



## **Expert Group Meeting: Population Dynamics and Climate Change**

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### **Implications of population dynamics and size for mitigation**

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#### **Abstract**

Significant demographic change is anticipated over the coming decades in many parts of the world, including substantial growth in some regions, shrinking populations in others, aging, urbanization, and changes in other household characteristics such as size and composition. These changes can affect emissions of greenhouse gases either through their effect on economic growth and the scale of the economy, or by affecting the mix of consumption goods over time. We use a multi-region, multi-sector general equilibrium model of the global economy to develop a set of scenarios that quantify the potential effects of demographic change on greenhouse gas emissions over the next 50-100 years. The scenarios are driven by a set of joint population-household-urbanization projections for multiple world regions that draw on long-term projections from the UN and IIASA, and on household headship rates from recent survey data and household model projections. The economic model is calibrated with production data from the Global Trade Analysis Project (GTAP), energy and emissions data from the International Energy Agency, and household consumption and income data from national surveys. Results show that accounting for demographic change can substantially affect projected greenhouse gas emissions, relative to scenarios that do not account for such change, with the sign and magnitude of these effects depending on the region and the relative importance of different demographic changes such as aging or urbanization. We also investigate the effect on future emissions of a slower population growth scenario, achievable at least in part through population-related policies, and compare it to emissions reductions achievable through other means such as increases in energy efficiency or renewable energy supply.