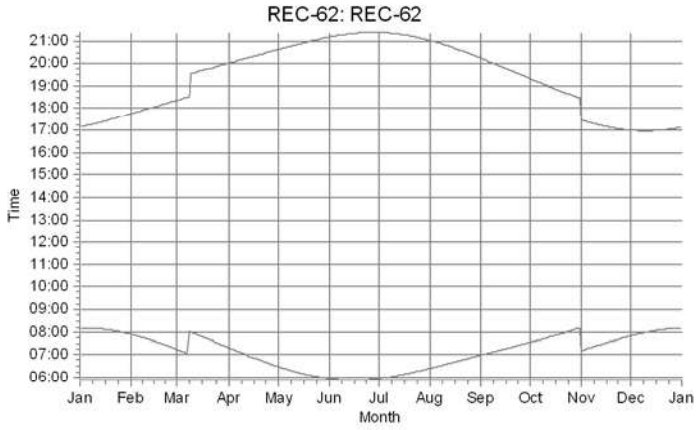
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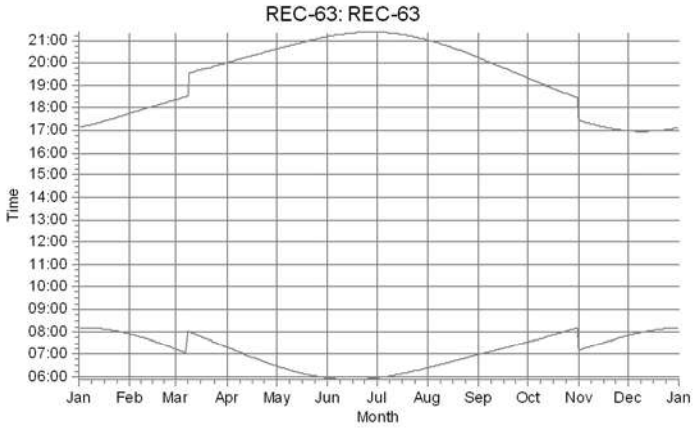
SHADOW - Calendar, graphical

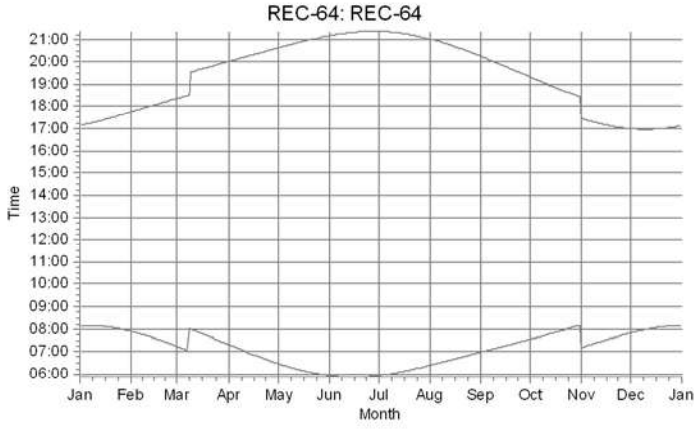
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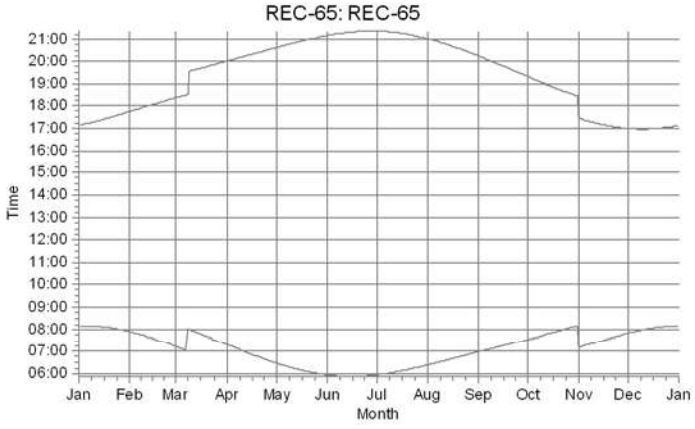












WTGs

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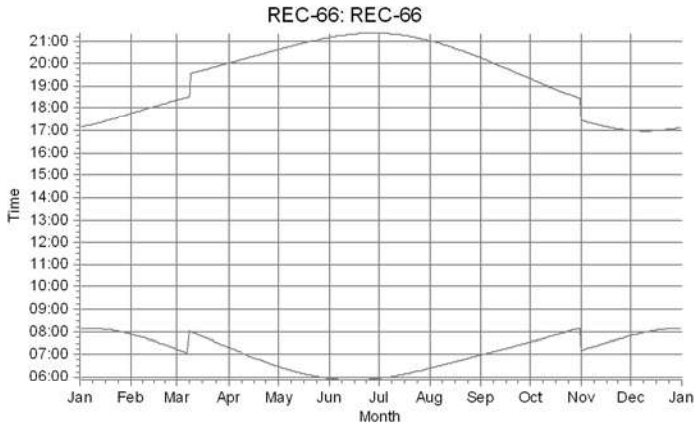
Project:
Prairie Wind (South Dakota)_Basin electric

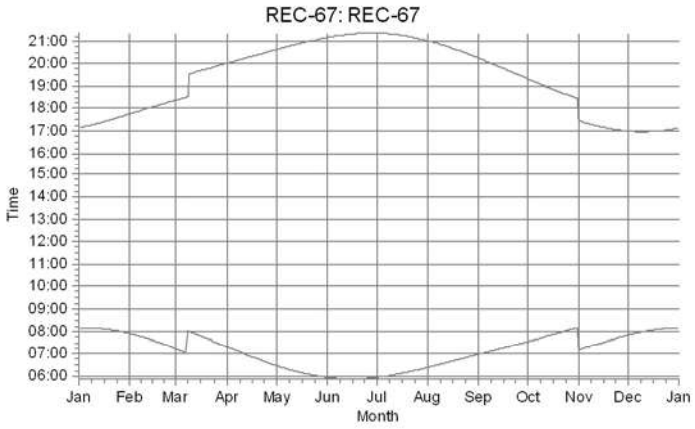
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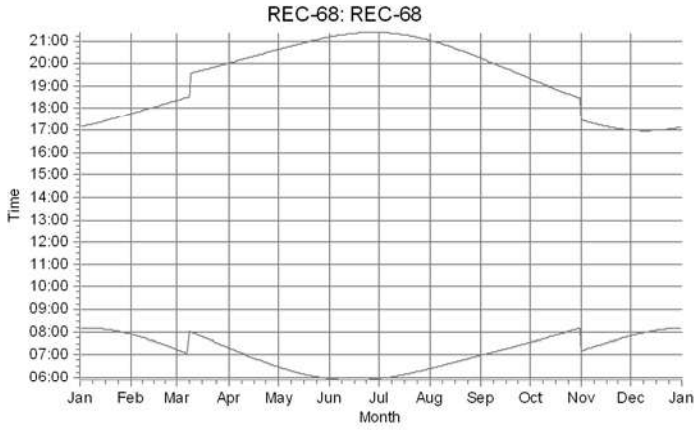
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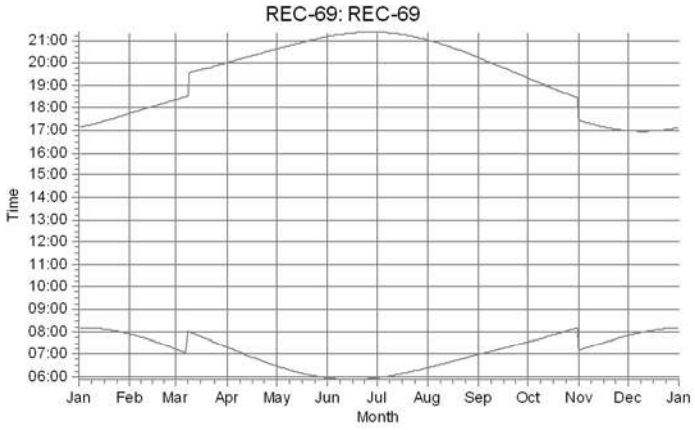
SHADOW - Calendar, graphical

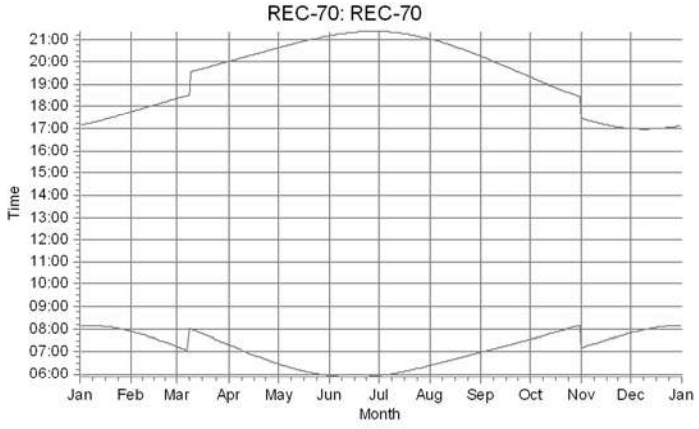
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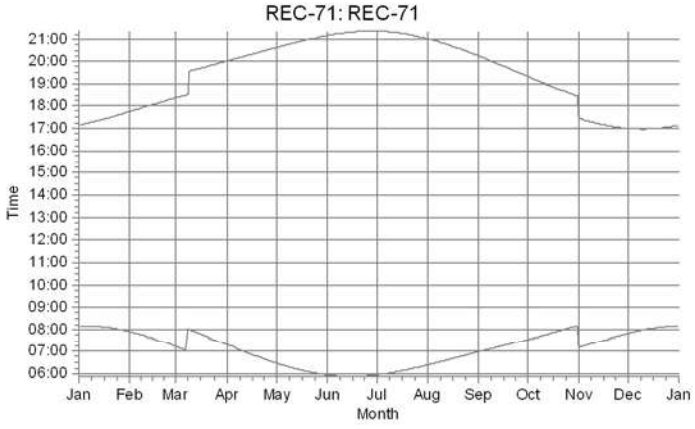












WTGs

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Prairie Wind (South Dakota)_Basin electric

