

Table 4.7.C. U.S. Transformer Automatic Outage Counts by Cause Code and by NERC Region, 2010

	(FRCC, MRO, NPCC, RFC, SERC, SPP)	TRE	WECC	Contiguous U.S.	(FRCC, MRO, NPCC, RFC, SERC, SPP)	TRE	WECC	Contiguous U.S.
Momentary Outage Causes								
Weather, excluding lightning	-	-	1	1	-	-	5.0	3.4
Lightning	2	-	13	15	22.2	-	65.0	51.7
Environmental	-	-	-	-	-	-	-	-
Contamination	-	-	-	-	-	-	-	-
Foreign Interference	-	-	-	-	-	-	-	-
Fire	-	-	-	-	-	-	-	-
Vandalism, Terrorism, or Malicious Acts	-	-	-	-	-	-	-	-
Failed AC Substation Equipment	-	-	-	-	-	-	-	-
Failed AC/DC Terminal Equipment	-	-	-	-	-	-	-	-
Failed Protection System Equipment	-	-	-	-	-	-	-	-
Failed AC Circuit Equipment	2	-	1	3	22.2	-	5.0	10.3
Failed DC Circuit Equipment	-	-	-	-	-	-	-	-
Vegetation	-	-	-	-	-	-	-	-
Power System Condition	-	-	-	-	-	-	-	-
Human Error	-	-	2	2	-	-	10.0	6.9
Unknown	1	-	3	4	11.1	-	15.0	13.8
Other	4	-	-	4	44.4	-	-	13.8
TOTAL	9	-	20	29	100.0	-	100.0	100.0
Sustained Outage Causes								
Weather, excluding lightning	1	-	2	3	0.7	-	3.6	1.5
Lightning	18	-	4	22	12.2	-	7.3	10.9
Environmental	-	-	2	2	-	-	3.6	1.0
Contamination	7	-	-	7	4.8	-	-	3.5
Foreign Interference	21	-	-	21	14.3	-	-	10.4
Fire	-	-	24	24	-	-	43.6	11.9
Vandalism, Terrorism, or Malicious Acts	-	-	-	-	-	-	-	-
Failed AC Substation Equipment	28	-	3	31	19.0	-	5.5	15.3
Failed AC/DC Terminal Equipment	-	-	-	-	-	-	-	-
Failed Protection System Equipment	7	-	4	11	4.8	-	7.3	5.4
Failed AC Circuit Equipment	9	-	2	11	6.1	-	3.6	5.4
Failed DC Circuit Equipment	-	-	-	-	-	-	-	-
Vegetation	-	-	2	2	-	-	3.6	1.0
Power System Condition	2	-	-	2	1.4	-	-	1.0
Human Error	11	-	6	17	7.5	-	10.9	8.4
Unknown	40	-	6	46	27.2	-	10.9	22.8
Other	3	-	-	3	2.0	-	-	1.5
TOTAL	147	-	55	202	100.0	-	100.0	100.0

Notes:

- Detailed information on the Transmission Availability Data System outage causes is available at:

<http://www.nerc.com/docs/pc/tadswq/Appendix%207%2020101202a%20clean.pdf>

Source: U.S. Energy Information Administration, Form EIA-411, "Coordinated Bulk Power Supply Program Report."