In this talk, we consider scattering problems for a generalized form of discrete Schroedinger operators on periodic lattices with long-range potentials. We prove that modified wave operators with time-independent modifiers, known as Isozaki-Kitada modifiers, exist and that the operators are partially isometric from the absolutely continuous subspace of the free operator onto that of the perturbed operator. We also show that we can apply the above method to quantum walks with coins with long-range perturbations.