

This report was prepared by the Energy Investment Unit in the Energy Supply and Investment Outlook (ESIO) Division of the Directorate of Sustainability, Technology and Outlooks (STO). Michael Waldron co-ordinated the project and was the lead author; he designed and directed the report with Tim Gould, Head of Division for Energy Supply and Investment Outlooks.

The team of principal authors and co-ordinators consisted of Lucila Arboleya Sarazola (led clean electricity; co-ordinated Chapter 3); Peter Zeniewski (led fuel supply; co-ordinated Chapter 4); Blandine Barreau (led financial systems); Tanguy de Bienassis (led buildings/end-use); Pablo Gonzalez (co-ordinated sources of finance modelling; clean electricity); Inchan Hwang (led transport; co-ordinated sources of finance data); Laura Maiolo (producer economies, industry). Ryszard Pospiech co-ordinated modelling and data across sectors.

Key contributions were made by Adam Baylin-Stern (CCUS), Arnaud Rouget (access), Jihyun Selena Lee (efficiency), Amelia Brinkerhoff (policies, financial indicators) and Hugh Miller (financial system/indicators). The report draws upon IEA modelling and analytical efforts by the World Energy Outlook team and the Energy Technology Perspectives team. Eleni Tsoukala and Marie Fournier-S'Niehotta provided essential support.

The report benefited greatly from other contributions from experts within the IEA: Yasmine Arsalane, Stéphanie Bouckaert, Davide D'Ambrosio, Chiara Delmastro, Carlos Fernandez Alvarez, Yuanyuan Gong, Zoe Hungerford, Tae-Yoon Kim, Jinyoung Kim, Kevin Lane, Lilly Yejin Lee, Christophe McGlade, Lia Newman, Sebastian Papapanagiotou, Apostolos Petropoulos, Jasmine Samantar, Martin Tav, Gianluca Tonolo and Brent Wanner. Erin Crum was the copy-editor.

Mechthild Wörsdörfer (Director for STO), Laszlo Varro (Chief Economist) and Alessandro Blasi provided support and guidance throughout the project.

Valuable comments and feedback were provided by senior management and numerous other colleagues within the IEA, in particular Keisuke Sadamori, Laura Cozzi, Katherine Dixon, Paolo Frankl, Peter Fraser, Rebecca Gaghen, Timur Guel, Tom Howes, Brian Motherway, Ali Al-Saffar, Cyril Cassisa, Kieran Clarke, Alejandro Hernandez, Joerg Husar, Maximilian Jarrett, Randi Kristiansen, Nathaniel Lewis-George, Jinsun Lim, Luca Lo Re, Rebecca McKimm, Ana Rovzar, Alan Searl and Nicole Thomas.

Thanks also to Jad Mouawad, Head of the Communications and Digital Office (CDO), and to CDO colleagues Tanya Dyhin, Merve Erdil, Grace Gordon, Jethro Mullen, Rob Stone, Jon Custer, Christopher Gully, Julie Puech, Mariam Aliabadi, Astrid Dumond, Isabelle Nonain-Semelin, Clara Vallois, Gregory Viscusi and Therese Walsh.

Graham Weale provided valuable expert feedback and editorial advice.

A High-Level Advisory Group provided strategic guidance for this project. Its members are:

Amani Abou-Zeid	Commissioner for Infrastructure and Energy, African Union Commission
Alfonso Blanco	Executive Secretary, Latin American Energy Organization (OLADE)
Roberto Bocca	Head of Energy, Materials and Infrastructure, World Economic Forum
Jason Bordoff	Founding Director of the Center on Global Energy Policy, Columbia University SIPA
Deirdre Cooper	Portfolio Manager and co-head of Thematic Equities, Ninety One
Charles Donovan	Executive Director, Centre for Climate Finance, Imperial College Business School
Nandita Parshad	Managing Director, Sustainable Infrastructure, European Bank for Reconstruction and Development
Demetrios Papathanasiou	Global Director for Energy and Extractives, World Bank
Ken Rogoff	Thomas D. Cabot Professor of Public Policy and Professor of Economics, Harvard University
Gurdeep Singh	Chairman and Managing Director, NTPC
Masakazu Toyoda	Chairman, The Institute Of Energy Economics, Japan
David Victor	Professor of innovation and public policy at the School of Global Policy and Strategy, UC San Diego
Merte Villum Pedersen	Head of Section, Business Models and Finance, UNEP DTU Partnership
Yongping Zhai	Chief, Energy Sector Goup, Asian Development Bank

The report was carried out in collaboration with the World Bank and the World Economic Forum.

