

The World Has Changed – Opportunities for Earth Scientists in the Mineral and Energy Arenas in the 21st Century

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We are experiencing the biggest boom in mineral and energy production ever, driven by rising world population and improvement in the standard of living in many parts of the world. The trends bode well for Earth scientists involved in mineral and energy resources and in related environmental fields. Although recycling and extraction of metals from low-grade, former waste will contribute to supply, new resources will need to be found. The geopolitical landscape of mineral resources has shifted dramatically in recent decades. China is by far the leading mineral producer. With 20% of the global population, China produces approximately 97% of the world's rare earth elements, 75% of the tungsten, 40% of the coal, and 35% of the iron ore. China's coal production will influence the ability of the rest of the world to mitigate or adapt to climate change. Of 40 key mineral commodities produced in 2008, China ranked among the top three producers of 26. With 0.5% of the global population, Canada ranked among the top three producers of 11 of these 40 commodities, leading in potash (31%) and uranium (21%). Canada is also a major producer of several byproduct elements that may emerge in the preferred technologies for solar energy production, including cadmium, indium, and selenium. China is not a significant producer of many mineral resources that are concentrated in Precambrian cratons, including nickel, cobalt, platinum-group elements, and diamonds. Canada is therefore well positioned to continue as a significant supplier of resources for global demand. A combination of trends in production, regional geology, and emerging technologies will influence exploration, research, and public policy in the decades ahead.

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Jon is the State Geologist and Director of the Nevada Bureau of Mines and Geology, a research and public service unit of the University of Nevada, Reno. He earned a bachelor's degree in geology and German from Lehigh University and master's and Ph.D. degrees in geology from the University of California, Berkeley. His geological career has included experience with industry, teaching, research, and government. He has worked in copper, iron, and uranium exploration and mining; taught undergraduate and graduate geology courses and supervised graduate theses; and conducted and directed research at state geological surveys. In 1988 he became the Nevada State Geologist. He was the 1997 President of the American Institute of Professional Geologists, the 1998-2002 President and Chair of the Board of Directors of the Western States Seismic Policy Council, the 2000-2001 President of the Association of American State Geologists, the 2003 President of the Society of Economic Geologists, and the 2006-2007 President of the Nevada Petroleum Society. He is currently the Secretary of the Nevada Earthquake Safety Council, Chair of the Nevada Hazard Mitigation Planning Committee, and Treasurer of the Geological Society of America. He was the 2009 recipient of the American Geological Institute's Medal in Memory of Ian Campbell for Superlative Service to the Geosciences.

