Method for rapid monitoring of current state of charge of an energy storage device comprises determining, from a response signal, a value of an area S of a figure bounded by a voltage decay curve $U_{сп}(t)$ on a battery after switching off a test pulse and by a straight line at a level of an open-circuit voltage value of the battery during a time equal to 15 s from a moment of switching off the test pulse, wherein said area is proportional to an amount of energy stored in the battery, and determining a current state of charge of the battery from an expression: $SoC_{(t)}=k\cdot S_{(t)}$, where k is a proportionality constant, a value of which depends on a type of electrochemical system and equals 10 for lead-acid batteries, and $S_{(t)}$ is a current value of the area S. Automated monitoring of the current state of charge of the battery is carried out by periodically applying test pulses to the battery, capturing response signals to the test pulses, and determining current values of the area S from the response signal with subsequent determination of current state of charge values of the battery from the expression: $SoC_{(t)}=k\cdot S_{(t)}$. Periodic application of the test pulse to the energy storage device is performed at a specified time interval. The response signals to the test pulse are registered and the voltage decay curve $U_{сп}(t)$ is extracted from each response signal within a range from an initial value $U_{сп.\pi}$ at the moment of switching off the test pulse during a time t equal to 15 s from the moment of switching off the test pulse to a value: $U_{сп.к} = 0,37\ U_{сп.\pi}$, furthermore a number of Haar wavelets N is calculated on the voltage decay curve $U_{сп}(t)$ in a time domain of its location within the range from $U_{сп.\pi}$ до $U_{сп.к} = 0,37$ in each response signal. The area S is determined by an equation: S=N, and current state of charge of the energy storage device is determined as a percentage of its full charge state value according to an expression: $SOC_{(t)} = S_{(t)}$, in which $S_{(t)}=N_{(к)}/N_{(\pi)}\times 100\ \%$, where $N_{(к)}$ is the number of Haar wavelets on the voltage decay curve $U_{сп}$ in the response signal at a current moment of time, and $N_{(\pi)}$ is the number of Haar wavelets on the voltage decay curve $U_{сп}$ in the response signal for a fully charged storage device.