Dani and Mainkar (2005) introduced a method for constructing a simply connected 2-step nilpotent Lie group \( N \) from a simple directed graph \( G \). The construction gives rise to a natural left-invariant metric on \( N \). Working with the corresponding metric Lie algebra, we will discuss joint work on geometric properties of these groups including geodesic properties, and describe the interplay between the graph \( G \) and the group \( N \). Following results of Mast (1994), Eberlein (1994) and Lee-Park (1996), we will discuss results on the density of closed geodesics in the compact quotient \( N \) by a lattice, where \( N \) is constructed from a simple graph. (Received September 18, 2017)