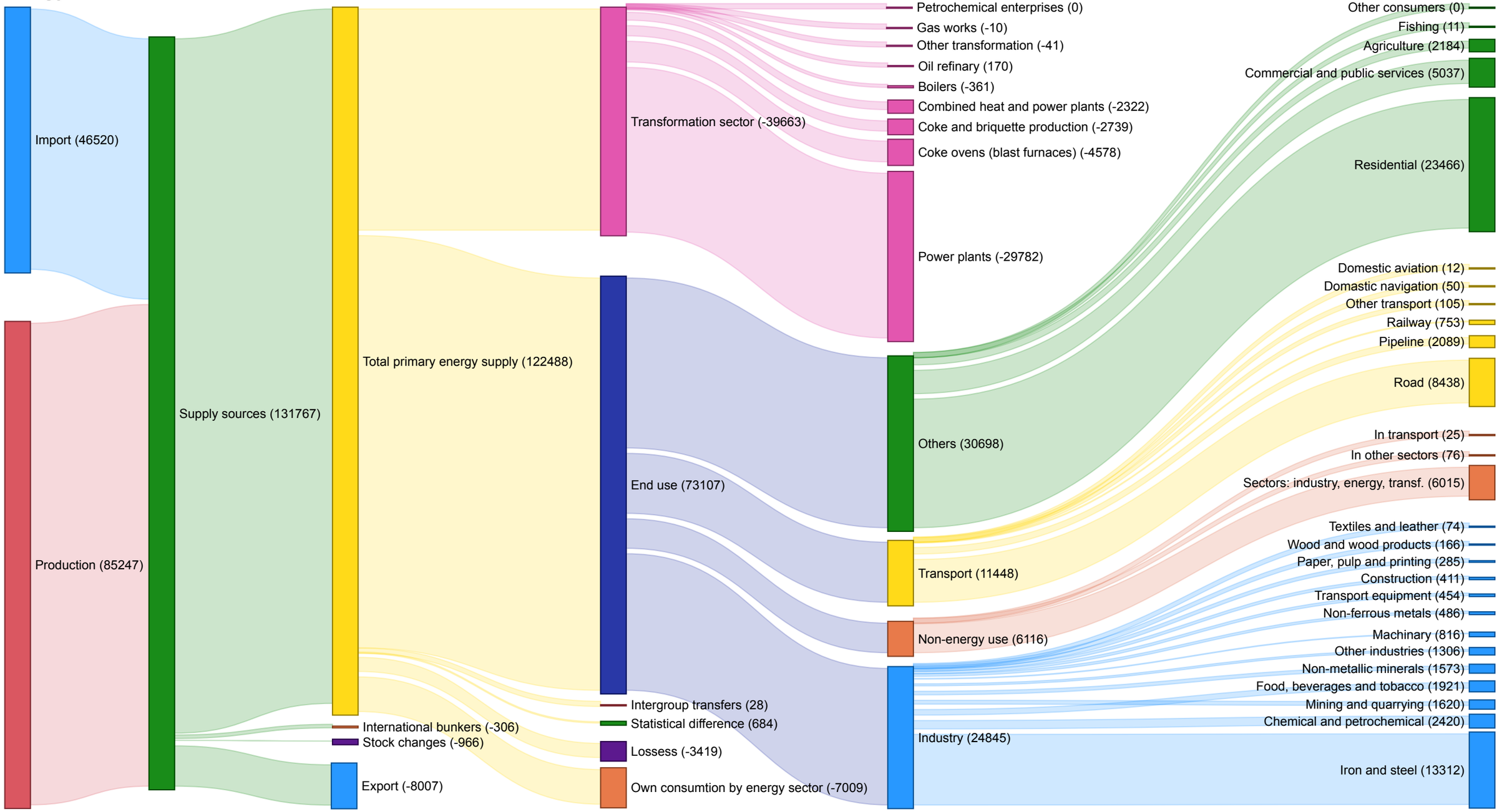Energy flows, th. toe, 2012