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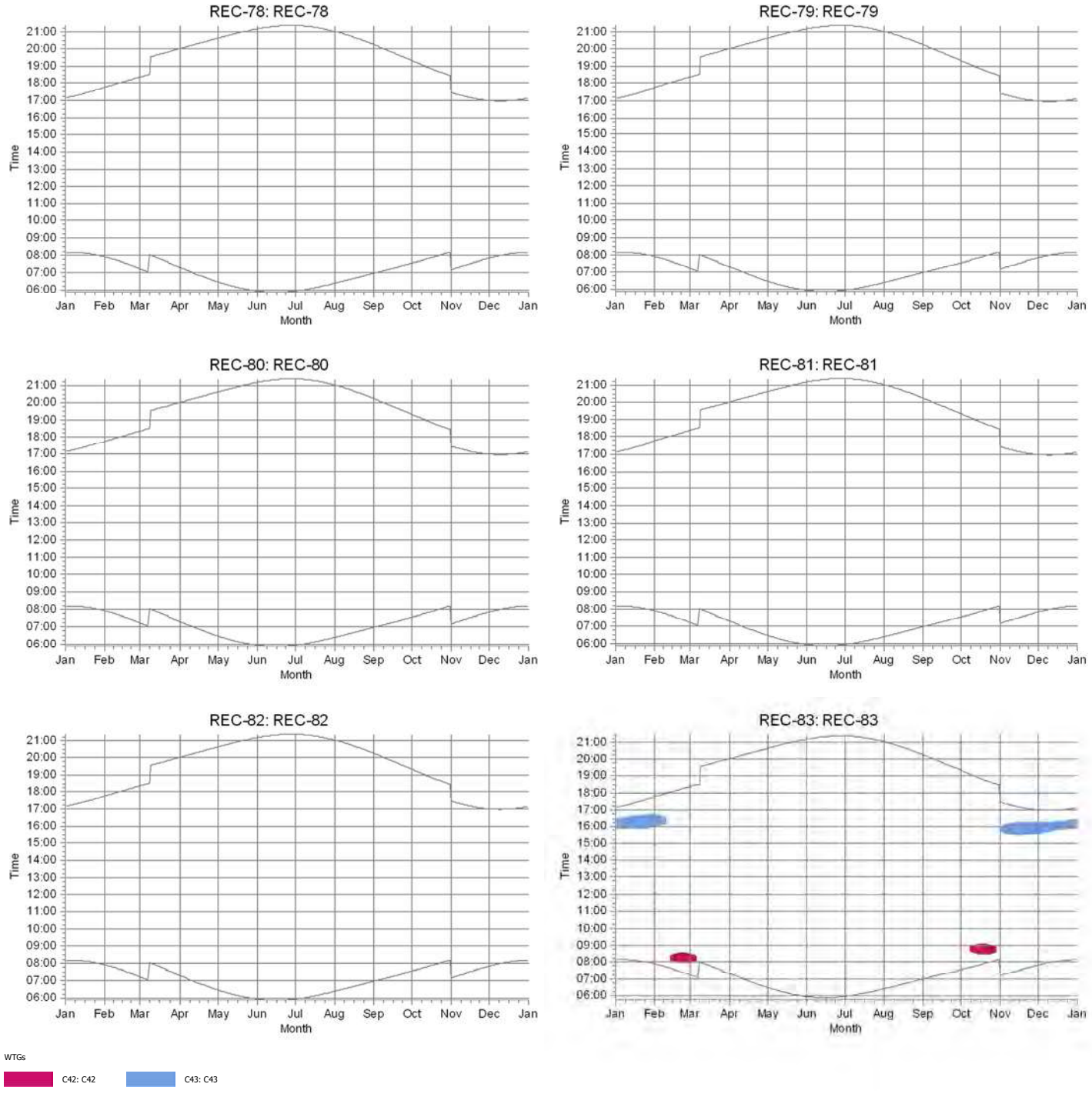
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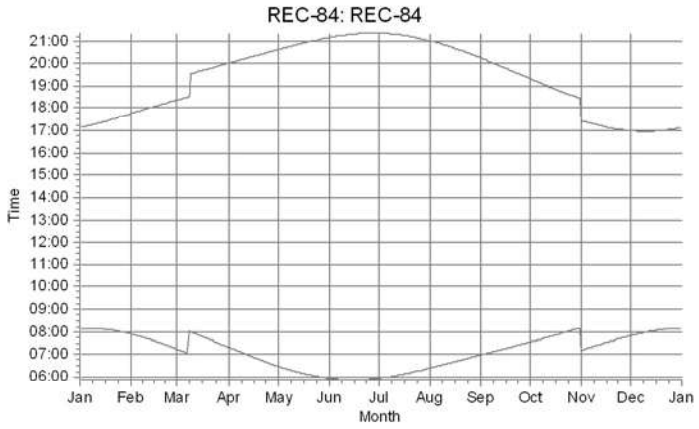
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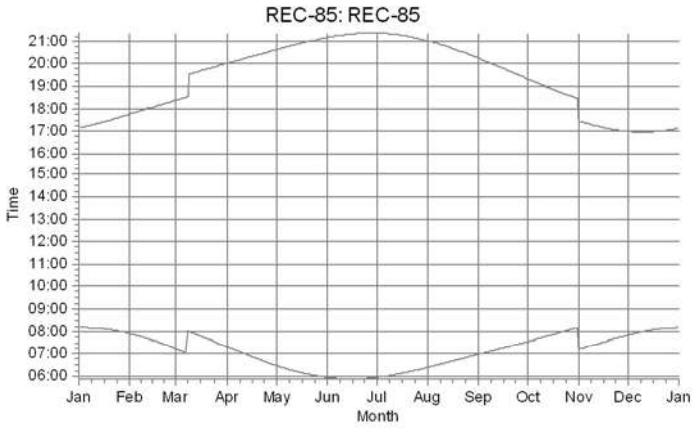
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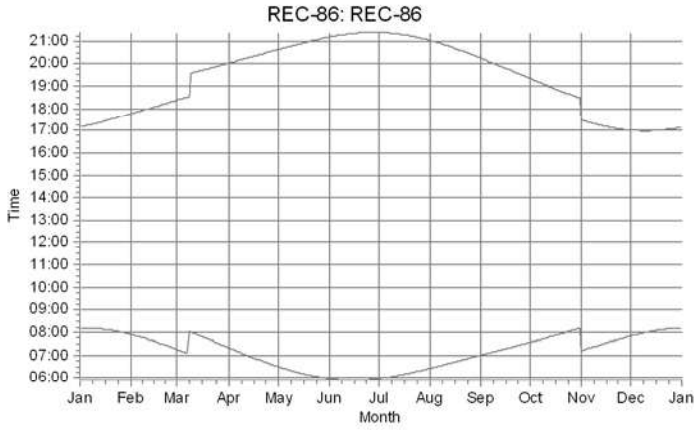
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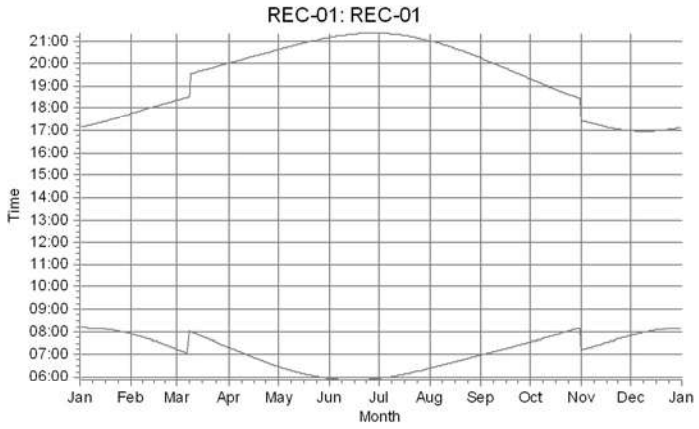
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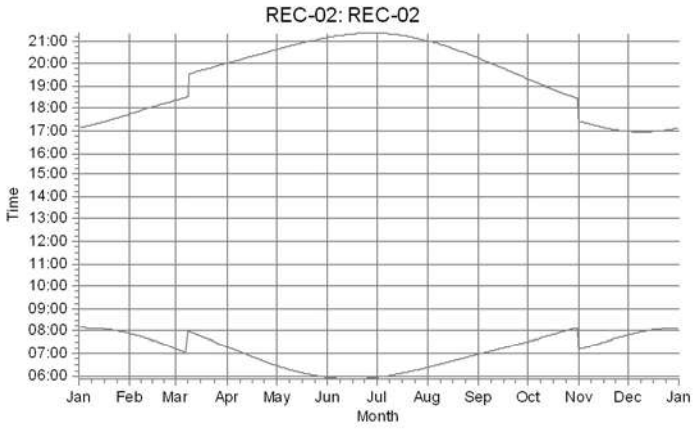
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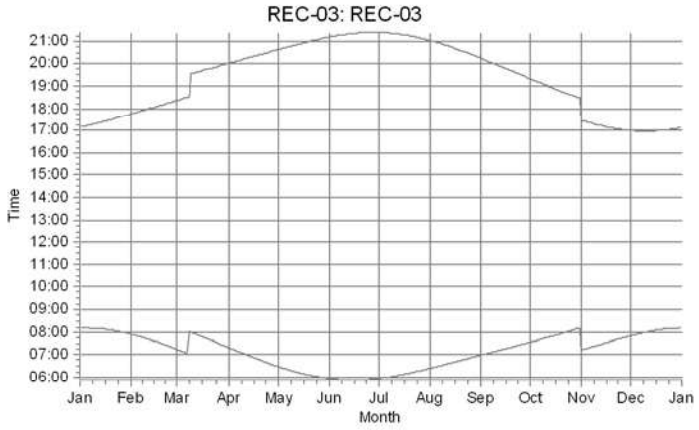
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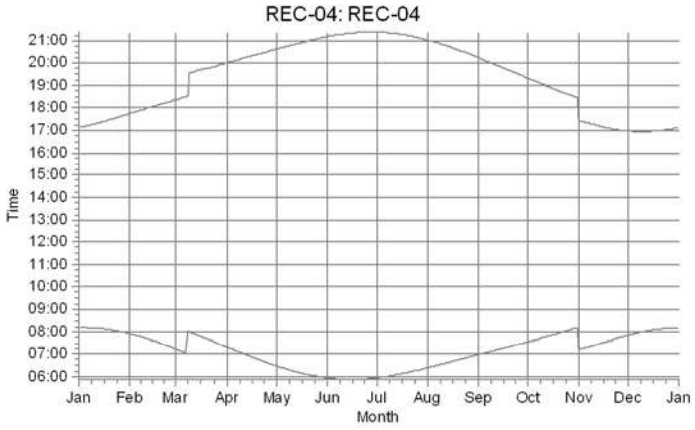
SHADOW - Calendar, graphical

