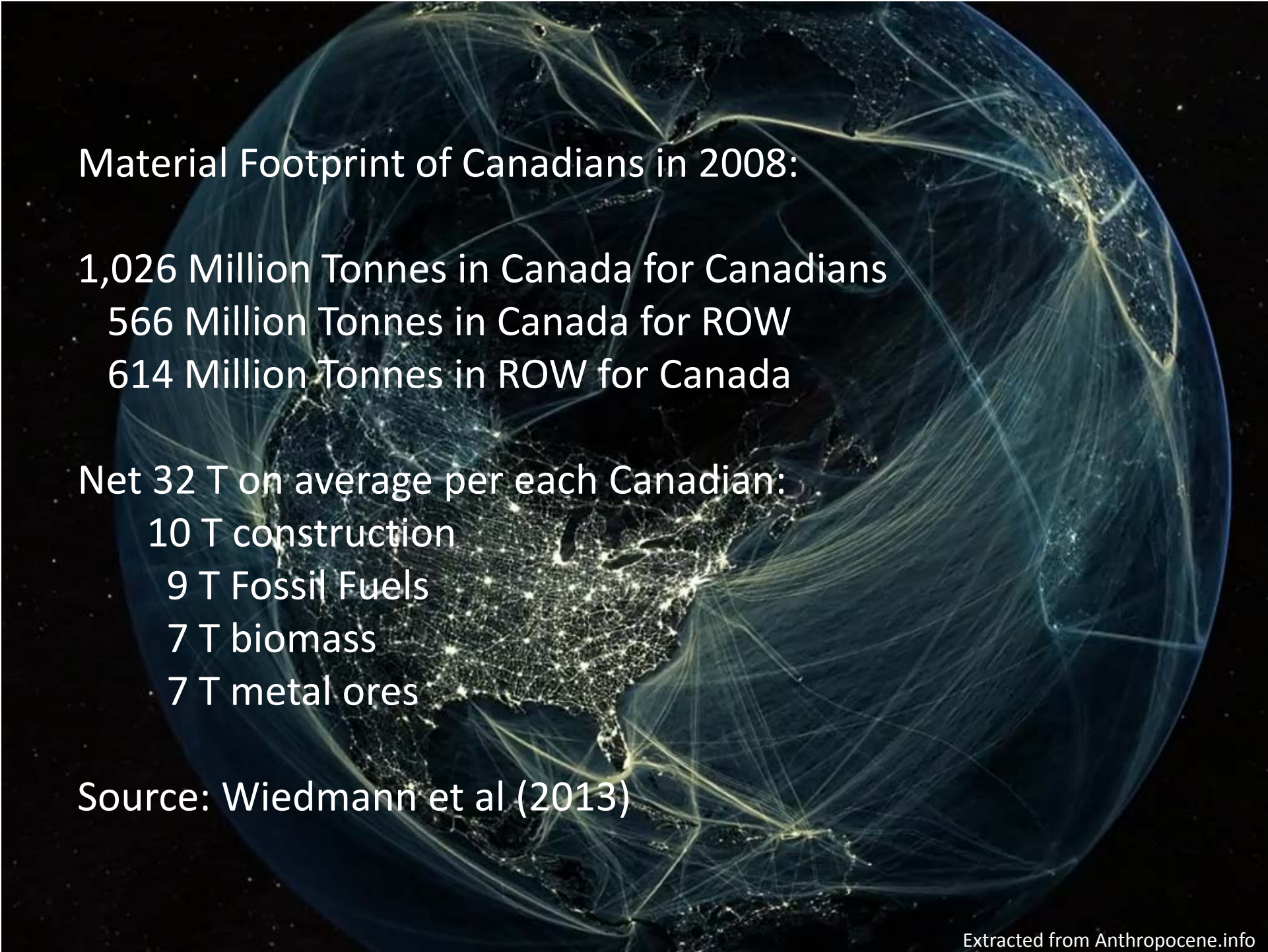


# Updating Economics to Inform Humanity's Future

Presented by Eric Miller ([h4x.ca](http://h4x.ca))