Valuable modelling input was provided by Andrew Burns, Alexander Haider and Charl Jooste from the World Bank Macroeconomics and Fiscal Management Global Practice. Valuable advice, guidance and case studies were provided by colleagues across the World Bank, including Pierre Audinet, Zuzana Dobrotkova, Pedro Antmann, Bente Brunes, Jonathan Coony, Sabine Cornieti, Fernando De Sisternes, Thomas Flochel, Chandrasekar Govindarajalu, Stéphane Hallegatte, Elín Hallgrímsdóttir, Claire Nicolas, Julie Rozenberg, Henrik Rytter Jensen and Sandhya Srinivasan.

We are grateful for the support, guidance and cooperation of Espen Mehlum, Justine Roche and Bart Valkhof from the World Economic Forum. Valuable advice and case studies were provided through the World Economic Forum’s taskforce on Mobilizing Investment for Clean Energy in Emerging Economies.

Many experts from outside of the IEA provided input, commented on the underlying analytical work, and reviewed the report. Their comments and suggestions were of great value. They include:

Alexander Ablaza	Asia-Pacific ESCO Industry Alliance
Gabriel Alonso	547 Energy
Manuel Baritaud	European Investment Bank
Thiago Barral	Empresa de Pesquisa Energética (EPE)
Harmeet Bawa	Hitachi ABB Power Grids
Leila Benali	Apicorp
Mitchell Board	Puma Energy Holdings Pte Ltd
Laurence Boone	OECD
Marie-Aimée Boury	Société Générale
Kanika Chawla	Sustainable Energy for All
Olivia Coldrey	United Nations Sustainable Energy for All (SEforALL)
Yannis Dafermos	SOAS University of London
Simon Dikau	Grantham research Institute on Climate Change and the Environment, London School of Economics
Julie Evain	I4CE, Institute for Climate Economics
Laura Fortes	GOGLA
Stefano Goberti	ENI
Emma Gordon	Administrative Data Research UK
Adil Hanif	European Bank for Reconstruction and Development (EBRD)
Håvard Halland	OECD Development Centre
Matt Harris	Global Infrastructure Partners
David Hart	Information Technology and Innovation Foundation

Andrew Herscowitz	US International Development Finance Corporation
Anuschka Hilke	I4CE, Institute for Climate Economics
Donald Perry Kanak	Prudential Plc
Benoît Leguet	I4CE, Institute for Climate Economics
Lahra Liberti	OECD Development Centre
Elvira López Prados	ACCIONA
Delphine Marchi	IFC
Jason Mariyappan	PETRONAS (Petroleum Nasional Bhd)
Dan McDougall	Climate and Clean Air Coalition
Valerio Micale	CPI
Nazmeera Moola	Ninety One
Joao Moreno	Banco BTG Pactual SA
Baysa Naran	CPI
Richard Norris	Pandreco Ltd
Jose Ignacio Perez-Arriaga	Comillas Pontifical University's Institute for Research in Technology, Spain
Andrea Pescatori	IMF
Davide Puglielli	Enel
Lazeena Rahman	IFC
Milagros Rivas Saiz	IDB Invest
James Roaf	IMF
Nick Robins	Grantham research Institute on Climate Change and the Environment, London School of Economics
Daniel Schroth	African Development Bank (AfDB)
Gagan Sidhu	CEEW Centre for Energy Finance
Aida Sitdikova	EBRD
Maria-Antonietta Solinas	Eni
Bjarne Steffen	ETH Zurich
Jessica Stephens	AMDA
Cecilia Tam	OECD

Wim Thomas	Consultant
Akhilesh Tilotia	National Investment and Infrastructure Fund (NIIF)
Fabby Tumiwa	IESR
Kaniaru Wacieni	Africa 50
Andrew Walker	Cheniere Marketing Ltd.
Kelvin Wong	DBS Bank
Peter Wood	Royal Dutch Shell
Akira Yabumoto	J-Power
Shinichi Yasuda	Development Bank of Japan

The work could not have been achieved without the support and co-operation provided by many government bodies, organisations and companies worldwide, notably: European Commission and European Union's Horizon 2020 research and innovation programme funding under grant agreement No 952363; Ministry of Economy, Trade and Industry, Japan; Ministry of Foreign Affairs, Japan; and Ministry of Economic Affairs and Climate Policy, Netherlands.

This publication has been produced with the financial assistance of the European Union as part of the Clean Energy Transitions in Emerging Economies programme. The Clean Energy Transitions in Emerging Economies programme has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 952363. This publication reflects the views of the IEA Secretariat but does not necessarily reflect those of individual IEA member countries or the European Union (EU). Neither the IEA nor the EU make any representation or warranty, express or implied, in respect to the publication's contents (including its completeness or accuracy) and shall not be responsible for any use of, or reliance on, the publication.