Last week, our campus was fortunate to host Amory Lovins, a noted critical thinker on energy issues. Amory is chairman and chief scientist of the Rocky Mountain Institute (RMI) http://www.rmi.org/, a non-profit think tank in Colorado, that works on reducing America's energy and oil consumption. He delivered an extremely fascinating lecture to a large group of faculty, staff and students in the library on Thursday night, and I'd like to share some of the highlights with you.

Having spent almost six years on this campus, I've listened to a fair number of environmental speakers. One general characteristic tends to be that I leave them depressed because they present a seemingly insurmountable set of problems. Amory talked about them as something for which a solution exists and is less that five years away from implementation, and which could all be done profitably – which I found very inspiring. Rather than try to give you data though, I'll instead share some of the most striking stories he mentioned.

The RMI has consulted on almost half the LEED Platinum buildings that have been built so far. One of their current projects is a retrofit of the Empire State Building http://www.esbsustainability.com/SocMe/?Id=0. Besides the usual lighting, HVAC and controls upgrades, they have set up a window factory in an unused section of the building, and intend to remove and remanufacture all the windows in the building. This means no large transportation costs (and associated emissions), and reuse of all the glass of that huge structure. Each of the the windows will be replaced by a super-window with a much larger insulating capability. The overall retrofit is expected to reduce the building's energy consumption by 38%.

One of the most interesting ideas he shared was the concept that by using integrated design approaches, energy efficiency steps can bypass the law of diminishing returns. For example, the normal approach when adding insulation to a house, is to add insulation upto the point where the cost of the insulation is more than the net present value of the heating energy that it will save over the lifetime of the house. Anything more doesn't make "economic sense." But, if you keep adding insulation, you can reach the point where you can eliminate the furnace, greatly reducing the capital costs, and saving more money than if you had followed the "normal procedure." This is the practice advocated by the Passivhaus Institute http://www.passiv.de/English/PassiveH.HTM, and that is becoming prevalent in new construction in Germany.

Another remarkable example he gave us was about pipe and pump systems that consume about 25% of the electrical energy in the U.S. Normal design practice is to use cheap, thin pipes, and lay them out around all the pumping and other equipment. Generally, also all connections are made using right-angled T junctions. This means that you need to put in large amounts of pumping energy to compensate for pipe friction and turbulence. For one of the cases that RMI consulted on, the redesigned a system putting in the pipes first, using large diameter pipes, and minimizing connections, using gradual, tapered joins and diagonal layouts when possible to reduce pipe length. This allowed them to use a much smaller and cheaper pumping system, and get rid of 18 pumps, reducing energy consumption by 92%, for a system that was simple, cheaper, more efficient and having a

longer life. The RMI is in the process of putting together an engineering casebook with examples like these, for use in Engineering schools (like ours), to bring about "the non-violent overthrough of bad engineering." He's taught guest classes on these issues at Stanford University.

The other major initiative he discussed was the work that RMI is doing to improve automotive efficiency by moving to cars with composite bodies that are cheaper, lighter stronger and much easier to assemble than current car designs. He showed us a design of a HyperCar that the RMI put together that had a body with only twelve parts that snapped together. Combined with using designs that substantially reduce aerodynamic drag, and an all-electric drive system this would allow for a truly sustainable transportation system. Applying some of these ideas to Walmarts trucking fleet has helped them to improve fuel efficiency 25%, and they expect to achieve another 25% in the next 5 years.

One story that he shared that especially pertains to our University was about a school district in New Orleans. The district superintendent, initiated a program to reduce energy costs, where he would share savings with the students. Within a year of starting the program, they had generated $50,000 in savings for one of their schools. A new superintendent however, questioned an incentive structure of that paid students for 'something they should be doing anyways' and canceled the program. With the incentive removed the savings soon disappeared. This is definitely something extremely important for our University to keep in mind as it prepares to institute a college-level billing program for energy.

Anyway, if you did not get a chance to see Amory Lovins, we are going to try and bring him back to campus in October, and I highly encourage you to look out for that and bring everyone you know to attend.