company that manages the local distribution network may manage faults that may occur in the feeder circuits or on circuits, called lateral circuits, which branch from the feeder circuits. The management of the local distribution network often relies on telephone calls from consumers when an outage occurs or relies on field workers analyzing the local distribution network.

[0006] Power companies have attempted to upgrade the power grid using digital technology, sometimes called a "smart grid." For example, more intelligent meters (sometimes called "smart meters") are a type of advanced meter that identifies consumption in more detail than a conventional meter. The smart meter may then communicate that information via some network back to the local utility for monitoring and billing purposes (telemetering). Other devices within a smart grid may also be controlled via remote terminals. Allowing devices within a smart grid allows electronic control over devices via commands on a very resolute scale, such as a major appliance in a residential customer home or major industrial equipment of an industrial customer. While single commands of this nature are not by themselves dangerous to the overall health of a smart grid, many of these commands executed within a relatively short amount of time may cause adverse effects within the smart grid.

BRIEF SUMMARY

[0006a] According to a first aspect, there is provided an utility grid command filter system comprising:

a memory configured to store a plurality of device command rules; and

a command filter module stored on the memory and executable by a processor to:

receive a plurality of commands, wherein each of the plurality of commands is received from a respective origination device, and wherein each of the plurality of commands is configured to provide a command for a respective device electrically coupled to a utility grid;

retrieve at least one device command rule from the plurality of device command rules;

retrieve utility grid connectivity data corresponding to current operating conditions of the utility grid;

retrieve utility grid historical data corresponding to operation of a device respective to the at least one command;

determine at least one predicted utility grid effect from authorization of the at least one command based on the utility grid historical data and the utility grid connectivity data;

determine when at least one command of the plurality of commands is authorized for execution by the respective device based on the at least one device command rule and the predicted utility grid effect; and

transmit the at least one command to be received by the respective device when the at least one command is determined to be authorized for execution by the respective device.

[0006b] According to a second aspect, there is provided a utility grid comprising:

a plurality of electrically-coupled devices; and

a command filter system configured to:

receive a plurality of commands, wherein each of the plurality of commands is received from a respective origination device, and wherein each of the plurality of commands is configured to provide a command to a respective device of the plurality of electrically-coupled devices;

retrieve at least one device command rule from a plurality of device command rules;

retrieve utility grid connectivity data corresponding to current operating conditions of the utility grid;

retrieve utility grid historical data corresponding to operation of a device respective to the at least one command;

determine at least one predicted utility grid effect from authorization of the at least one command based on the utility grid historical data and the utility grid connectivity data;

determine when at least one command of the plurality of commands is authorized for execution by the respective device based on the at least one device command rule and the predicted utility grid effect; and

transmit the at least one command to be received by the respective device when the at least one command is determined to be authorized for execution by the respective device; and

a communication network configured to relay the at least one command from the command filter system to the respective device.

[0006c] According to a third aspect, there is provided a computer-readable medium comprising a plurality of instructions executable by a processor, the computer-readable medium comprising:

instructions to direct the processor to receive a plurality of device commands, where each device command is configured to be executed by a respective device of a plurality of devices interconnected to a utility grid;

instructions to direct the processor to retrieve a set of command rules;

instructions to direct the processor to retrieve utility grid connectivity data corresponding to current operating conditions of the utility grid;

instructions to direct the processor to retrieve utility grid historical data corresponding to operation of a device respective to the at least one command;

instructions to direct the processor to determine at least one predicted utility grid effect from authorization of the at least one command based on the utility grid historical data and the utility grid connectivity data;

instructions to direct the processor to apply the set of command rules and the predicted utility grid effect to the plurality of device commands to determine when the plurality of device commands are authorized for execution by the respective device;

instructions to direct the processor to transmit each of the plurality of device commands for execution by the respective device when the plurality of device commands comply with the set of command rules and do not result in an adverse effect on the utility grid; and

instructions to prevent each of the plurality of device commands from being executed by the respective device when the plurality of device commands fail to comply with at least one command rule of the set of command rules and that are predicted to result in an adverse effect to the utility grid based on the predicted utility grid effect.

[0007] According to an embodiment, a~~A~~ command filter system to filter device commands within a utility grid is provided. The command filter system may be implemented in a smart grid for improving the management of a power utility grid. The smart grid as presently disclosed includes using sensors in various portions of the power utility grid, using communications and computing technology to upgrade the current electric power grid so that it can operate more efficiently and reliably and support additional services to consumers. The smart grid as presently disclosed may upgrade a traditional electricity transmission and distribution network or "grid," such as by using robust two-way communications, advanced sensors, and distributed computers (including additional intelligence in the electric power transmission and/or electricity distribution). The smart grid may further include additional functionality at a central