Abstract. We consider a radio network consisting of \( n \) stations represented as the complete graph on a set of \( n \) points in the Euclidean plane with edge weights \( \omega(p, q) = |pq|^\delta + C_p \), for some constant \( \delta > 1 \) and nonnegative offset costs \( C_p \). Our goal is to find paths of minimal energy cost between any pair of points that do not use more than some given number \( k \) of hops. We present an exact algorithm for the important case when \( \delta = 2 \), which requires \( O(kn \log n) \) time per query pair \((p, q)\). For the case of an unrestricted number of hops we describe a family of algorithms with query time \( O(n^{(1+\alpha)}) \), where \( \alpha > 0 \) can be chosen arbitrarily. If we relax the exactness requirement, we can find an approximate \((1+\epsilon)\) solution in constant time by querying a data structure which has linear size and which can be built in \( O(n \log n) \) time. One tool we employ might be of independent interest: For any pair of points \((p, q)\) we can report in constant time the cluster pair \((A,B)\) representing \((p, q)\) in a well-separated pair decomposition of \( P \).