

Mechanical Engineering Department Seminar

3:35pm March 21, 2018
1130 Mechanical Engineering
111 Church Street SE, Minneapolis, MN 55455

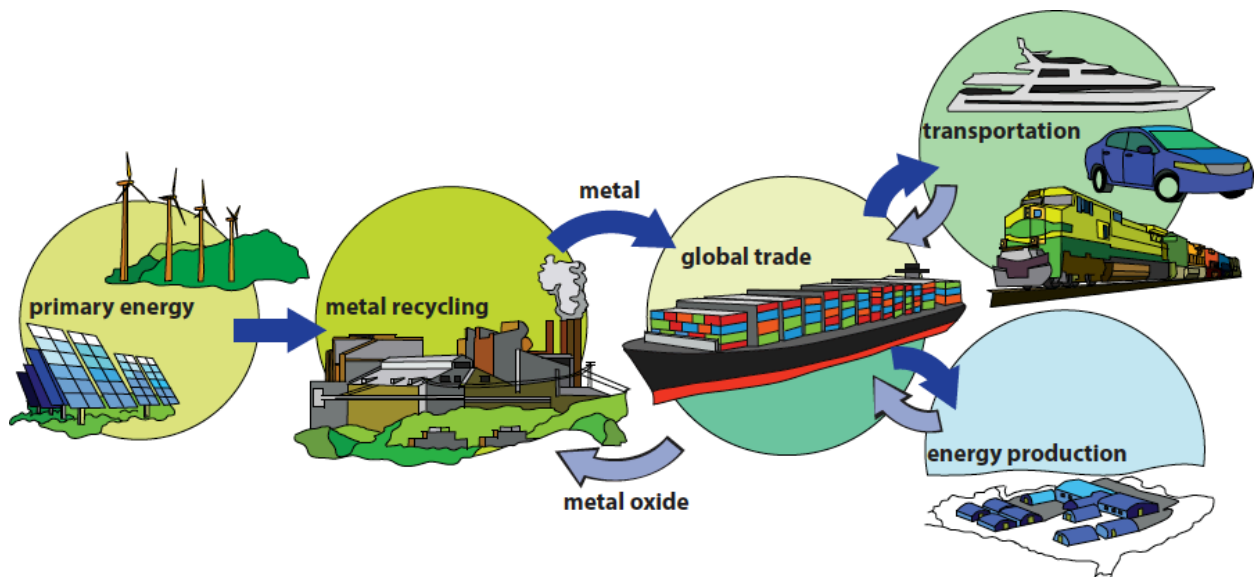


Beyond Batteries: Metal Fuels for Zero-Carbon Heat and Power

Jeffrey Bergthorson

Associate Professor; Department of Mechanical Engineering – McGill University

In order to address climate change, we must transition to a low-carbon economy. Many clean primary energy sources, such as solar panels and wind turbines, are being deployed and promise an abundant supply of clean electricity in the near future. The key question becomes how to store, transport and trade this clean energy in a manner that is as convenient as fossil fuels. The Alternative Fuels Laboratory (AFL) at McGill University is actively researching the use of recyclable metal fuels as a key enabling technology for a low-carbon society. Metal fuels, reduced using clean primary energy, have the highest energy density of any chemical fuel and are stable solids, simplifying trade and transport. The chemical energy stored in the metal fuels can be converted to useful thermal or motive power through two main routes: the Dry Cycle, where metal powders/sprays are burned with air, or the Wet Cycle, where metal powders are reacted with water to produce hydrogen and heat as an intermediate step before using the hydrogen as a fuel for various power systems. This talk will overview the concept of metal fuels and the various power system options, and touch on the combustion physics of metal fuels.



Bio: Jeffrey Bergthorson received his B.Sc. in Mechanical Engineering from the University of Manitoba (1999), and his M.Sc. (2000) and Ph.D. (2005) in Aeronautics from the Graduate Aeronautical Laboratories of the California Institute of Technology. He is the Panda Faculty Scholar in Sustainable Engineering and Design, and an Associate Professor in the Department of Mechanical Engineering, at McGill University where he leads the Alternative Fuels Laboratory. Dr. Bergthorson's research interests are in the broad area of the combustion and emissions properties of alternative and sustainable fuels, including biofuels and the use of metals as recyclable fuels.