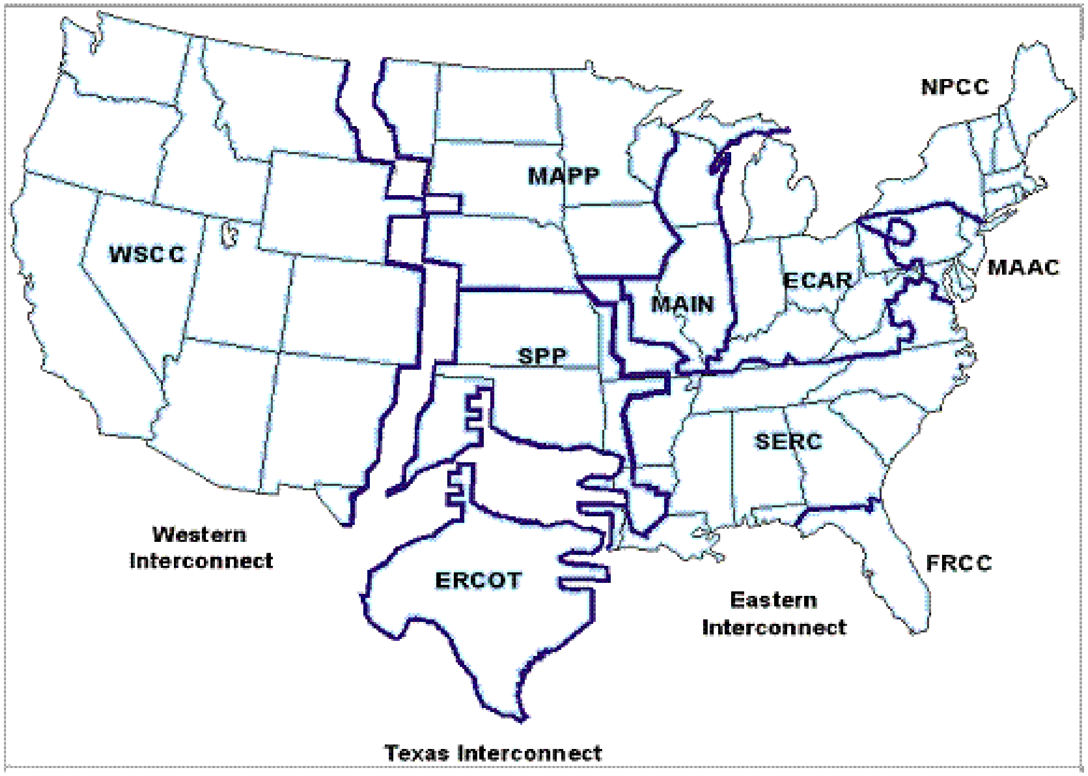
PROMETHEUS COUNCIL

Power Grid

It is important to note that there is no "national power grid" in the United States. In fact, the continental United States is divided into three main power grids:
- The Eastern Interconnected System, or the Eastern Interconnect
- The Western Interconnected System, or the Western Interconnect
- The Texas Interconnected System, or the Texas Interconnect



The main interconnections of the U.S. electric power grid and the ten North American Electric Reliability Council (NERC) regions. Note: The Alaska Systems Coordinating Council (ASCC) is an affiliate NERC member.

ECAR - East Central Area Reliability Coordination Agreement

ERCOT - Electric Reliability Council of Texas
FRCC - Florida Reliability Coordinating Council
MAAC - Mid-Atlantic Area Council
MAIN - Mid-America Interconnected Network
MAPP - Mid-Continent Area Power Pool
NPCC - Northeast Power Coordinating Council
SERC - Southeastern Electric Reliability Council
SPP - Southwest Power Pool
WSCC - Western Systems Coordinating Council

The Eastern and Western Interconnects have limited interconnections to each other, and the Texas Interconnect is only linked to the others via direct current lines. Both the Western and Texas Interconnects are linked with Mexico, and the Eastern and Western Interconnects are strongly interconnected with Canada. All electric utilities in the mainland United States are connected to at least one other utility via these power grids.

The grid systems in Hawaii and Alaska are much different than on the U.S. mainland. Alaska has an interconnected grid system, but it connects only Anchorage, Fairbanks, and the Kenai Peninsula. Much of the rest of the state depends on small diesel generators, although there are a few mini-grids in the state as well. Hawaii also depends on mini-grids to serve each island's inhabitants.

When magnetic fields move about in the vicinity of conductors, such as electrical lines, an electric current is induced into the conductor. This happens on a grand scale during geomagnetic storms. Power companies transmit alternating current (AC) to customers via long transmission lines. The nearly direct current (DC) induced in these lines from geomagnetic storms can destroy electrical equipment throughout the entire system.

The magnetic fields from solar flares and geomagnetic storms, create huge voltage control problems and protective system problems can occur, some grid systems may experience complete collapse or blackouts and transformers can be destroyed. With voltage control problems some protective systems will mistakenly trip out key assets from the grid, or create false alarms.

Often before the grid goes down, a brown out will occur. Brown outs are nothing more than reduced voltage running through the transmission lines, as a method of controlling a complete blackout. Hoping that by reducing the electrical load to all, there will be sufficient power to run all the systems at a reduced level.

Cities that are further down the power transmission zone, will suffer from further reduced power, because cities closer to the actual transmission zone will siphon off more power to serve their needs, thereby reducing the availability of power to end users.

If power is restored after a blackout, huge power demands will result, often 600% of the normal line carrying capacity. This results because de-energized lines must assume the full load instantly of the entire power drain, instead of carrying the load over a period of time. This alone may cause the power systems to go off line again because it cannot handle the initial 600% power increase.

Back to the Knowledge Base