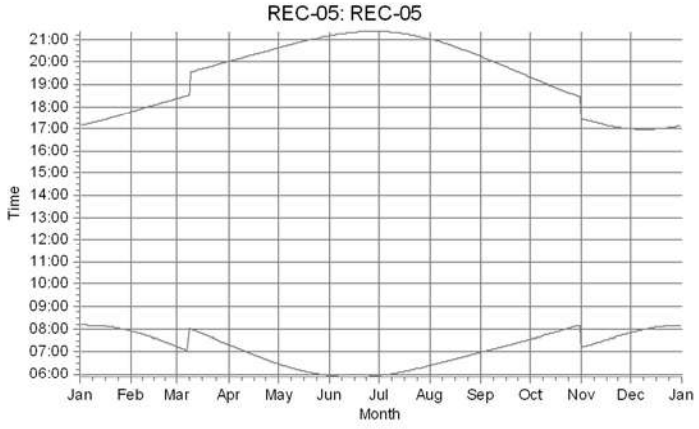
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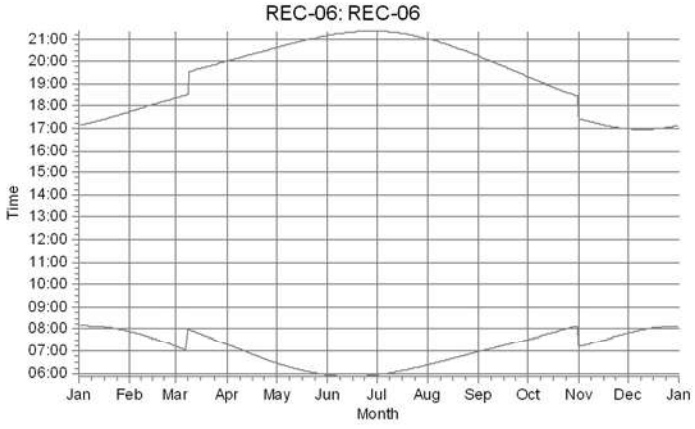












WTGs

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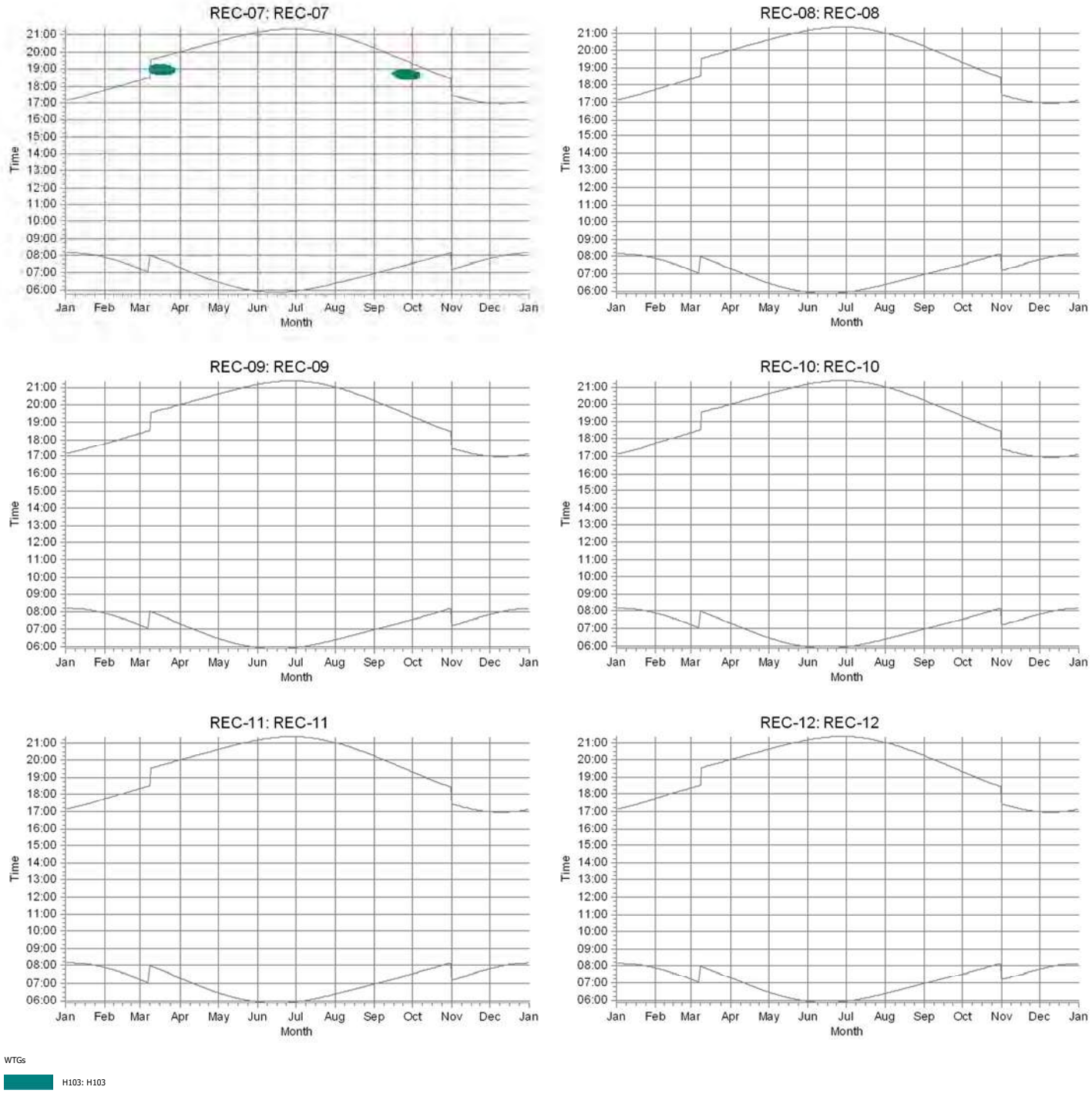
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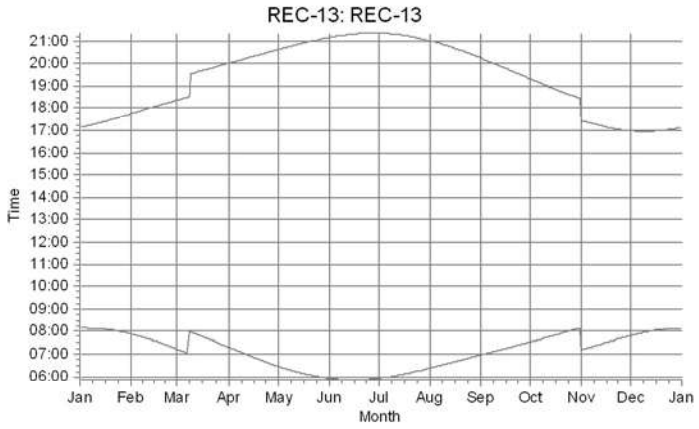
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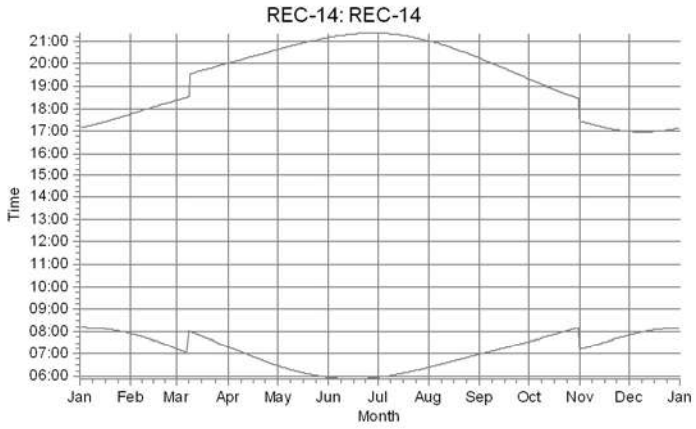
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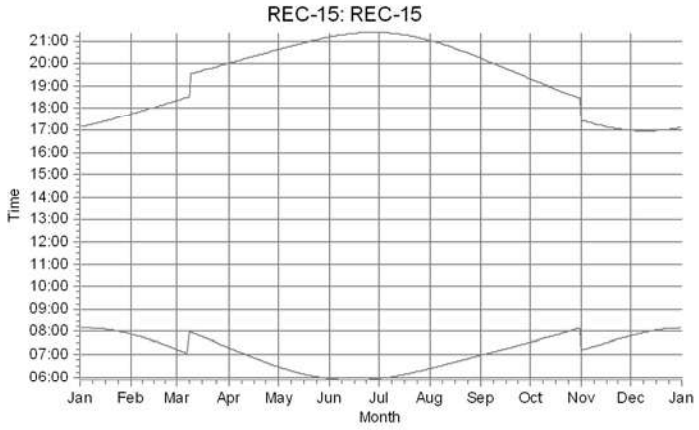
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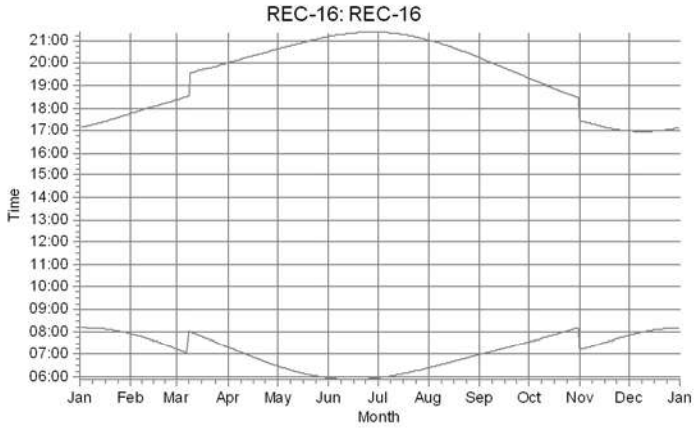
SHADOW - Calendar, graphical

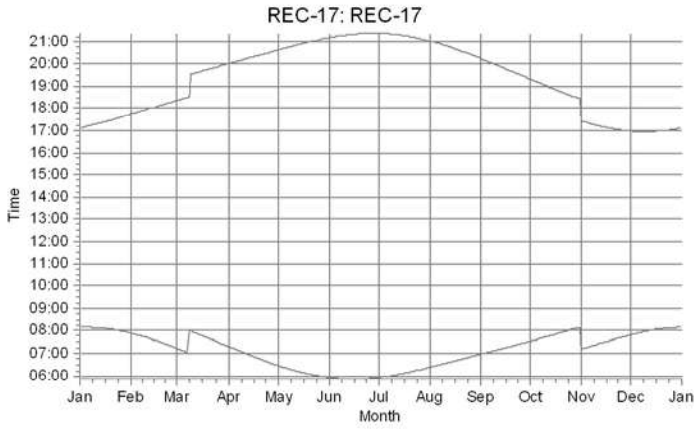
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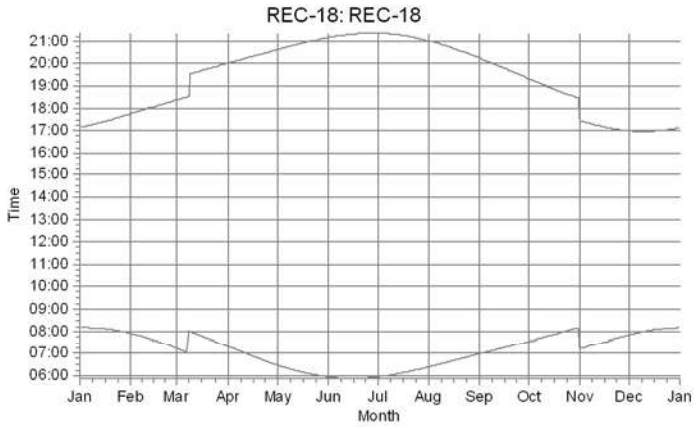












