This report was commissioned by the Danish Climate Commission in 2009 to analyse how research, development and demonstration (RD&D) on sustainable energy technologies can contribute to make Denmark independent on fossil energy by 2050. It focuses on the RD&D investments needed as well as adequate framework conditions for Danish knowledge production and diffusion within this field. First part focuses on the general aspects related to knowledge production and the challenges related to research. Energy technologies are categorized and recent attempt to optimize Danish efforts are addressed, including RD&D prioritisation, public-private partnerships and international RD&D cooperation. Part two describes the development and organisation of the Danish public RD&D activities, including benchmark with other countries. The national energy RD&D programmes and their contribution to the knowledge value chain are described as well as the coordination and alignment efforts. Part Three illustrates three national innovation systems for highly different technologies – wind, fuel cells and intelligent energy systems. Finally, six recommendations are put forward: to make a national strategic energy technology plan; to enforce the coordination and synergy between national RD&D programmes; to strengthen social science research related to the transition to a sustainable energy system; to increase public RD&D expenditure to at least 0.1% of GDP per year; to strengthen international RD&D cooperation; and to make a comprehensive analysis of the capacity and competence needs for the energy sector. The authors were assisted by a reference group with participation from the Danish Energy Authority, the Danish Research and Innovation Agency, the TSO energinet.dk and the Climate Commission secretariat. The report conclusions and recommendations are solely the responsibility of the authors.

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