Oct 24 2014 at University of Guelph  
Geography Brown Bag Speakers Series

Anthropocene



Material Footprint of Canadians in 2008:

1,026 Million Tonnes in Canada for Canadians

566 Million Tonnes in Canada for ROW

614 Million Tonnes in ROW for Canada

Net 32 T on average per each Canadian:

10 T construction

9 T Fossil Fuels

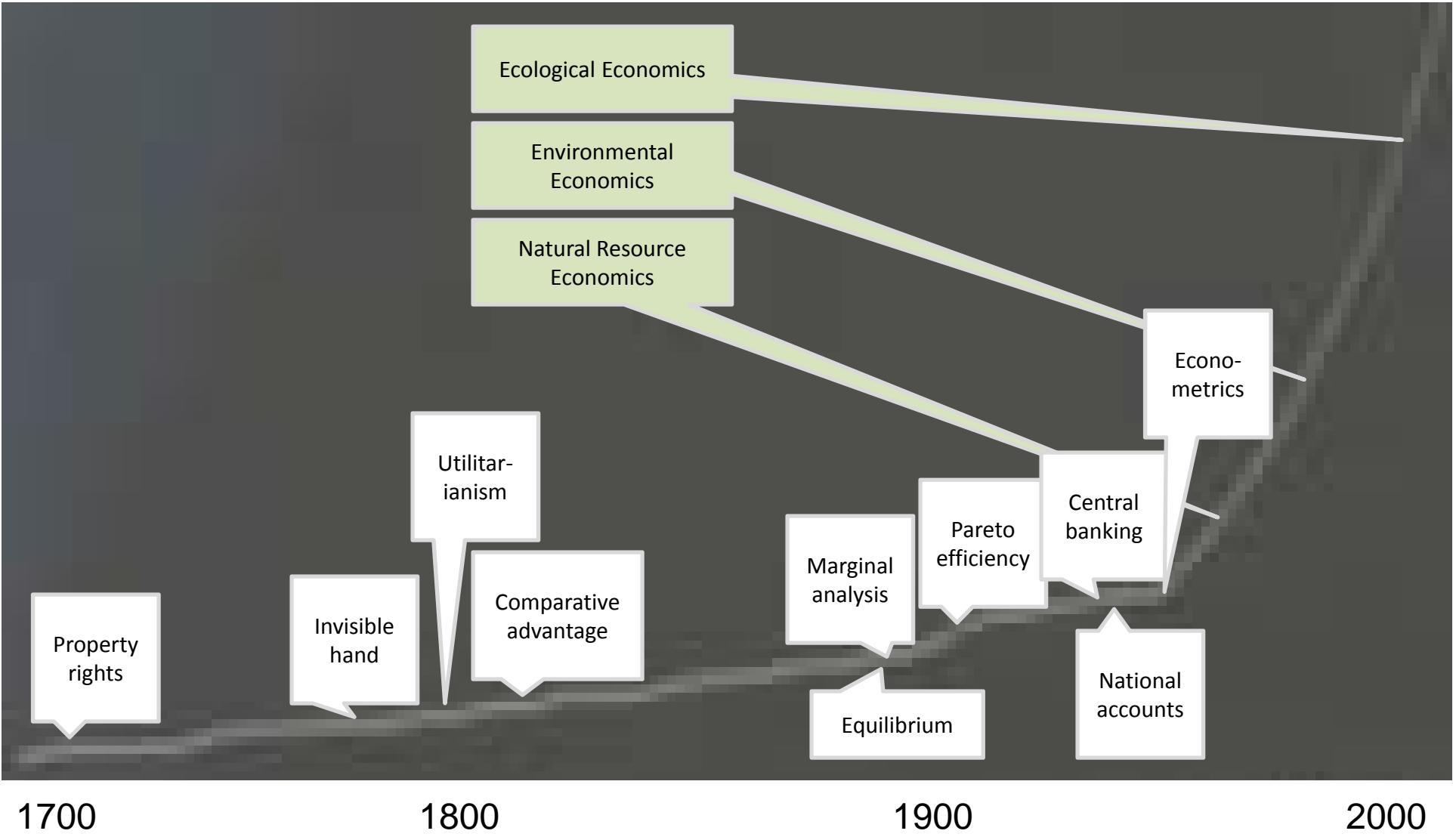
7 T biomass

7 T metal ores

Source: Wiedmann et al (2013)