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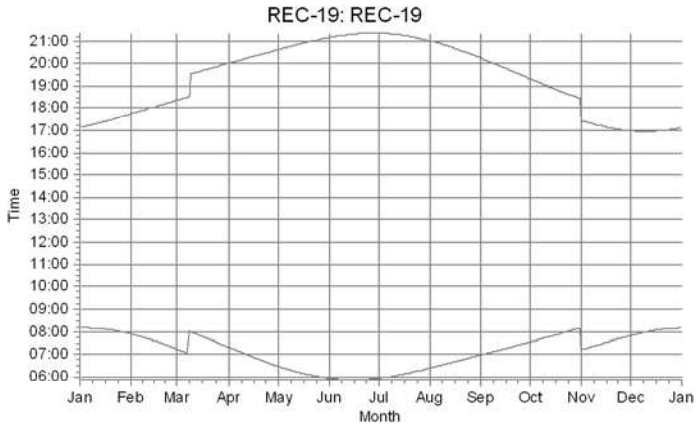
Project:
Prairie Wind (South Dakota)_Basin electric

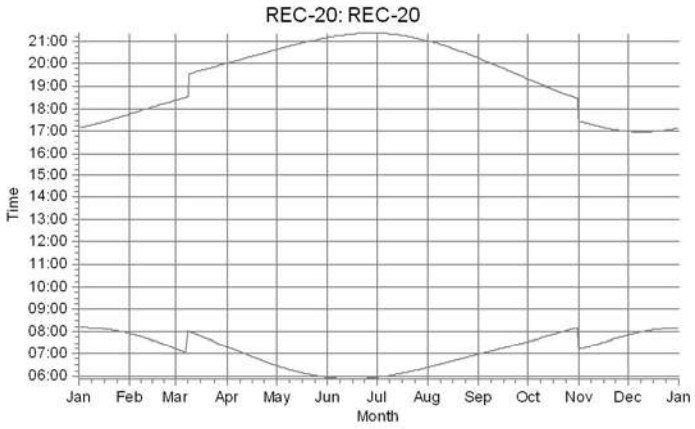
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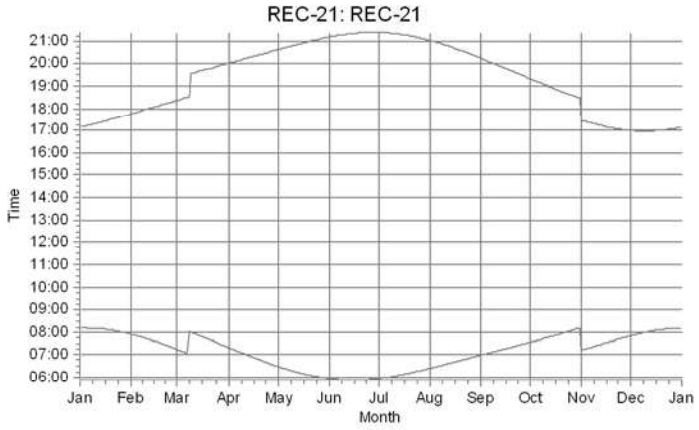
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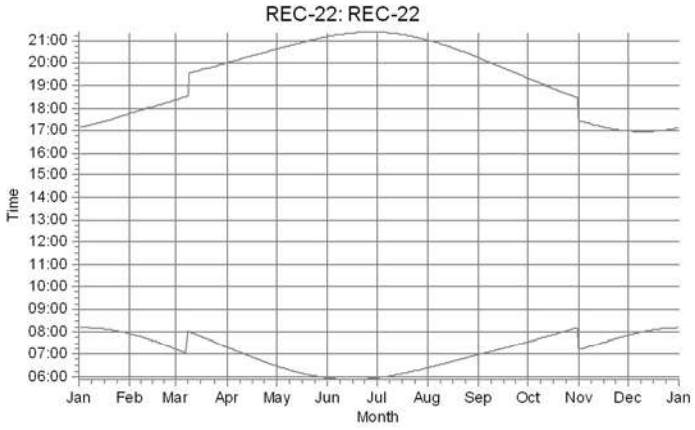
SHADOW - Calendar, graphical

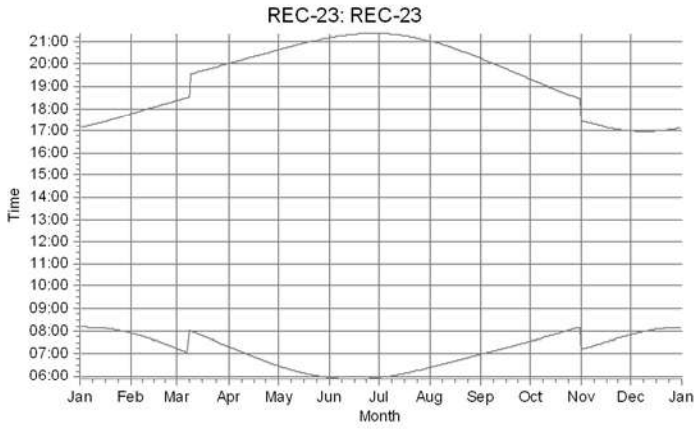
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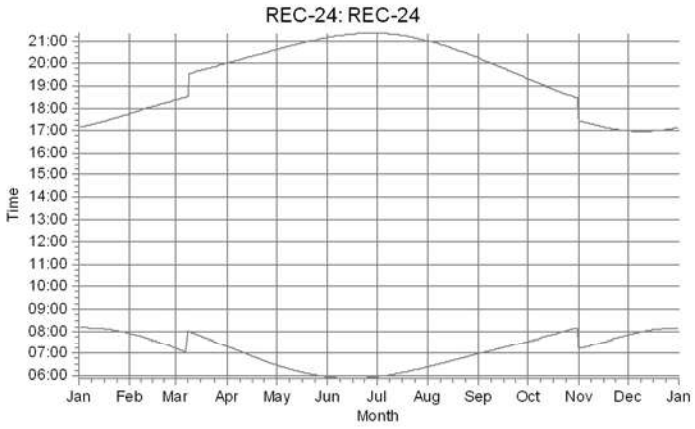












