

BRIEF SUMMARY

[0005] The present disclosure generally relates to a method and a system for monitoring for and analyzing grid event data from power consumption and power generation devices in a power grid, anticipate events based on the analysis, and predict an outcome of the future event based on new events and past behavior of the power consumption and power generation devices. New event data or new events may be aggregated at a household or unit level, up to and including at community and regional levels. Analysis of the aggregated new events may lead to anticipation of a higher-level new event in the grid, which may include brownout or blackout conditions or other fault in the power grid.

[0006] Application of certain algorithms on the aggregated data may further lead to a prediction of an outcome of the new event at a hierarchical level of the power grid. Based on any prediction from the above predictions, the system may send a demand response command to one or more consumption or generations devices in an attempt to resolve the potential fault. In response to the demand response command, these devices may adjust the amount of power consumed or generated, or may shut down or turn on. The command may be sent to individual devices or may be sent to groups of devices at household or community level. Priorities may be considered in deciding to which devices to send a demand response command.

[0007] Further analysis may be performed in the case of an identified device or groups of devices that has deficient power or energy. Additional analysis may identify closest power source(s) in the grid that may have excess power and actions may be taken to redistribute the excess power to the deficient devices or group of devices. In so doing, the system may analyze the paths of the grid that may extend between the excess power sources and the devices that need the excess power. Part of the analysis may recommend action and/or take actions to skirt around or go through obstacles in the power grid so that the excess power may be successfully transferred to the devices that have deficient power sources.

[0008] In a first aspect of the present invention, there is provided a method ~~comprising one example, a processor-implemented method for enhancing the stability of the power grid may include orchestrating peer-to-peer communication between power consumption devices over a communication network, each of the power consumption devices being associated with an access device operable to~~

provide communication with other of the consumption devices. The method may further monitor, using a processor of a computing device, ~~for~~ new event data from the consumption devices. The new event data may include information selected from the group consisting of: ~~regarding the~~ device location, operating information of the devices, and ~~or~~ sensor data from the devices. The method may further analyze, using the processor, the new event data to determine power consumption behavior of the consumption devices. The method may further anticipate, using the processor, an occurrence of a future event responsive to the analysis in relation to ~~at least one of the~~ consumption devices. The method may further predict, using the processor, the outcome of the future event based on analysis of the received new event data in relation to past behavior data of the consumption device, and communicate the anticipated future event and the predicted outcome to one or more of the other consumption devices to control, using the processor, consumption choices for the one or more of the other consumption devices.

[0009] In a second aspect of the present invention, there is provided a system ~~comprising~~ A system for enhancing reliability of a power grid may include, among other structures, a processor and a network interface executable by the processor to monitor ~~for~~ new event data from power consumption devices over a network. The new event data may include information selected from the group consisting of: ~~regarding~~ device location, operating information of devices, and sensor data from the devices. The system may further include an estimation engine executable by the processor to analyze the new event data to determine power consumption behavior of one of the ~~a~~ consumption devices. The system may further include a predictor executable by the processor to anticipate an occurrence of a future event responsive to the analysis, and to predict the outcome of the future event based on analysis of the new event data in relation to past behavior data of the consumption device. The network interface is further operable to ~~may further~~ communicate the anticipated future event and the predicted outcome to one or more of the other consumption devices to control, using the processor, consumption choices for the one or more of the other consumption devices.

[0010] Another processor-implemented method of enhancing reliability of the power grid may include determining power demand from buildings that include power consumption devices connected into the power grid. The method may further determine an amount of power supply available from power sources that feed the buildings. The method may further calculate a power demand-supply gap at each of at least some of the buildings. The method may further forecast times when and