Abstract: Stieltjes (1885) found the first description of the equilibrium position for a system of discrete charges on a segment of the real line, characterizing their locations by the zeros of Jacobi polynomials. Schur, Fekete, Siegel and others developed these ideas in connection with various applications in analysis and number theory. We consider two related types of the minimum energy (equilibrium) problems for charges on the real line. In the first case, the equilibrium is attained in the external field of a charge located outside the real line. In the second case, we study the equilibrium of charges with a fixed value of potential at a given point off the real line. The equilibrium position of charges is described by the zeros of two explicit families of polynomials: One family has a particularly simple expression as a linear combination of powers of two linear functions, while the other family is related to generalized Jacobi polynomials. We also find explicit formulas for the minimum energy. Our results have applications to some questions of Erdos about the largest disks contained in polynomial lemniscates. This is joint work with Arturas Dubickas (Vilnius University).