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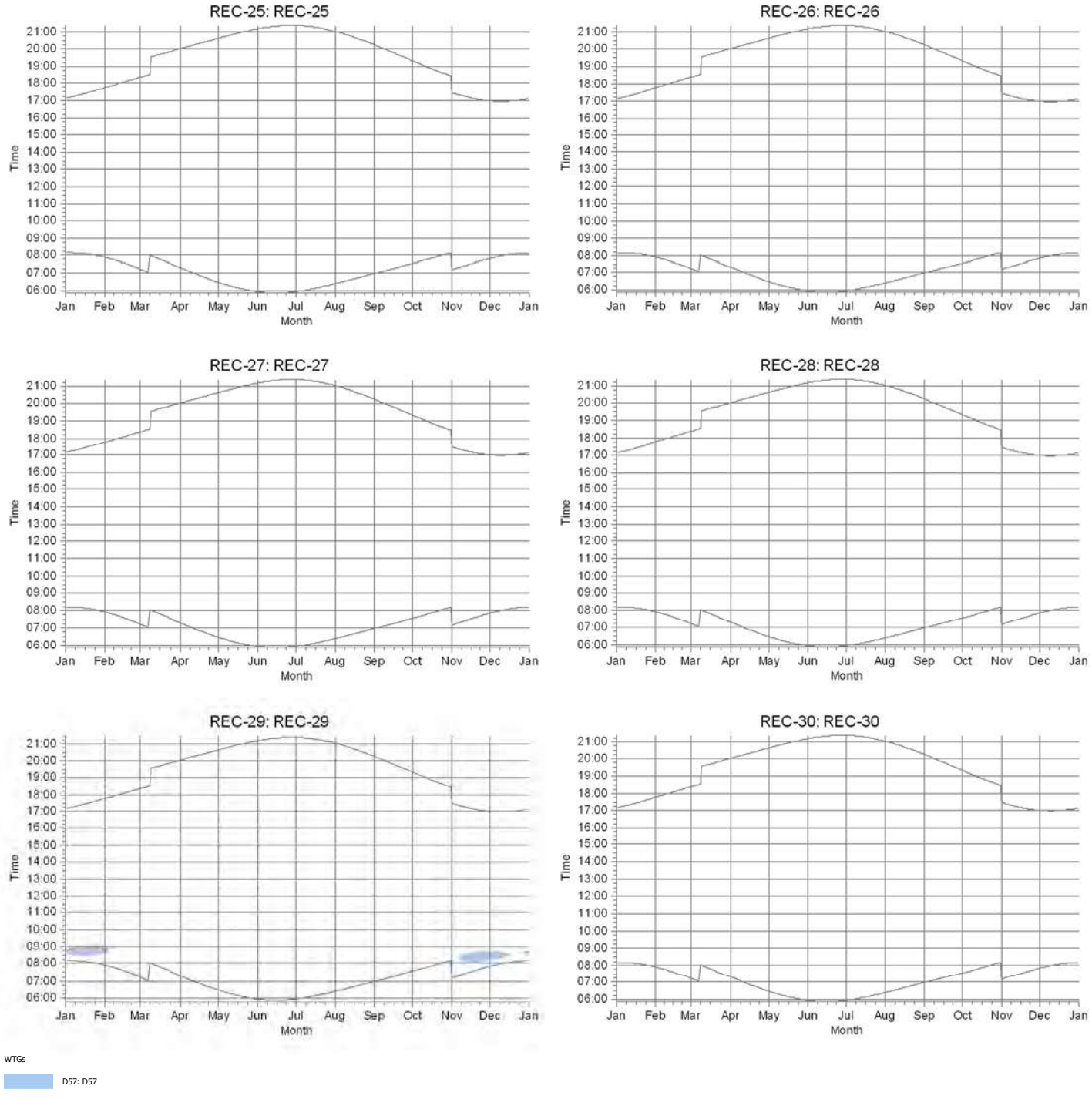
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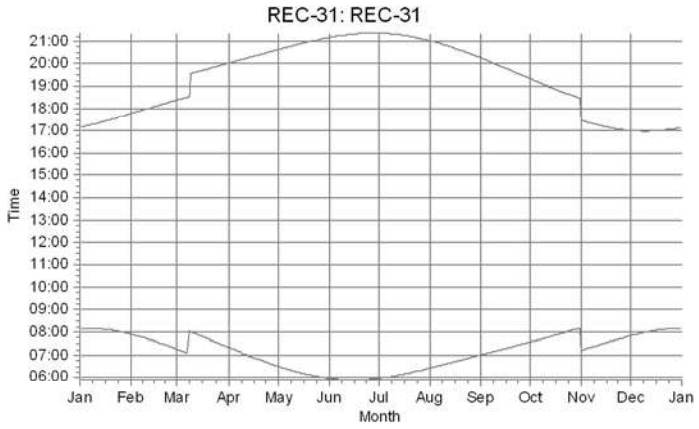
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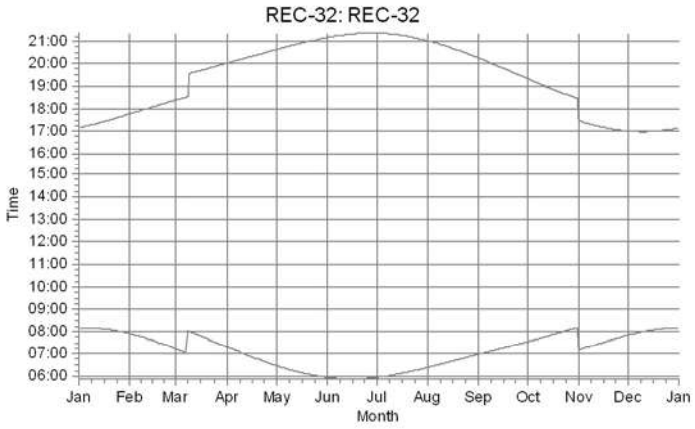
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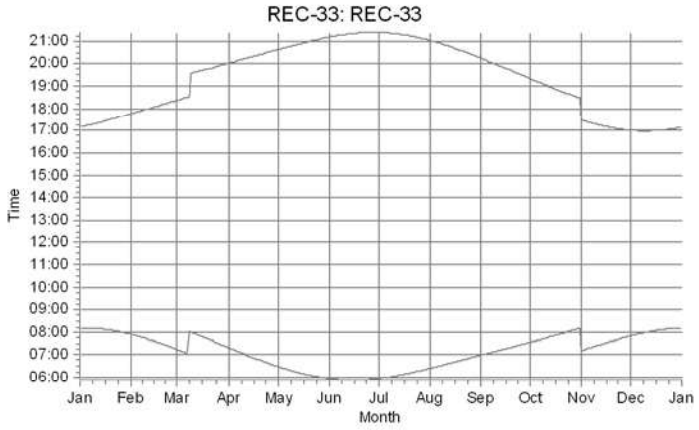
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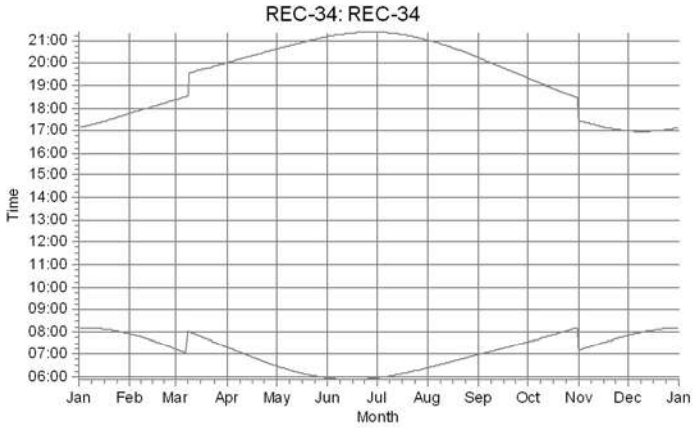
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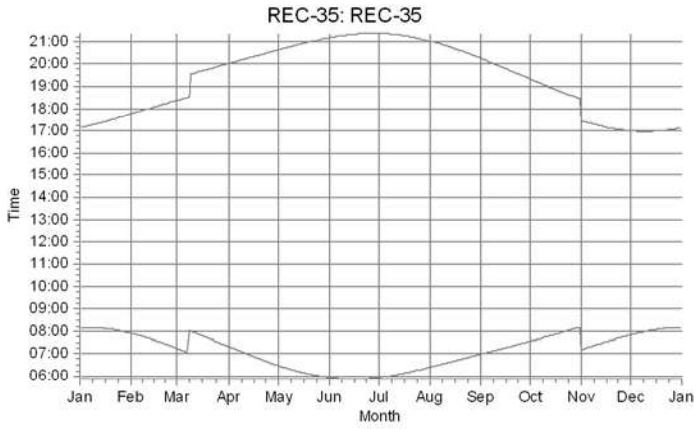
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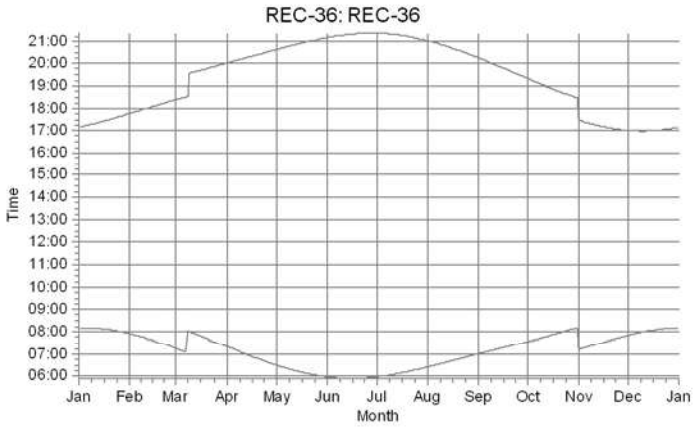












WTGs

Graphical calendar shows worst-case shadow occurrences. Real-case reductions (sun probability, operational time, wind direction) are not applied to the graph.

Project:
Prairie Wind (South Dakota)_Basin electric

Description:
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SHADOW - Calendar, graphical

Calculation: Basin electric_Prairie Wind (SD)_Turbines.shp_GE1.6-97_80mHH_points_v1



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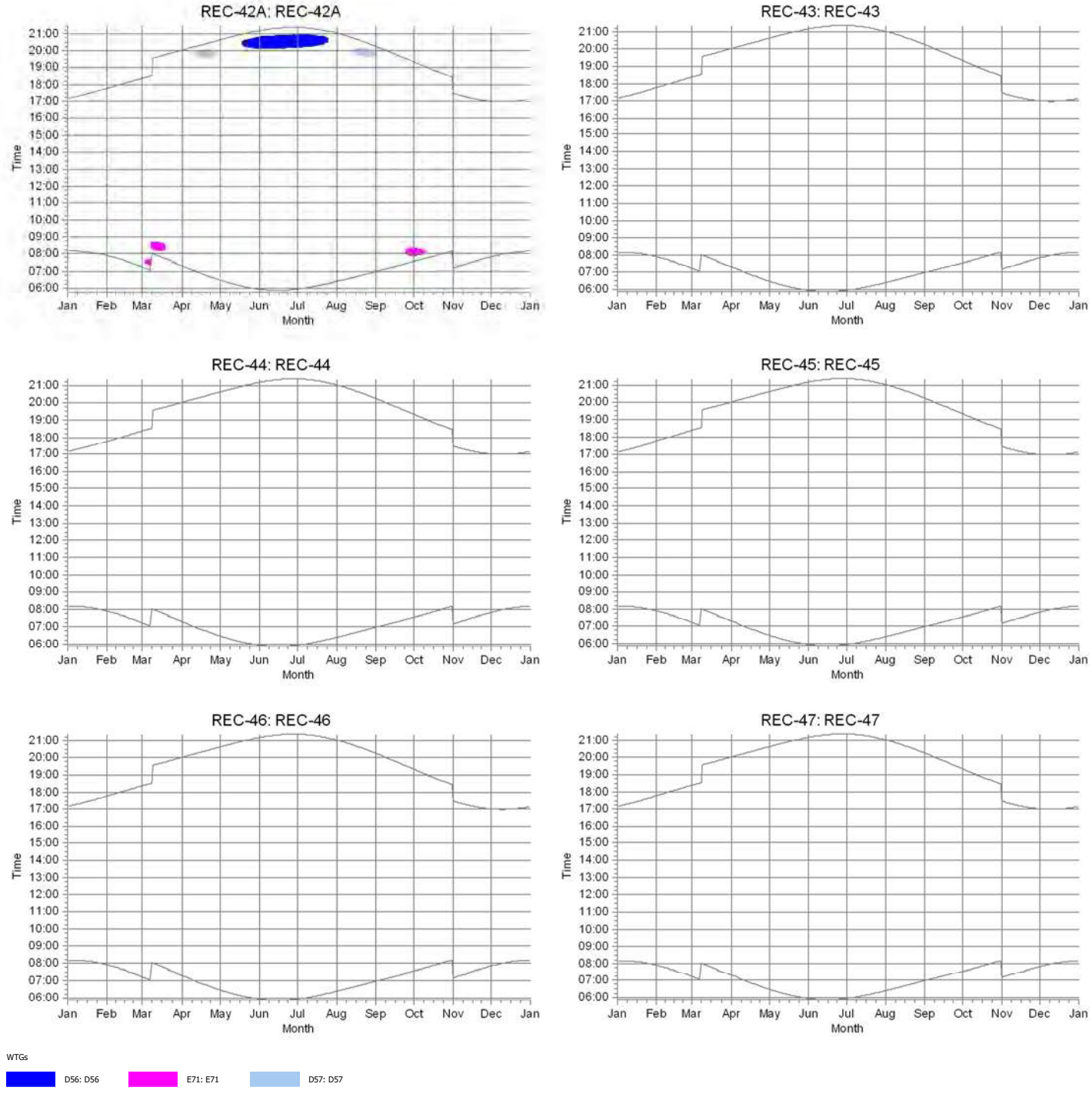
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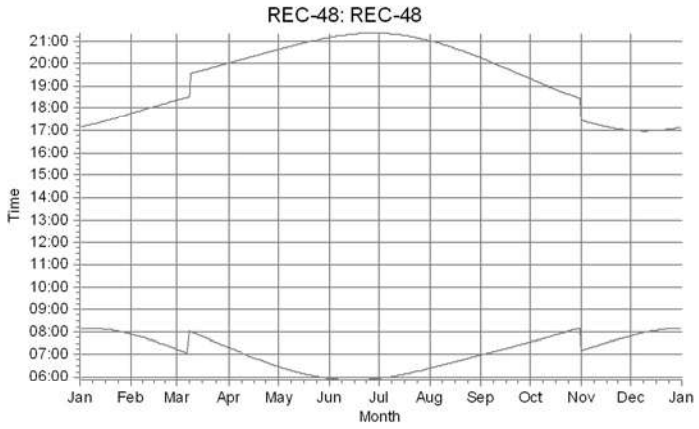
Project:
Prairie Wind (South Dakota)_Basin electric

