Lunch Packaging at NU

MSE 395: MATERIALS FOR ENERGY-EFFICIENT TECHNOLOGY

SPRING 2009

Eating lunch involves packaging

- There are several options available for lunch at NU.
- Eating lunch will inevitably involve some kind of packaging or tableware.
- Each of these has its own associated costs of production, manufacturing, use, and disposal.

- What is the environmental cost of the packaging for Northwestern lunch options?

Options and issues we explored

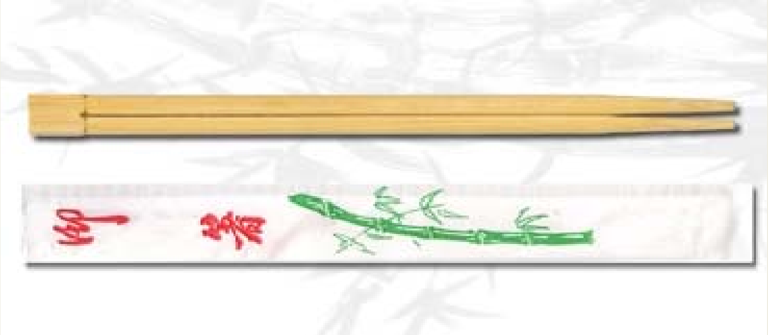
- We looked at
  - Norris Stir Fry
  - Rollin' to Go
  - Chinese Lunch
  - Noyes Street Café
  - Leftovers
- Cost for one use
- Breaking even points due to reuse
- Effects of refuse burning

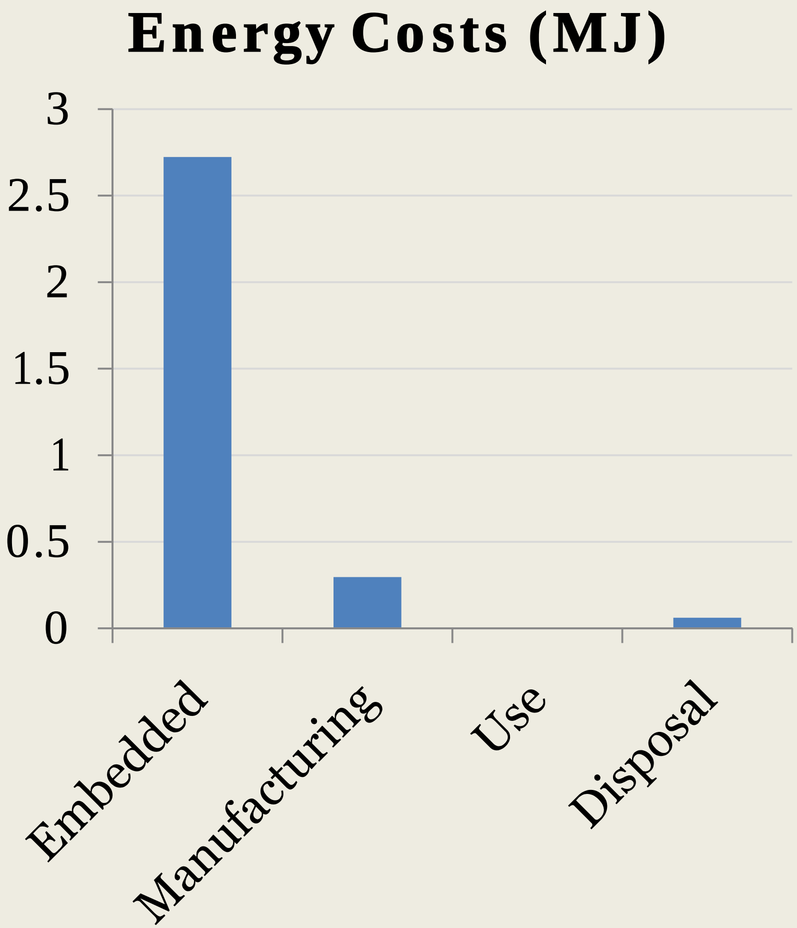
Assumptions

- CES is all knowing
  - Embedded energy values
  - Manufacturing energy values
  - Recycling rates and energy values
- Disposal patterns
  - Picked up by garbage trucks in Evanston
  - Freight train to landfill in Michigan
- Burning of refuse happens near landfill
  - 5.11 kWh per kg refuse

