Food for thought: Moving toward Sustainable Dining

**Introduction**
As humans, we are exploiting our natural resources beyond our global capacity and our current energy demands far exceed a sustainable level. Change is necessary at a global, national and individual scale in order to prevent the earth from becoming an uninhabitable environment for future generations. As North Americans, we are responsible for consuming the most energy on a per capita basis. One of the less obvious contributions to our energy burden is the type of food we eat. We take for granted the processes and energy required to produce a wide variety of food and the possible contamination levels present within food products. These processes all require energy and contribute to our over-consumption. The objective of the SFU ecotoxicology group was to prepare a meal and to calculate the energy and contaminant burden associated with producing that meal. Following this we had a second dinner where the goal was sustainable dining, in other words to lower the energy and contaminant burden as much as possible while maintaining nutritional requirements. By comparing the dinners we hope to provide people with ideas on how to eat sustainably, and therefore make changes on an individual level towards building a healthier planet.

**Approach**
We prepared two potluck dishes; the first dish without any consideration for either energy (Kj) or contaminant burden (dish 1), the second with the explicit objective to produce a dish with the lowest energy cost and contaminant burden possible. (dish 2) for potluck 2. The energy associated with the production, transportation, storage, packaging, and preparation were calculated following a series of assumptions. Due to the size and diversity of the food industry it was not possible to learn everything about a specific food item. The assumptions provided a framework and put logistical limitations on the information. One of the concepts included in the assumptions was that of “free energy.” Energy and therefore a good was considered “free” if it did not require manufactured energy inputs for production such as wild meat, fish, water, and home-grow organic goods. It was also assumed that human energy inputs such as manual labour, walking, and bicycling were free. Energy was calculated to be as specific for a food item as possible, that is the energy to transport and store the item were proportioned for its weight and size. This required the assumption that items were only shipped when a transport was loaded to its maximum gross vehicle weight or gross tonnage. A complete table of assumptions is available at [http://www.sfu.ca/cstudies/science/science.htm](http://www.sfu.ca/cstudies/science/science.htm).

The energy and contaminant information were collected using many different sources. Food manufactures, suppliers, and growers were contacted and questioned regarding their energy use for growing or making a specific food item. Suppliers, such as grocery stores, were used to identify where the food product originated. Transportation companies were questioned to identify which routes were used and the quantities and types of fuels consumed. Literature searches were used to identify the contaminate loading of food items. Online Canadian and International food health information was consulted, along with scientific articles, and industry information. All of the contaminant and energy information was tabulated and is presented at [http://www.sfu.ca/cstudies/science/science.htm](http://www.sfu.ca/cstudies/science/science.htm).
**Findings and conclusions**

Each and every person has a vested interest in sustainable dining. As the total human population approaches the six billion mark, more and more of our attention must be focused on practical solutions to supporting the masses in a sustainable manner. The purpose of this exercise was to highlight the possible areas in which we as consumers can make a difference in working towards building a sustainable food supply.

One important point derived from this exercise was the importance of supporting locally produced food. Whether this be harvested from our own gardens, community gardens or purchased from our local farmers market, locally grown products reduce high transportation costs and energy inputs. Since most means of long-distance transport support non-renewable resources, such as fossil fuels, they are not seen as viable options in our future access to food-goods.

Buying goods that are “in season” also helps to support more sustainable practices of agriculture. Consumer demand for year-round access to particular fruits, vegetables and herbs, has increased the frequency of long distance, fuel-demanding transport. If consumers are willing to increase their consumption of in-season, local produce, this may further help to reduce the demand for the importation of goods.

Packaging costs, associated with many ready-made/processed goods, also significantly contributes to the total energy bill of a meal. Plastics, a common ingredient in most commercial packaging, are derived from fossil fuels. The process of producing various plastic wraps, containers, bottles is in itself, energetically expensive. While plastic product recycling has increased dramatically in the last decade, our production of these items far exceeds our re-use. Some more ecologically sound alternatives to reducing plastic use and production include utilizing cloth or other reusable bags for shopping, as well as purchasing items that are not pre-packed (convenience now vs. inconvenience of the future).

Currently in North America, our total intake of animal protein far exceeds what can be sustained on a global level, indefinitely. These types of protein are energetically expensive to produce, as they require large feed, water and commercial fertilizer inputs. Some of these costs can be mitigated, however, if the producer chooses to raise his stock in a more sustainable manner. Unfortunately, there is little incentive for producers to adopt these practices as they are currently more economically expensive. One important consumer choice that can significantly reduce the energy bill attached to a meal is to limit the inclusion of animal source proteins.

In addition to being energetically expensive, meat, seafood and milk products, can have an extremely high contaminant burdens. This is in part due to the sequestration of persistent organic contaminants in the fatty tissues, and the metal accumulation in the organ tissues of animals. When eaten, a portion of this body burden transfers to the consumer. Contaminant loads in a meal can be reduced by consuming meat and dairy products of a lower fat content and by avoiding the consumption of organ meat.
Certain plant crops may also be contaminated when pesticides are applied and, depending on their locale, by drifting industrial pollutants. Some plants will uptake and store heavy metals if they are available in the soil. Often, exposure to these various contaminants can be reduced by simply removing the skin or peel. Consumers who are concerned about their contaminant load from food sources need to educate themselves as to where they should limit their intake of certain goods. Unfortunately, clear sources of unbiased, contaminant information are not easily found.

To summarize, there are many actions that we as consumers can take to reduce our impact on the world. Dining in a sustainable manner is an action that most individuals dwelling in western society have complete control over. An informed consumer population can shape how we as a society approach food production, processing, and transport. By demanding the development of ecologically-sound practices and management of food goods, via the products we choose to purchase, we can reduce our personal energetic cost and move towards living a sustainable existence.