We explain how to calculate, in some particular cases, the Seidel representation of $\pi_1(\mathrm{Ham}(M,\omega))$ in the units of the quantum homology ring, where $\mathrm{Ham}(M,\omega)$ denotes the group of Hamiltonian symplectomorphisms of a closed symplectic manifold (M,ω). This is very difficult to calculate in general. However, following the work of D. McDuff and S. Tolman, we make some progress by computing explicit expressions of the Seidel elements in the case of 4-dimensional NEF toric manifolds. From these expressions we can obtain the quantum homology ring of these manifolds. We also give explicit formulas for the Seidel elements in some non-NEF cases. These results are closely related to recent work by Fukaya, Oh, Ohta, and Ono, González and Iritani, and Chan, Lau, Leung, and Tseng. The main difference is that in the 4–dimensional case the methods we use are more elementary: they do not rely on open Gromov–Witten invariants nor mirror maps. We only use the definition of Seidel's elements and specific closed Gromov–Witten invariants which we compute via localization. This makes the resulting formulas directly readable from the moment polytope. This is joint work with Rémi Leclercq.