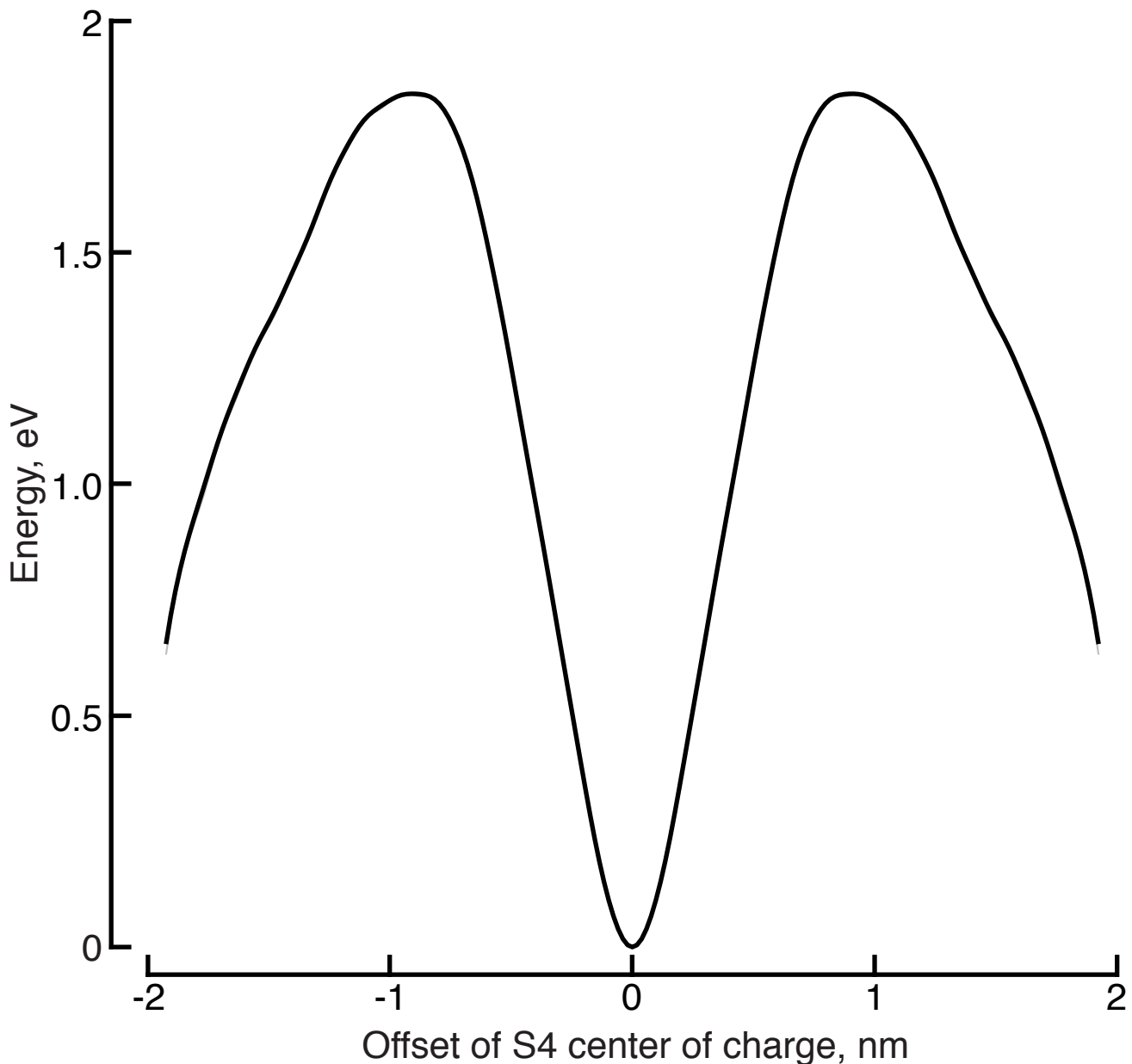


**Fig 6 The 'Conventional' S4 is a Screw**



**Fig 6** Rather than following the spiral path of 'conventional' S4 motion, we move the S4 charges across the membrane without allowing them to rotate about the S4 axis. Very large energies are needed to force this path of motion. The torque needed to 'kill the thread' this way is 200 pN\*nm (not shown).