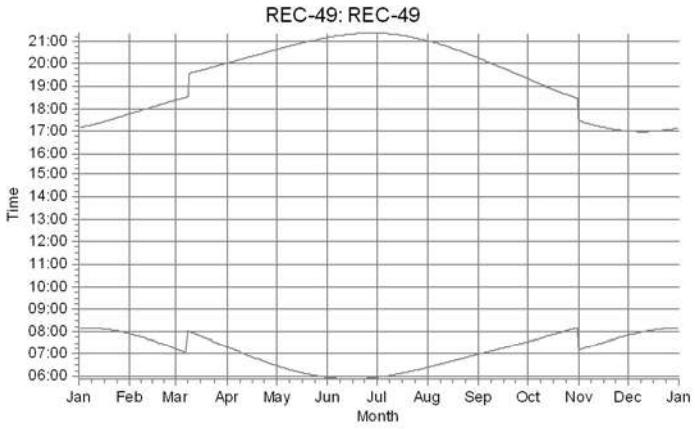
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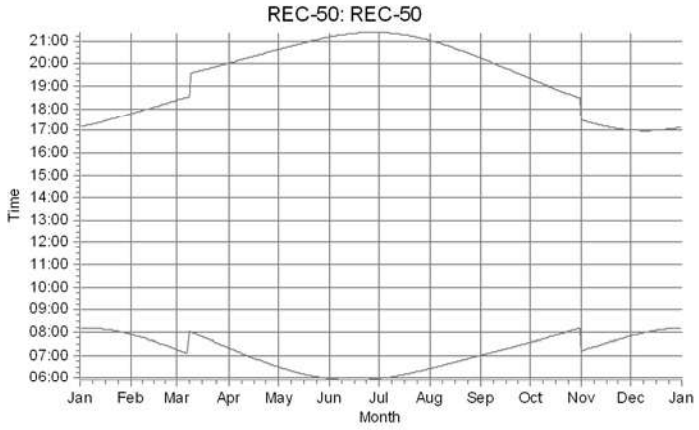
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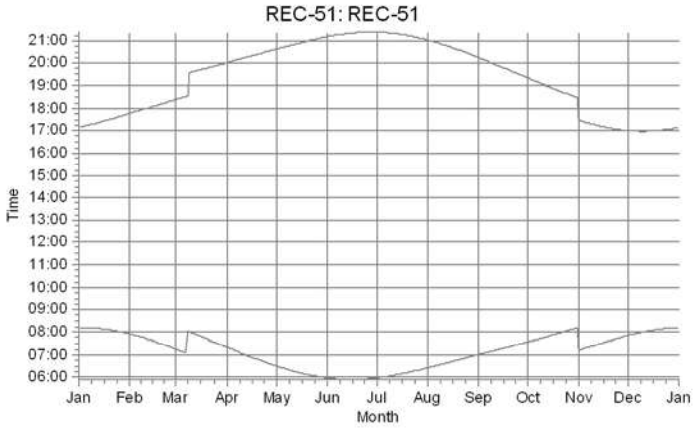
SHADOW - Calendar, graphical

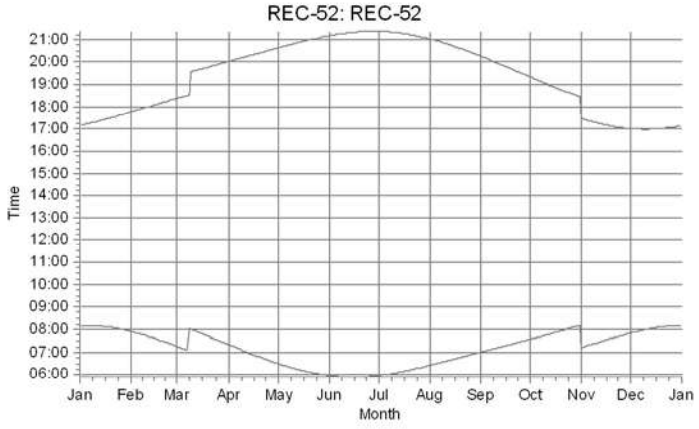
Calculation: Basin electric_Prairie Wind (SD)_Turbines.shp_GE1.6-97_80mHH_points_v1

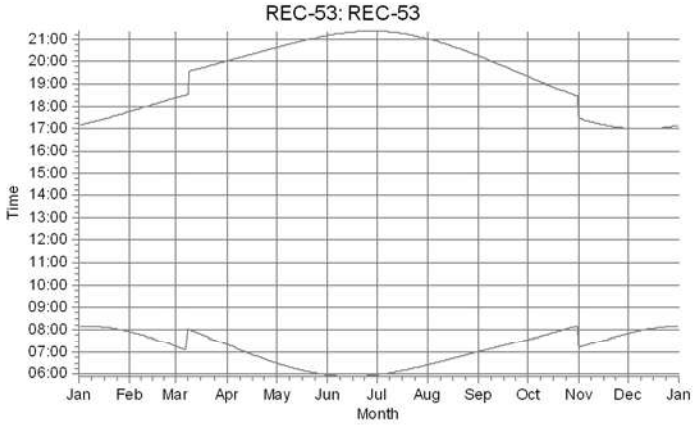












WTGs

Graphical calendar shows worst-case shadow occurrences. Real-case reductions (sun probability, operational time, wind direction) are not applied to the graph.

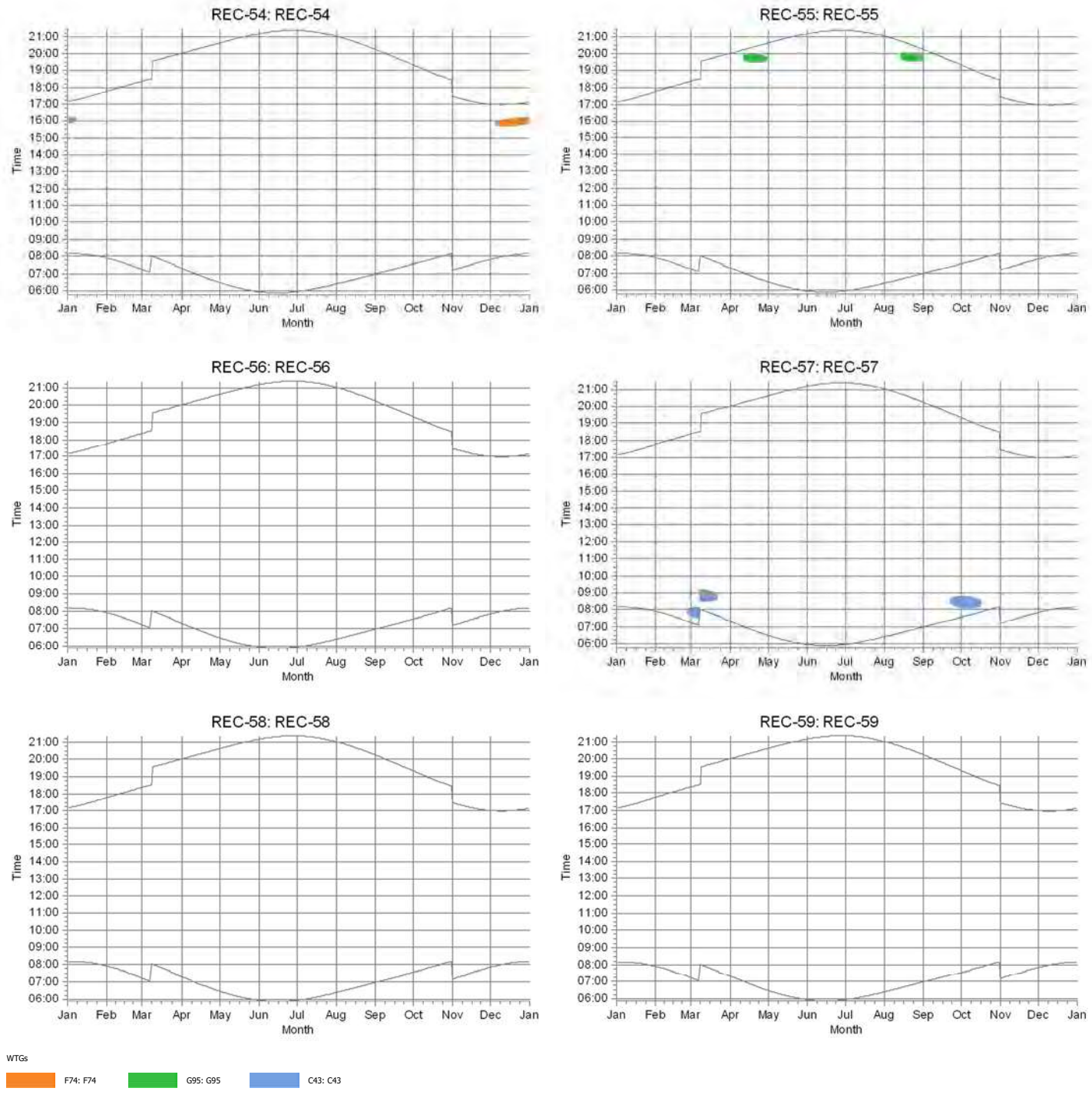
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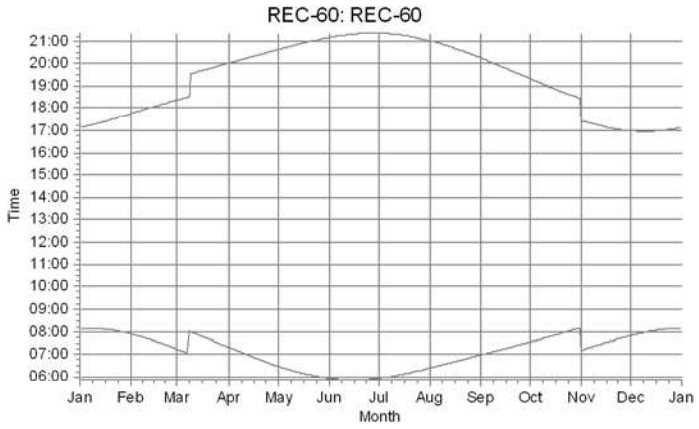
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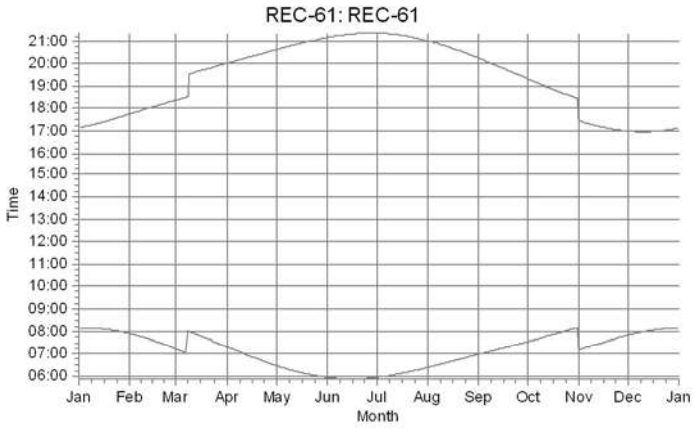
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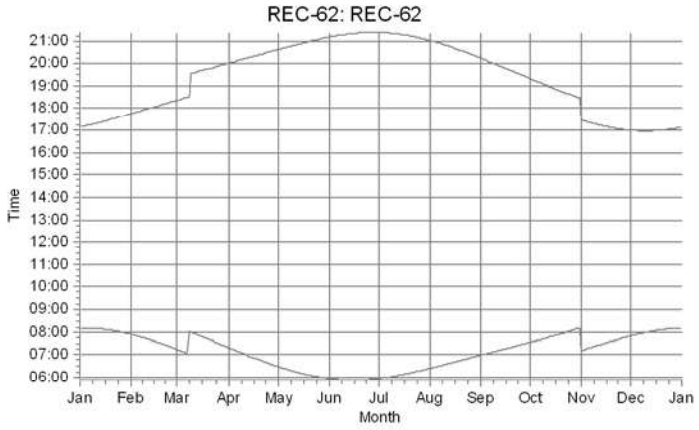
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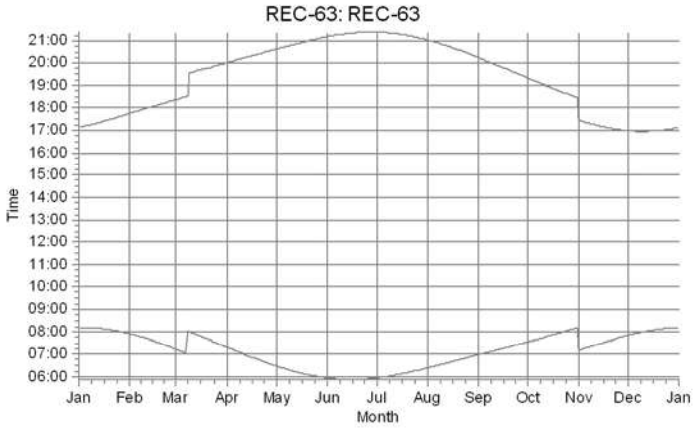
SHADOW - Calendar, graphical