Norris Stir Fry

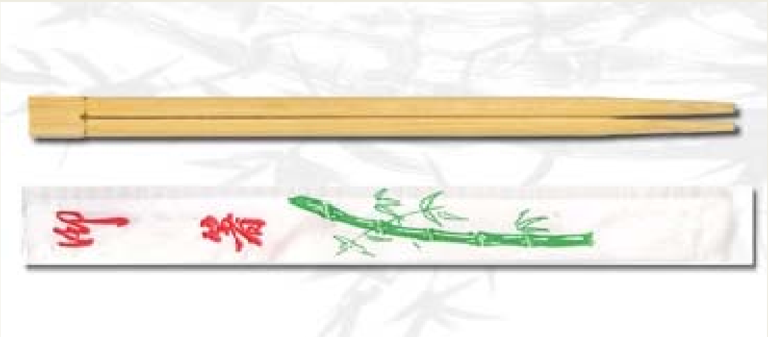
- Disposable PS container
- Disposable wooden chopsticks
- Total
  - Energy: 3.080 MJ
  - CO_2: 0.1138 kg

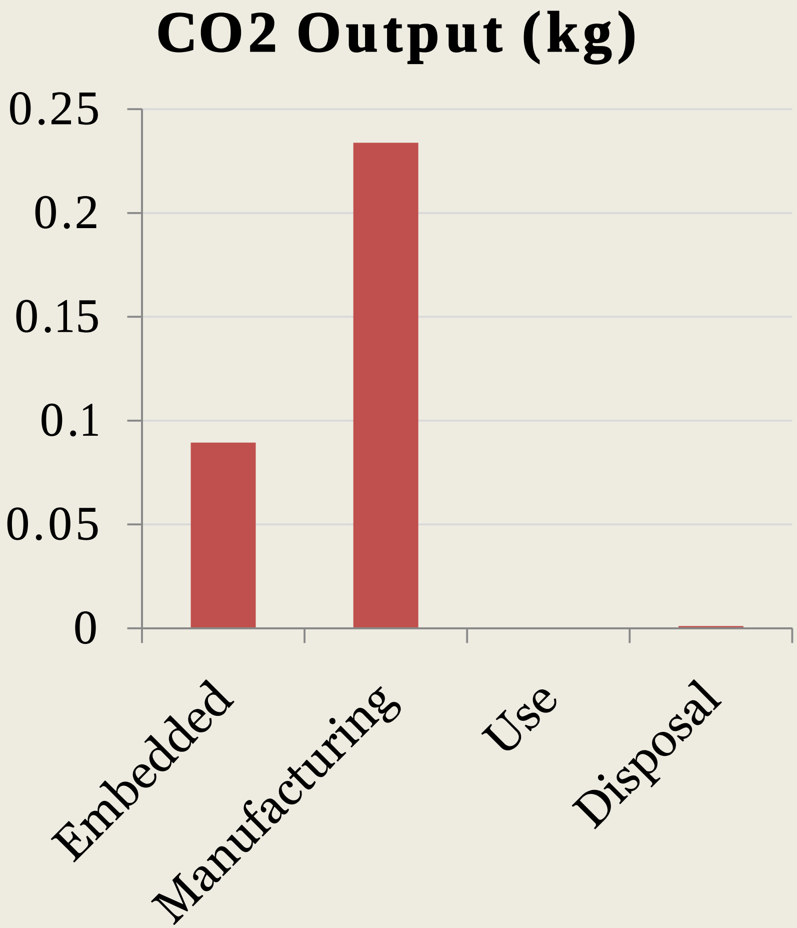




Norris Stir Fry

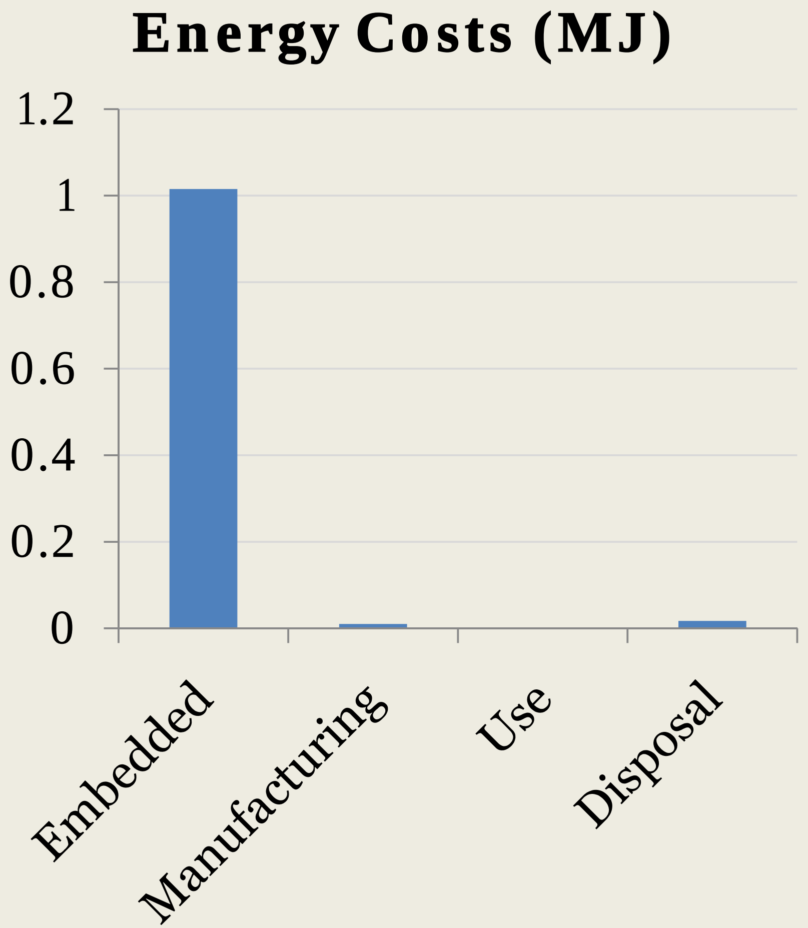
