

WORLD ENERGY OUTLOOK 2014 FACTSHEET

Nuclear power: retreat, revival or renaissance?

- ▶ **At the end of 2013, there were 434 operating commercial nuclear reactors worldwide, with total installed capacity of 392 GW.** Nuclear power plants today account for 11% of global electricity generation, down from a peak of almost 18% in 1996. More than 80% of capacity is in OECD countries. Though their share of installed capacity is low today, non-OECD countries are set to account for the bulk of future growth: of the 76 GW presently under construction, more than three-quarters is in non-OECD countries.
- ▶ **In the New Policies Scenario, the share of nuclear power in global electricity generation increases slightly to 12% in 2040. Nuclear generation capacity rises by 60% to 624 GW in 2040.** This is the net result of 380 GW of capacity additions and 148 GW of retirements. The pattern of growth reflects the challenges facing all types of new thermal generation capacity in competitive power markets and the specific suite of other economic, technical and political challenges that nuclear power has to overcome. China, India, Korea and Russia see the most significant increases in installed nuclear capacity. The increase in China, of 132 GW, exceeds the current installed capacity of the United States and Russia combined. India's and Russia's nuclear power capacity rises by 33 GW and 19 GW, respectively. Despite capacity in Korea more than doubling, to 49 GW, the OECD share of global nuclear capacity falls from 80% in 2013 to 52% in 2040. The number of economies worldwide operating nuclear reactors increases from 31 in 2013 to 36 in 2040, as newcomers more than offset countries that phase out nuclear power. Uranium resources are more than sufficient to provide fuel to satisfy these projections.
- ▶ **Nuclear power's limited exposure to disruptions in international fuel markets and its role as a reliable source of baseload electricity can enhance energy security.** Although the upfront costs to build new nuclear plants are high and, often, uncertain, nuclear power can offer economic benefits by adding stability to electricity costs and improving balance of payments. In the Low Nuclear Case – in which global capacity drops by 7% compared with today – indicators of energy security tend to deteriorate in countries that utilise nuclear power. For example, the share of energy demand met from domestic sources is reduced in Japan (by 13 percentage points), Korea (by six) and the European Union (by four) relative to the central scenario.
- ▶ **Nuclear power is one of a limited number of options available at scale to reduce CO₂ emissions. It has avoided the release of an estimated 56 Gt of CO₂ since 1971, or close to two years of emissions at current rates.** By 2040, in the New Policies Scenario, nuclear power has avoided the release of almost four years of CO₂ emissions at current rates. The average cost of avoiding emissions through new nuclear capacity depends on the mix and the costs of the fuels it displaces, and therefore ranges from very low levels to over \$80/tonne.
- ▶ **In the New Policies Scenario, the cumulative amount of spent nuclear fuel that has been generated (a significant portion of which becomes high-level radioactive waste) more than doubles, reaching 705 000 tonnes in 2040.** Today – 60 years since the first nuclear reactor started operating – no country has yet established permanent facilities for the disposal of high-level radioactive waste from commercial reactors, which continues to build up in temporary storage. All countries which have ever had nuclear generation facilities have an obligation to develop solutions for long-term storage.
- ▶ **A wave of retirements of ageing nuclear reactors is approaching: almost 200 of the 434 reactors operating at the end of 2013 are retired in the period to 2040,** with the vast majority in the European Union, the United States, Russia and Japan. The industry will need to manage this unprecedented rate of decommissioning, while also building substantial new capacity for those reactors that are replaced. We estimate the cost of decommissioning plants that are retired to be more than \$100 billion. Considerable uncertainties remain about these costs, reflecting the relatively limited experience to date in dismantling and decontaminating reactors and restoring sites for other uses. Regulators and utilities need to continue to ensure that adequate funds are set aside to cover these future expenses.