

Coping through 2050

The current trends in energy demands, population growth, development pathways, and climate change present serious challenges for the coming decades. A serious look at coping and adaptation strategies to meet the challenges of 2050 and beyond 2050 is needed.

The interconnections which is illustrated by globalization and global change defines some of the emerging patterns which frame the vision of 2050. Markets, resources, information, business enterprises, ecosystem services, and climate are all interwoven in a complex fashion which led to rapid development during the last Century, and to global deterioration of the environment, ecosystem services, and the climate system. However, these interconnection also represents an opportunity to develop coping mechanisms to meet the challenges of globally challenged future. The perspective that is portrayed here is one that faces the stark reality that climate change in the coming decades will continue to unravel the fragile fabric of the earth system. Strategies then are needed to provide a course of actions to begin the process to mitigate the effects of GHG warming and to cope with the global environmental changes that are emerging across the globe.

What does a 2050 world look like: globally averaged temperature increases of 1.5 degree, atmospheric CO₂ concentrations around 440ppm, disruptive melting of the major continental ice sheets in Greenland and Antarctica, biotic disruption due breaching of critical thresholds, adjustments of food producing areas, water shortages in Asia, flooding of coastal areas, and disruption of ocean biota due increased ocean acidification and nutrient pollution. The impacts of these climate changes will result in the need to deal with coastal relocation, food and energy security issues, large regional displacement of people, and water scarcity for many regions of the world.

Coping framework will involve greater social-economic-technological-scientific collaboration to enhance the resilience of regions under stress and to enable mitigation actions to work aggressively to off-set the current trends of emissions affecting the climate system. Socio-economic and technological changes that are in the works include: greater reliance on renewable energy, food-energy systems integrated for biomass production, ground transportation electrified, CCS implemented globally to decarbonizes coal, use of the biological pump to draw down CO₂ from the atmosphere.

What is needed to enable strategies to cope with a 2050 world includes:

- Enhanced Global Cooperation: Policies and financial mechanisms need to set in place to enhance the ability to increase the resiliency of regions in an equitable and accessible fashion
- Collaboration of science and engineering: Mitigation and Adaptation strategies need to be formed and technologies developed to provide coping mechanisms to deal with changes already in the system and new technological advances to change the direction of the climate change trends. These also involve a strong linkage to social and financial changes to implement these strategies and mechanisms.
- Social contract for global sustainability goals: A global commitment of governments and the public need to understand the urgency to work toward a development pathway that is less consumptive and depend more on renewal pathways.

These strategies will need to deal with multi-sector and -scaled set of issues, in a simultaneous fashion. These include: Energy; Thresholds and abrupt changes; Development strategies; Resource sharing; and Risk assessment

Factors which may unravel these activities include more rapid displacement of the Greenland and Antarctic ice sheets; degassing of CH₄ from the permafrost and coastal regions of the northern high latitudes; and the increased desertification of the continental core regions.