- Disposable PS container
- Disposable wooden chopsticks
- Total
  - Energy: 3.080 MJ
  - CO_2: 0.1138 kg





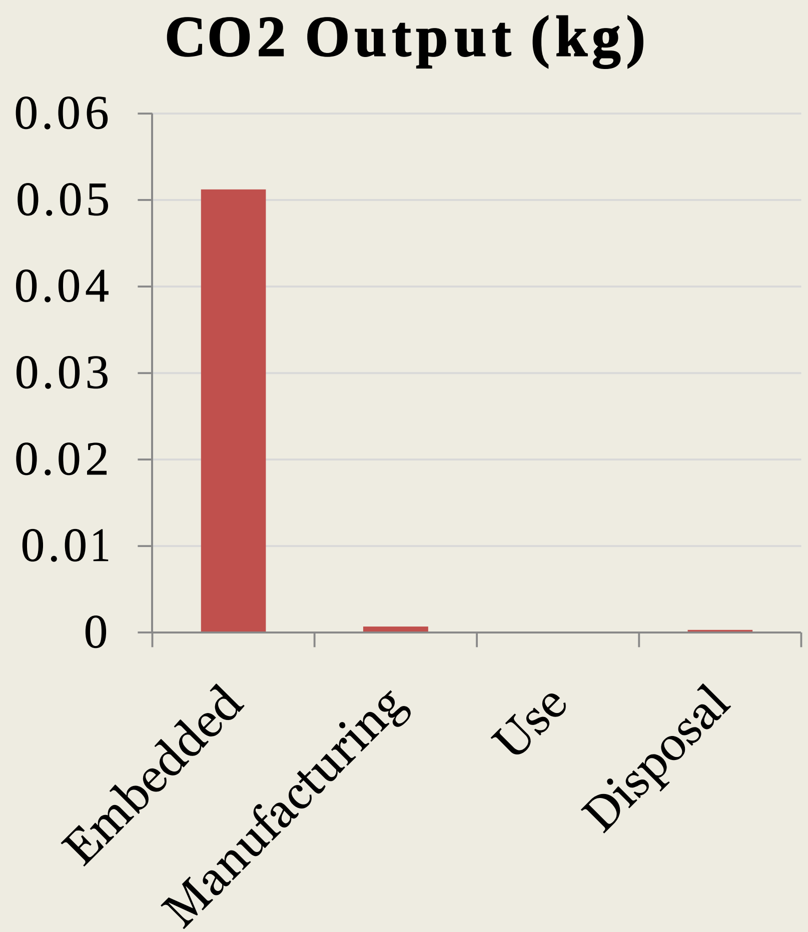
Rollin' to Go

- Brown paper bag
- Paper sandwich wrapper lined with aluminum
- Total
  - Energy: 1.042 MJ
  - CO_2: 0.0522 kg