“Welcome to the Anthropocene”  
video from [anthropocene.info](http://anthropocene.info)

# Origins of important economic concepts and practices



# Macroeconomics

FIFTH CANADIAN EDITION



DORNBUSCH • FISCHER  
STARTZ • ATKINS • SPARKS

Production uses up natural resources, in particular energy. Is it true, as is sometimes alleged, that exponential growth in the economy will eventually use up the fixed stock of resources? Well yes, it is true in the limited sense that current theories suggest the universe will one day run down. However, this seems more of a concern for a course in astrophysics, or perhaps theology, than for a course in economics. Over any interesting horizon, the economy is protected from resource-depletion disasters by two factors. First, technical progress permits us to produce more using fewer resources. For example, the energy efficiency of room lighting has increased by a factor of 4,500 since Neolithic times.<sup>12</sup> Second, as specific resources come into short supply, their prices rise, leading producers to shift toward substitutes.

Environmental protection is important, however. Even here, technology can be directed to assist us. For example, the conversion of urban transportation systems from horses to internal combustion engines has eliminated most of the pollution associated with transportation.<sup>13</sup> As incomes rise and populations move away from the edge of survival, people and governments choose to spend more on protecting the environment. Unlike other consumption choices, environmental protection is often “bought” through political choices rather than in the marketplace. Because the benefits of environmental protection flow across property boundaries, there is greater reason for the government to intervene on environmental issues than there is with respect to purely private goods.

<sup>11</sup>Barro and Sala-i-Martin, *Economic Growth*, table 10.1.

<sup>12</sup>Actually, people in Neolithic times probably didn't have “rooms” per se. For a more recent benchmark, the energy efficiency of room lighting has improved by a factor of 20 since 1900. See William D. Nordhaus, “Do Real Output and Real Wage Measures Capture Reality? The History of Lighting Suggests Not,” Cowles Foundation Discussion Paper 1078, 1994.

<sup>13</sup>Think about it for a minute.

Solar energy inputs



**Human Society on Planet Earth**

**Materials & Energy  
Inputs**



**Waste Materials  
& Heat Output**

**Natural Resource  
Economics**

**Agricultural  
Economics**

**Environmental  
Economics**

**Other academic disciplines: Physics, Biology, Psychology, etc**

**Ecological Economics**

# How should economics respond?

- Updated theory of production
- Updated consideration of time
- Consideration of space and place
- Updated concept of humans
- Updates to other aspects relevant to human-environment relations

## Where should leadership come from?



Canadian Society  
for Ecological Economics

[www.cansee.org](http://www.cansee.org)

as a chapter of

The International Society for  
Ecological Economics

[www.ecoeco.org](http://www.ecoeco.org)

# References Cited

- Dornbusch, R. 1999. *Macroeconomics*. 5th Canadian Ed. Toronto, McGraw-Hill Ryerson.
- Wiedmann, T.O, H. Schandl, M. Lenzen, D. Moran, S. Suh, J. West, K. Kanemoto. 2013. The material footprint of nations. *Proceedings of the National Academy of Sciences of the United States of America*. doi: 10.1073/pnas.1220362110

Slide 3 is a screenshot of the video shown in slide 4, which is from [Anthropocene.info](http://Anthropocene.info) which is a collaborative project between researcher and communicators from some of the leading scientific research institutions on global sustainability, including the International Geosphere-Biosphere Program (IGBP).