We will show that the the optimal transport problem

$$\inf_{\pi} \int c(x-y)\pi(dxdy), \qquad \pi \in \Pi(\mu,\nu)$$

with $c : \mathbb{R}^d \to \mathbb{R}^d$ convex has a solution of the form $\pi = (\mathrm{Id}, T)_\sharp \mu$. The proof is based on a decomposition of Sudakov's type.