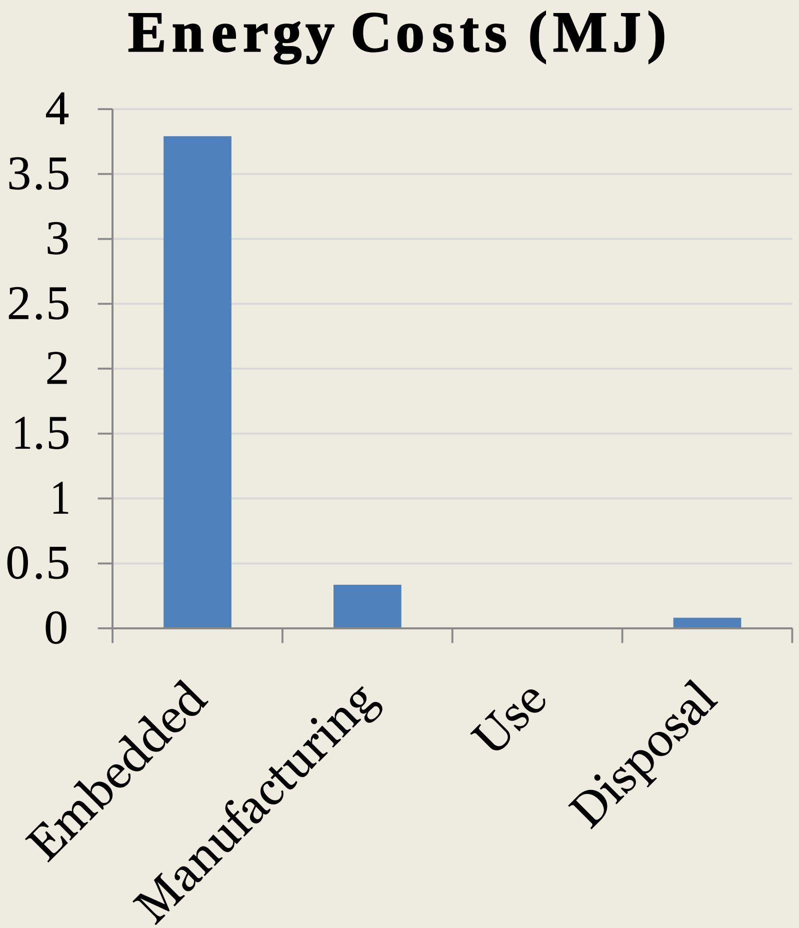
Rollin' to Go

- Brown paper bag
- Paper sandwich wrapper lined with aluminum
- Total
  - Energy: 1.042 MJ
  - CO_2: 0.0522 kg



