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The potential role of Neutral Beam Injection in EU DEMO PIETRO VINCENZI, Consorzio RFX (CNR, ENEA, INFN, Universit di Padova, Acciaierie Venete SpA) Corso Stati Uniti 4 - 35127 Padova, Italy, JEAN-FRANCOIS ARTAUD, CEA/IRFM, 13108 St Paul-lez-Durance, France, TOMMASO BOLZONELLA, Consorzio RFX (CNR, ENEA, INFN, Universit di Padova, Acciaierie Venete SpA) Corso Stati Uniti 4 - 35127 Padova, Italy, GERARDO GIRUZZI, CEA/IRFM, 13108 St Paul-lez-Durance, France — EU DEMO studies for pulsed (DEMO1) and steady-state (DEMO2) concepts are currently in the pre-conceptual phase. Present DEMO1 design is based on ITER baseline H-mode scenario, while DEMO2 is based on advanced scenarios with moderate reversed q profile sustained by non-inductive currents. One of the possible flattop heating power systems currently considered is Neutral Beam Injection (NBI). In this work the role of NBI in DEMO1 and DEMO2 is investigated by means of integrated simulations of DEMO scenarios using METIS fast tokamak modelling tool. Limitations, requirements and benefits of the use of a NBI system are discussed. For DEMO1 pulsed concept, the role of NBI is mainly central plasma heating for scenario stability (high fusion power H-mode). As a by-product of the tangential injection, NBI is capable of current drive, which is favorable in order to extend the discharge duration. Regarding a steady-state DEMO2 concept, in addition to plasma heating, NBI becomes a direct actuator for the advanced scenario by driving a considerable part of the plasma current. This requires more than 100MW with off-axis injection. The effect of an increase of the injection energy on the driven current density profile is also presented for DEMO2.

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