



Alberta Oil Sands, August 2010 (Elvin Wyly)

**World Commission on Environment and Development (the Brundtland Commission),
“Towards Sustainable Development.”**

The environmental paradox of life in most contemporary cities is one of *invisibility*: we don't usually *see* the tentacles of material, energy, and resource flows that connect our local lives in the city to the natural world beyond at the regional, national, and global scales. We have to learn about the far-flung networks of agricultural production, processing, and transportation that deliver goods to the shelves of the grocer down the street. We have to be reminded that the computers, televisions, smartphones, and other advanced devices used by so many of us in the “informational city” are packed with contradictions -- rare alloys and precious metals, but also materials that are hazardous to the natural environment as well as human health -- in a transnational network of “e-waste.” We have to be told to stop and think about what it means to drive a long distance in an automobile to see the dramatic urban growth of Fort McMurray, Alberta, and then to ride in a small airplane to capture images of the extraordinary phenomenon of the Oil Sands. So many aspects of life in Walt Rostow's “age of high mass consumption” are simply not sustainable, given what we know about the environmental consequences and the famous Brundtland Commission criterion of “meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs.”

You should hold me responsible, therefore, for the decisions involved in acquiring the image shown above. Once the irrevocable decisions were made, however, I just *had* to share the image with you. Fort McMurray had been on my bucket list ever since I read a wonderful piece in *The New Yorker* noting that the region's extraordinary growth leads residents to call the place "Fort McMurray."¹ You might recall from our exploration of suburbia that there are an estimated 39 thousand "FIFOs" -- fly-in, fly-out workers who have homes and families elsewhere, and come to the Sands solely for work. How does this alter our definition of a city, and what does it mean for sustainability?

The estimates are that the Athabasca sands contain enough heavy hydrocarbon "bitumen" tar to yield 1.7 trillion barrels of "synthetic" crude. If even only a tiny share of this volume can be recovered and processed, this is still the second-largest oil reserve on the planet, after Saudi Arabia's proven reserves of "conventional" crude that flows out under pressure once oil wells are drilled. But producing synthetic crude involves a complex process (the most prevalent procedure here is "steam-assisted gravity drainage") that requires 1,600 megajoules of energy to extract each barrel of oil from the sandy, rocky mixture of quartzite, clay, water, and heavy hydrocarbons. That's an amount of energy equivalent to about a quarter of a barrel of oil. This means that for every four barrels of unconventional crude, one has been consumed to obtain the resource. For this reason, production at the oil sands is only economically profitable when world oil prices are sufficiently high. It costs about US\$30 to produce each barrel of synthetic crude; as of November 4, 2013, West Texas Intermediate is selling at \$94.62 per barrel. The energy required to produce synthetic crude is also one of the reasons the oil sands -- and the Keystone XL pipeline proposed to expand the capacity of bitumen transport south to the U.S. and export shipping terminals on the Gulf of Mexico -- has become one of North America's most prominent political struggles.

This is just one image among many that could be offered to get us to think about the relations between cities and the natural environment. As LeGates and Stout note, "The physical city is a human-made construct, but the relationship between the city and the surrounding natural environment has always helped to define the character and quality of urban life."

Questions

1. Do you have an image in your mind's eye that, like the Alberta image above, helps you tell a story of the connections between urbanization and environment?
2. The Brundtland Commission writes, "The Earth is one but the world is not." What do they mean by this, and what implications do you find most useful from this concise statement?
3. The Commission traveled the world for three years, and held special public hearings to hear the views of thousands of people. The Commission reports:
"We found everywhere deep public concern for the environment, concern that has led not just to protests but often to changed behavior. The challenge is to ensure that these new values are more adequately reflected in the principles and operations of political and economic structures."

¹ Elizabeth Kolbert (2007). "Annals of Ecology: Unconventional Crude." *The New Yorker*, November 12, 46-51.

Individual behavior, in other words, is changing in encouraging ways -- but the principles and operations of “political and economic structures” are more problematic. Can you think of examples of the problem the Commissioners identify?

4. The Commissioners’ explanation of the concept of sustainable development is multi-faceted, and deals with a) the needs of the world’s poor, b) the limitations of current technologies and social organization, c) the relations between economic growth and improvements in living standards, d) equity considerations across generations and within generations, and e) contextual geographical variations in how these matters relate to one another in particular settings.

Given this multi-faceted definition, it’s hard to think of current examples of solutions that achieve progress on all dimensions at once. But can you think of examples that seem to advance sustainability on at least two or three criteria identified by the Commissioners?