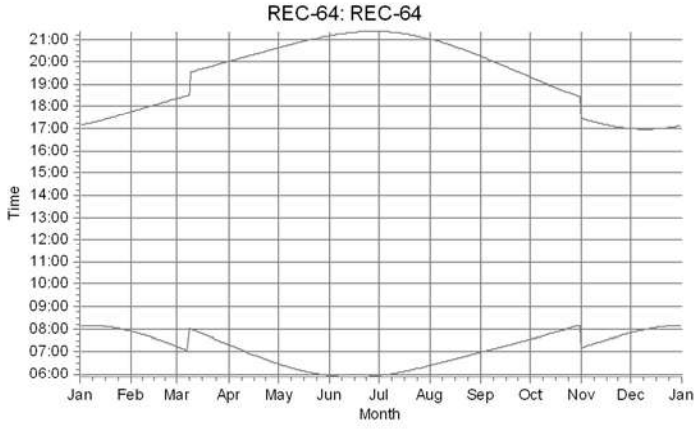
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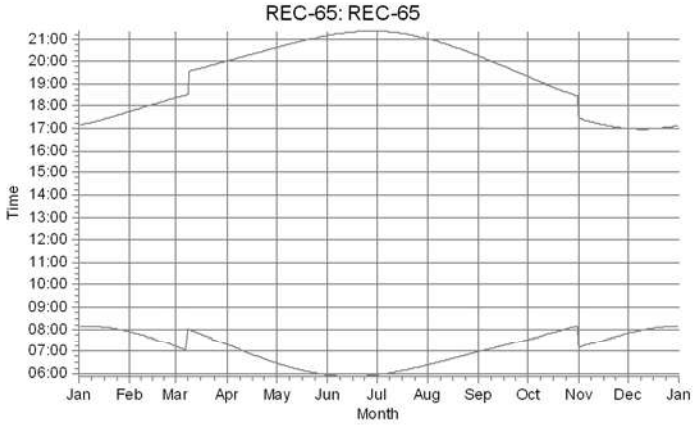












WTGs

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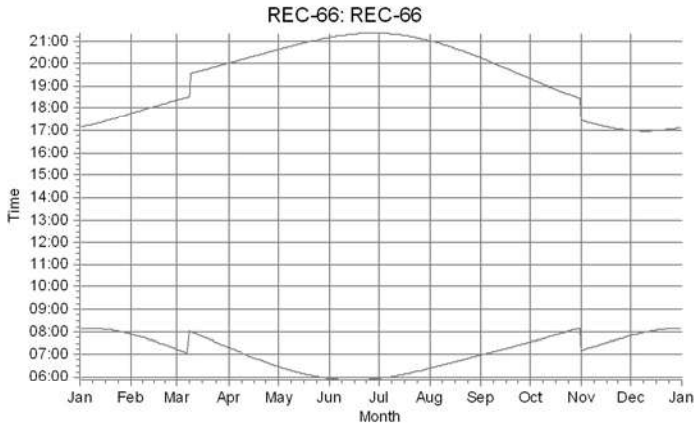
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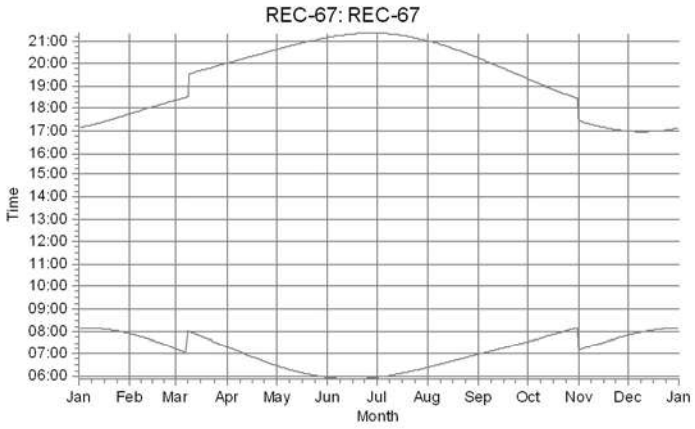
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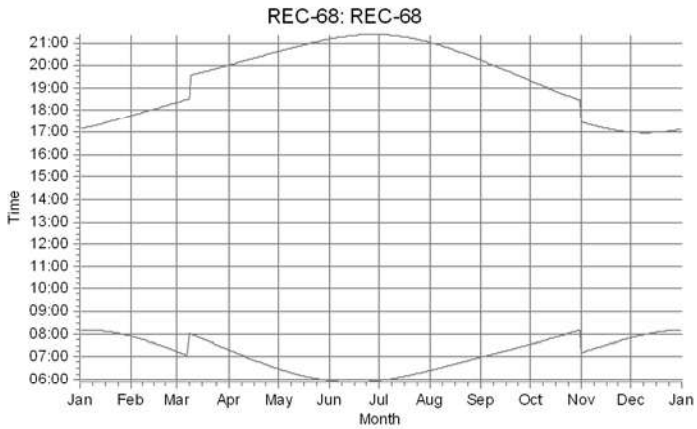
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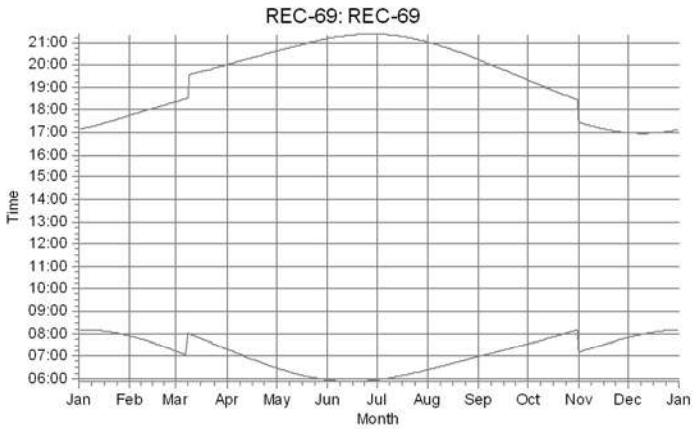
SHADOW - Calendar, graphical

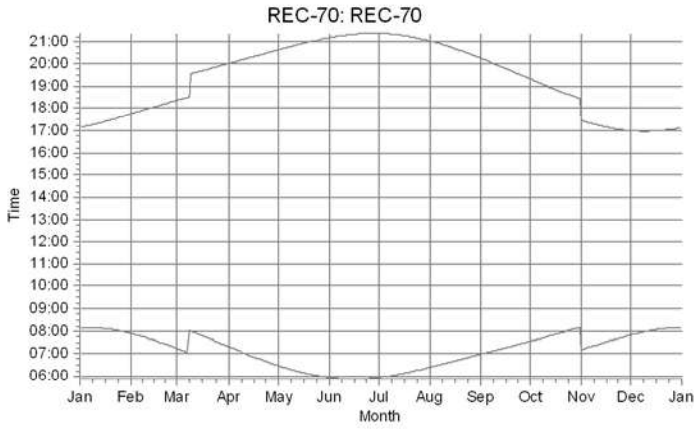
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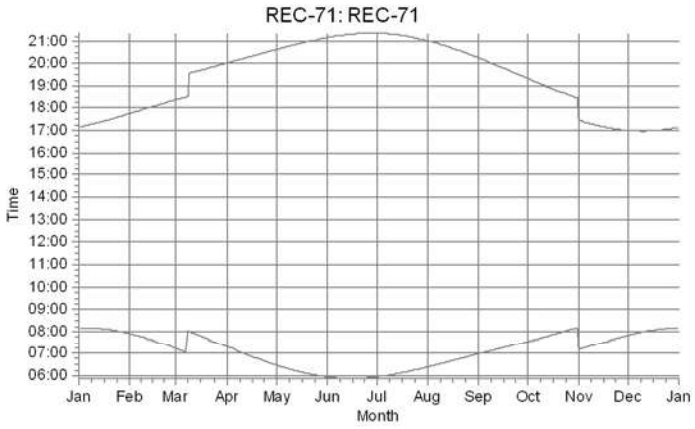












