

Rapid global transformations towards net zero CO₂ emissions

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■Abstract

The presentation is focusing on transformation pathways consistent with the long-term goal of the UN Paris Agreement to hold warming well below 2°C and pursue limiting it to 1.5°C. The pathways illustrate the paramount importance of rapid near-term transformation towards net-zero emissions that will have significant long-term gains for the economy (even without considering the benefits of avoided climate impacts). Limiting the overshoot of the temperature goals has multiple benefits, as it reduces reliance on global net negative CO₂ emissions; it is economically more attractive over the long term; and involves lower climate risks. The talk will further identify possible alternative configurations of net-zero CO₂ emissions systems and the distinct roles of different sectors and regions in order to balance emissions sources and sinks. In this context, the importance of demand-side measures cannot be overemphasized. It is the demand in service sectors which ‘sizes’ the overall mitigation challenge. Low-Energy-Demand scenarios illustrate how the historical trajectory of ever-rising energy demand leading to ever aggravating resource and environmental impacts can be reversed driven by technological, organizational and behavioral innovations in all aspects of energy end-use. Dramatic transformations in the way we move around, heat and cool our homes, and buy and use devices and appliances can help raise living standards in the Global South to meet, even exceed the UN Sustainable Development Goals, while also remaining within the 1.5°C target set by the 2015 Paris Agreement, and without relying on unproven and uncertain negative emissions technologies (CO₂ removal from the atmosphere by technological means).

■Biography

Keywan Riahi is the Director of the IIASA Program on Energy, Climate, and Environment. He is also visiting professor at the Graz University of Technology (TU Graz), a fellow at the Payne Institute of the Colorado School of Mines, and an external faculty member at the Institute for Advanced Study (IAS) at the University of Amsterdam.

His main research interests are long-term patterns of technological change and economic development, particularly evolution of the energy system. His present research focuses on energy-related sources of global change, and on future development and response strategies related to the Sustainable Development Goals (SDGs).

Dr. Riahi’s current projects, among others, include an EU-ERC Synergy Grant called GENIE on negative emissions technologies and ‘Exploring National and Global Actions to reduce Greenhouse gas Emissions (ENGAGE)’.

He is a member of the Scientific Steering Committee of the Integrated Assessment

Modeling Consortium (IAMC) and has co-led and coordinated a variety of different international community research efforts, including for example the development of the RCP-SSP framework for the integrated assessment of climate change, or recently the EU-funded research project CD-LINKS (Linking Climate and Development Policies-Leveraging International Networks and Knowledge Sharing). His work within international modeling comparison projects, such as Stanford-based Energy Modeling Forum, focuses on climate and energy policies for rapid transformation toward environmental, economic and social sustainability. He is regular advisor to national government organizations, energy and environment ministries, and the Industry.

Dr. Riahi has been appointed as a coordinating lead author in Working Group III of the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (chapter three on mitigation pathways compatible with long-term goals). He has served as lead author and review editor to various international assessments, such as the Global Energy Assessment (GEA), The World in 2050 (TWI2050), and other IPCC reports, including the Third, Fourth, and Fifth Assessment Reports, the Special Report on Emissions Scenarios (SRES), the Special Report on CO₂ Capture and Storage (SRCCS), and the Special Report on Renewable Energy (SRREN).

Clarivate Analytics (formerly Thomson Reuters) has repeatedly acknowledged Riahi as a Highly Cited Researcher Worldwide in two categories between 2016 and 2020.