CLAIMS

1. A method for controlling power ramps with prediction in intermittent power generation plants, which minimizes the energy storage requirements in intermittent power generation plants guaranteeing at all times compliance with a maximum admissible ramp value for the power being fed into the grid, $P_G(t)$, given by a grid code regulation, or other similar instrument, characterized in that the method comprises:

- a stage for calculating, in each t moment, the maximum plant power, $P_{Max}(t)$, and the minimum plant power $P_{Min}(t)$, of the instantaneous power generated by the intermittent power generation plant, P(t), in a prediction time horizon, the maximum plant power being, $P_{Max}(t)$, and the minimum plant power being, $P_{Min}(t)$, the maximum and minimum power, respectively, being those that can be produced in the intermittent power generation time during that prediction time horizon;
- a stage for determining the maximum possible fluctuation that can occur in the instantaneous power generated by the intermittent power generation plant, P(t), wherein the maximum possible fluctuation is one of the two following fluctuations: a positive fluctuation, calculated between the instantaneous power, P(t), and the maximum plant power, $P_{Max}(t)$, and a negative fluctuation calculated between the instantaneous power, P(t), and the minimum plant power, $P_{Min}(t)$;
- a stage for dynamically calculating the state of charge of an energy storage system required to support the maximum possible fluctuation $SOC_{mpf}(t)$; and
- a stage for determining a stabilized state of charge, $SOC_{sta}(t)$, of the storage system, wherein the stabilized state of charge, $SOC_{sta}(t)$, is calculated as the state of charge of the energy storage system required to support the maximum possible fluctuation $SOC_{mpf}(t)$, plus a term that takes into account the energy required by the power being fed into the grid, $P_G(t)$, to reach the instantaneous power, P(t), generated by the intermittent power generation plant.

2. The method for controlling power ramps with prediction in intermittent power generation plants according to claim 1, characterized in that it further comprises a control stage wherein the state of charge, SOC(t), of the energy

storage system associated with the difference between the power being fed into the grid, $P_G(t)$, and the instantaneous power generated by the intermittent power generation plant, P(t), is modified according to the stabilized state of charge, $SOC_{sta}(t)$, if the previous value of the stabilized state of charge $SOC_{sta}(t-1)$, is not able to support the maximum possible fluctuation, or is not modified if the previous value of the stabilized state of charge, $SOC_{sta}(t-1)$, is capable of supporting the maximum possible fluctuation.

3. The method for controlling power ramps with prediction in intermittent power generation plants according to any of the preceding claims, characterized in that it comprises an additional stage between the stage for calculating the maximum plant power, $P_{Max}(t)$, and the minimum plant power, $P_{Min}(t)$, of the instantaneous power generated by the intermittent power generation plant, P(t), during a prediction time horizon, and the stage for determining the maximum possible fluctuation that can occur in the instantaneous power generated by the intermittent power generation plant, P(t), wherein said additional stage is a stage for correcting the maximum plant power, $P_{Max}(t)$, and the minimum plant power, $P_{Min}(t)$, of the instantaneous power generated by the intermittent power generation plant, P(t), during the prediction time horizon.

4. The method for controlling power ramps with prediction in intermittent power generation plants according to any of the preceding claims, characterized in that the maximum plant power, $P_{Max}(t)$ and/or the minimum plant power, $P_{Min}(t)$, are calculated through specific values of irradiance, G(t), and measured temperatures of the cell (T_c), or optionally, with a non-parametric method, in which the intermittent power generation plant is a photovoltaic plant.

5. The method for controlling power ramps with prediction in intermittent power generation plants according to any of claims 1 to 3, characterized in that the maximum plant power, $P_{Max}(t)$, and/or the minimum plant power, $P_{Min}(t)$, are calculated through specific values of the following meteorological variables: wind speed, $\vec{v}_w(t)$, and temperature, T(t), or optionally with a non-parametric method, in which the intermittent power generation plant is a wind turbine or a wind farm.

6. The method for controlling power ramps with prediction in intermittent

power generation plants according to claims 3 and 4, characterized in that the stage for correcting the maximum plant power, $P_{Max}(t)$, and the minimum plant power, $P_{Min}(t)$, of the instantaneous power generated by the intermittent power generation plant, P(t), during the prediction time horizon, corrects the minimum plant power, $P_{Min}(t)$, at a moment of time around sunrise and corrects the maximum plant power, $P_{Max}(t)$, at a moment of time around sunset.

7. The method for controlling power ramps with prediction in intermittent power generation plants according to any of the preceding claims, characterized in that the stage for calculating the maximum plant power, $P_{Max}(t)$, and the minimum plant power, $P_{Min}(t)$, of the instantaneous power generated by the intermittent power generation plant, P(t), is performed for each of a group of plants in order to calculate the maximum power, $P_{Max}(t)$, and the minimum power, $P_{Min}(t)$, of the group of plants.

8. The method for controlling power ramps with prediction in intermittent power generation plants according to claim 2, characterized in that it further comprises a stage for adjusting a dynamic component of the ramp defined as the rate at which the power in the plant must be modified in the control stage, according to the state of charge SOC (t) of the energy storage system.

9. The method for controlling power ramps with prediction in intermittent power generation plants according to claim 1, characterized in that it comprises an additional stage for calculating the error committed in the stage for calculating the maximum plant power, $P_{Max}(t)$, and the minimum plant power, $P_{Min}(t)$, of the instantaneous power generated by the intermittent power generation plant, P(t), during the prediction time horizon, with respect to the instantaneous power values actually generated by the intermittent power generation plant, P(t).

10. The method for controlling power ramps with prediction in intermittent power generation plants according to claim 9, characterized in that:

- if the calculated error exceeds a predetermined value, the method comprises as stage for controlling the state of charge, SOC(t), wherein the state of charge of the energy storage system required to support the maximum possible fluctuation, $SOC_{mpf}(t)$, is a target state of charge, $SOC_{tar}(t)$, and the method further

comprises a control stage, wherein the state of charge, SOC(t), of the energy storage system associated with the difference between the power being fed into the grid, $P_G(t)$, and the instantaneous power generated by the intermittent power generation plant, P(t), is modified according to the target state of charge, $SOC_{tar}(t)$, if the previous value of the target state of charge, $SOC_{tar}(t-1)$, is not capable of supporting the maximum possible fluctuation, or is not modified if the previous target state of charge, $SOC_{tar}(t-1)$, is capable of supporting the maximum possible fluctuation; while

- if the calculated error in the stage for calculating error does not exceed the predetermined value, the method comprises a stage for controlling the state of charge, SOC(t), according to claim 2.

11. The method for controlling power ramps with prediction in intermittent power generation plants according to claim 10, characterized in that the predetermined value is in the range of 60%, more preferably it is 60%.