

Foreword

There is no doubt that the energy sector will only reach net-zero emissions if there is a significant and concerted global push to accelerate innovation. It is also clear that there is a disconnect between the climate goals that governments and companies have set for themselves and the efforts underway to develop better and cheaper technologies to realise those goals. While we have witnessed tremendous progress in technologies like solar PV, wind turbines and lithium-ion batteries, the technological advances that will be needed demand a step change in both the speed at which innovation occurs and the scale at which new technologies are deployed. And this progress must be achieved in a way that makes our energy systems more secure and resilient.

The energy innovation challenge facing the world extends to sectors that have not significantly changed for many decades and that do not yet have commercially available low-carbon options. It also requires a rapid evolution of the technology mix, particularly in some emerging economies that are just starting out on their decarbonisation journeys. The under-appreciation of these urgent challenges in today's energy debate is a real concern. However, this *Energy Technology Perspectives Special Report on Clean Energy Innovation* provides reason for hope. It pinpoints the areas where innovation is most urgently needed and, crucially, recommends that governments integrate clean energy innovation into the heart of their energy policy making.

This report represents a new chapter in the International Energy Agency's (IEA) work under the *Energy Technology Perspectives (ETP)* banner. It is three years since the IEA released its last *ETP* report, and we have used that time to reflect on the critical technology challenges that need to be addressed in such sectors as long-distance transport and heavy industry, which are all too often neglected. The time away has also allowed us to develop improved modelling tools that now provide us with unparalleled capacity to answer key technology questions in more detail.

The return of *ETP*, starting with this Special Report and continuing with the release of the flagship *ETP 2020* publication later in 2020, could not come at a more pivotal moment as Covid-19 has further complicated efforts to accelerate clean energy transitions. Since the crisis erupted, the IEA has mobilised its resources to support governments and other energy stakeholders, notably with the publication of our Sustainable Recovery Plan as part of the *World Energy Outlook (WEO)* series. The plan shows how specific policies and targeted investments over the next three years could simultaneously boost economic growth, create millions of jobs and make 2019 the definitive peak in global greenhouse gas emissions. This *ETP* Special Report builds on that foundation by setting out the key priorities for innovation to continually drive emissions down from that peak, all the way to net-zero.

Together, the *ETP* and *WEO* reports will provide the foundation for the IEA Clean Energy Transitions Summit, which will bring together dozens of ministers and CEOs, as well as leaders from the investment community and civil society, with the aim of driving economic development by accelerating transitions towards clean, resilient and inclusive energy systems. It is my firm conviction that the efforts we are now making – including the revamp of the *ETP* series – are significant advances in the IEA's modernisation agenda that I launched in 2015, which is putting the Agency at the forefront of sustainable and secure clean energy transitions globally.

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