WTGs

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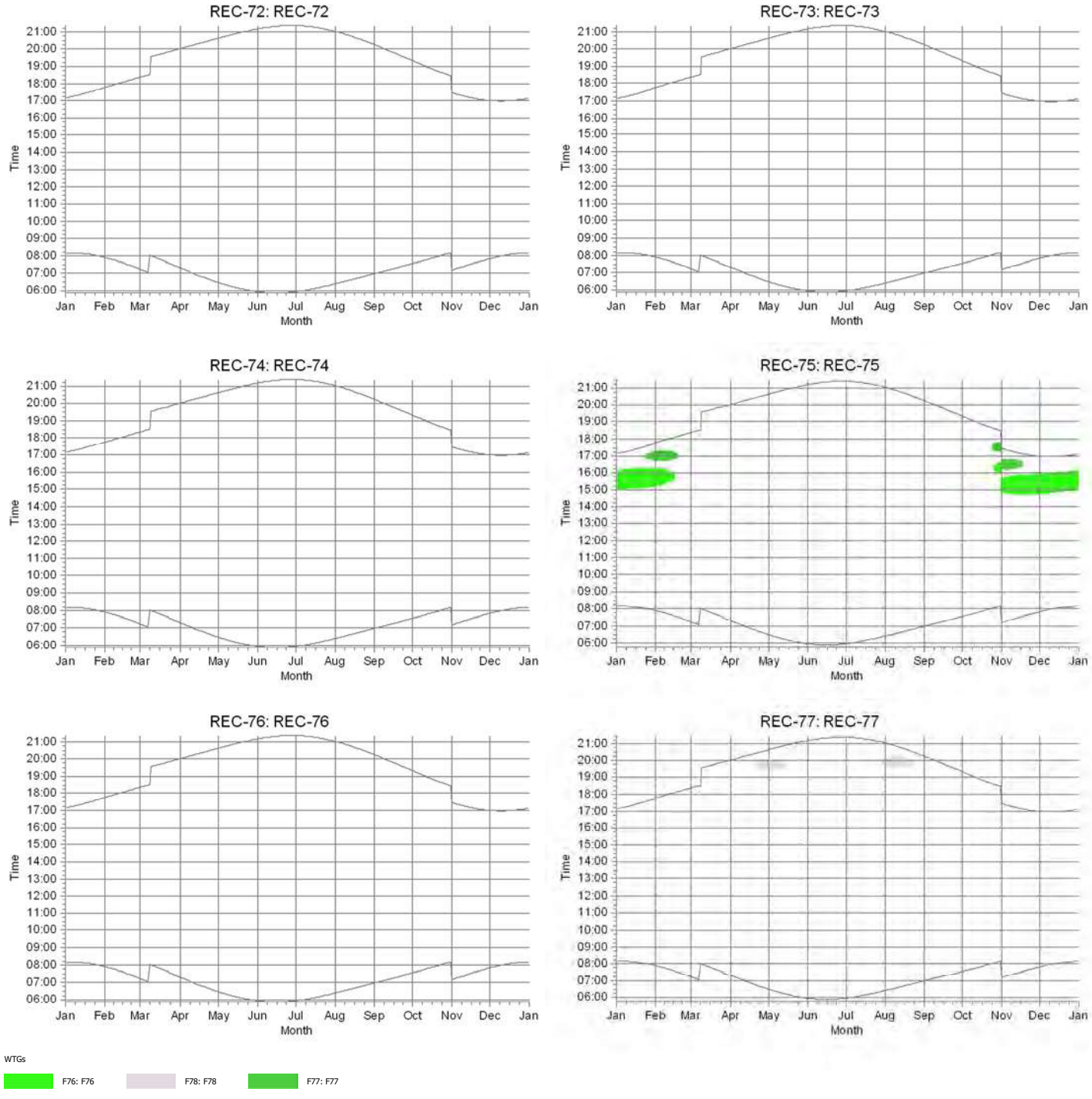
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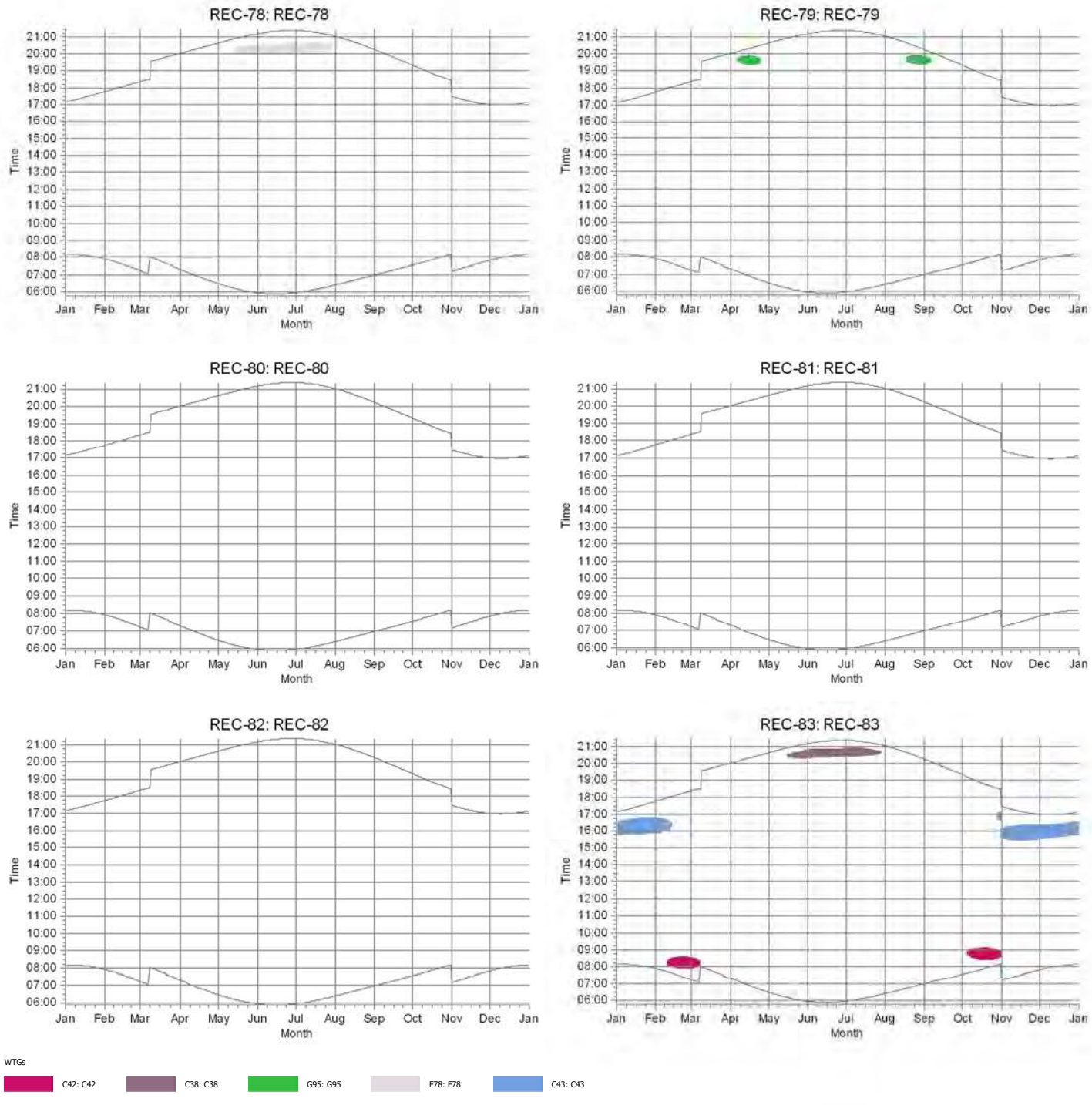
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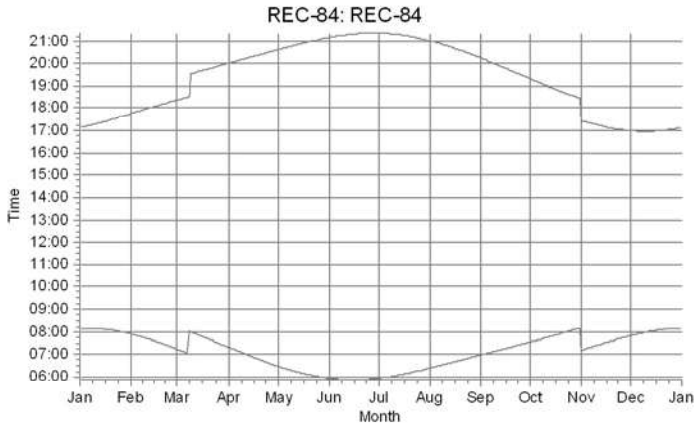
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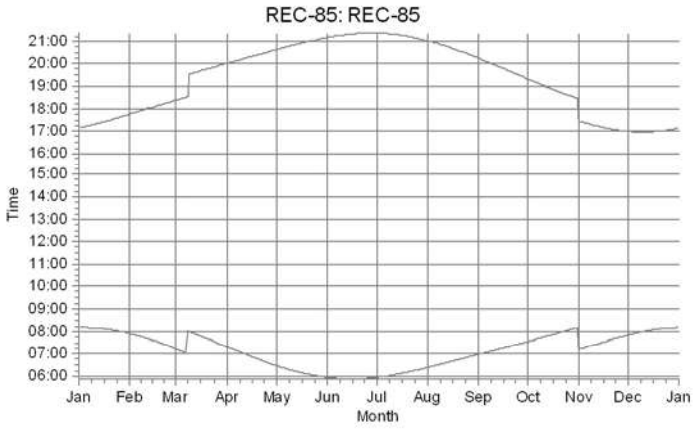
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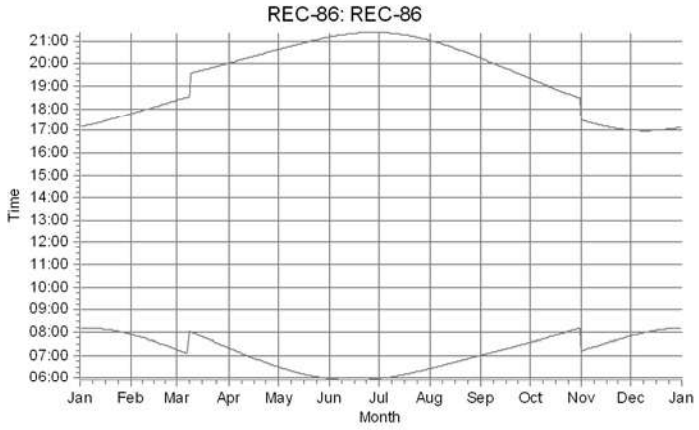
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