Introduction
This study examines the total energy consumed in the process of producing and transporting produce from "farm to table." Estimates indicate that in 2002, the U.S. food system alone accounted for 17 percent of all hydrocarbon fuel use in the country and 14 percent of all energy consumed. In 2007, the U.S. food system accounted for a total 15.7 percent of national energy consumption. The aim of this study is to illuminate where and when energy is consumed within this system. From this information, we can draw meaningful conclusions about what aspects of this system are wasteful, efficient, and what can be changed and what cannot. Since the majority of food in the U.S. is produced in the industrial agricultural system, I will compare this system with the energy expenditures in the local organic sector.

Methods
To calculate the energy consumed to produce the basic components of salad, each major energy input was analyzed separately. Identifying each energy input provides both an accurate estimate of total energy consumed, as well as facilitates the identification of wasteful and efficient practices within the food system.

For each major energy input, the amount of energy consumed was calculated per standard serving of vegetables, as specified by the Nutrition Labeling and Education Act.

**Metabolic Energy: NLEA Serving of Head (Iceberg) Lettuce**

<table>
<thead>
<tr>
<th>Energy Expended to Produce a Salad</th>
<th>Chemicals</th>
<th>Irrigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>400000 kcal</td>
<td>13.1 kcal</td>
<td>4.3 kcal</td>
</tr>
<tr>
<td>400000 kcal</td>
<td>11.3 kcal</td>
<td>2.2 kcal</td>
</tr>
<tr>
<td>82 kcal</td>
<td>198 kcal</td>
<td>374 kcal</td>
</tr>
</tbody>
</table>

Discussion and Policy Recommendations
The food production system of tomatoes and lettuce by conventional methods consumes a significant amount of energy. The food system consumes approximately 9 times as much energy as it produces in metabolic energy from tomatoes, and approximately 11 times as much energy as it produces in metabolic energy from lettuce. The energy consumed to produce just a serving of tomatoes and a serving of lettuce to make a salad is equivalent to the metabolic energy contained in two whole heads of lettuce and five large tomatoes. Most of this consumption takes place during the transportation of produce and the use of mechanized equipment on farms.

Greater sourcing of produce from local and organic sources can possibly mitigate these consumption patterns. However, since lettuce and tomatoes grow seasonally, producing these foods off-season in heated greenhouses locally consumes even more energy than that expended via transportation. Head lettuce is especially low in nutrition content, and as such, perhaps is not worth the costs of production and emissions during the off-season. Local is not necessarily always more fuel-efficient, but seasonal is local.

One interesting finding is that more energy is consumed by weight during a 5-mile round trip to the grocery store than is consumed in the average 5000 mile trip from farms to markets. Americans on average travel to the grocery store 3 times a week. Fewer trips to the store, and buying more foods in a single trip would significantly decrease consumption levels on the part of consumers.

Conclusion
This case study of energy consumption in the conventional U.S. food system reveals considerable opportunities to curb energy consumption, and therefore greenhouse gas and particulate emissions. The American people's addiction to lettuce and tomatoes is deeply related to the country's addiction to crude oil. Energy sourcing from alternative fuels as well as efficiency measures such as decreasing the distance between the farmer and consumer are good ways to mitigate this issue. This study illuminates the fact that though industrialization facilitates the production of a large amount of food for a large population, future policy decisions and consumer choices should consider the quality of foods produced and possible wasteful practices behind their production.