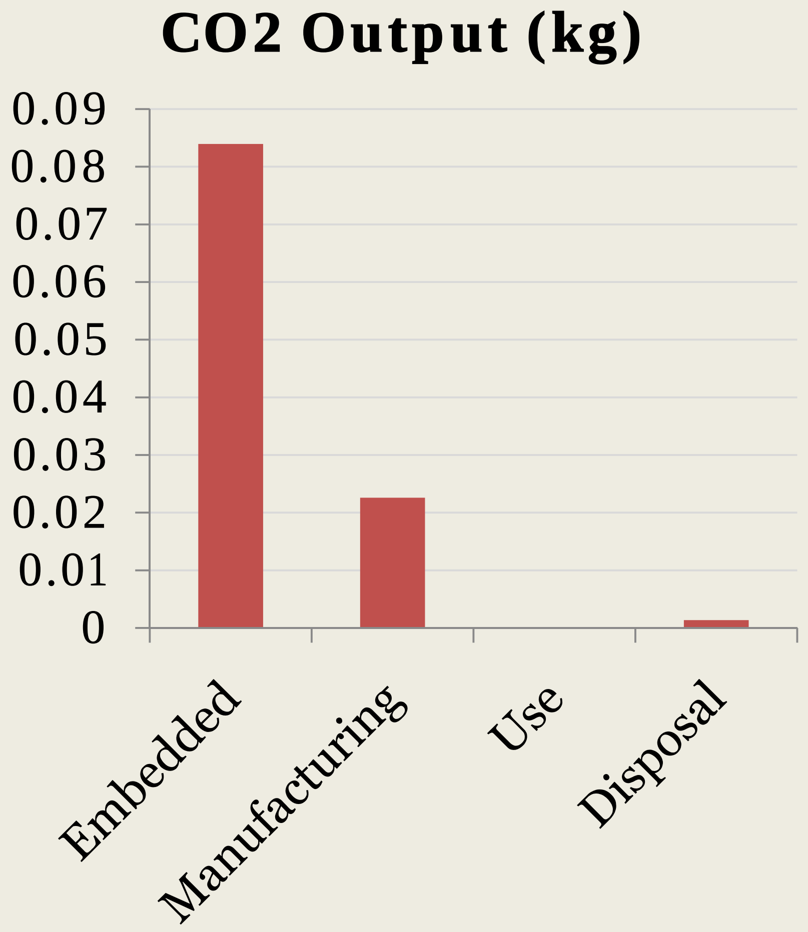
Chinese Lunch

- PS foam shell
- HDPE soup container
- Disposable fork
- Total
  - Energy: 4.210 MJ
  - CO_2: 0.13?? kg



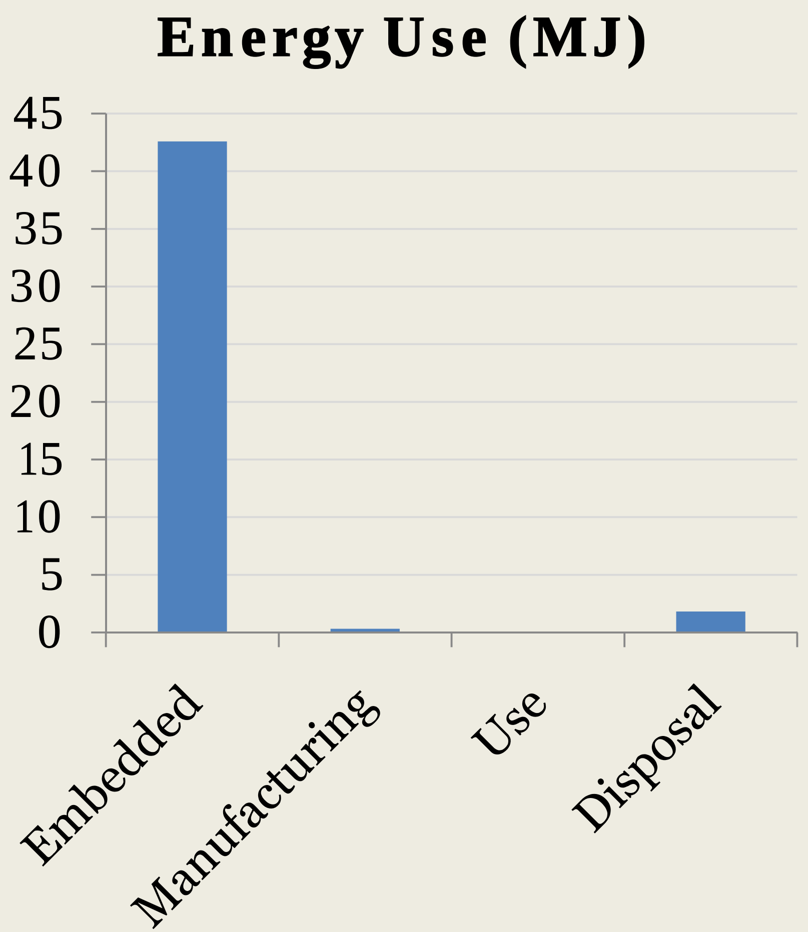
Chinese Lunch

- PS foam shell
- HDPE soup container
- Disposable fork
- Total
  - Energy: 4.210 MJ
  - CO_2: 0.13?? kg



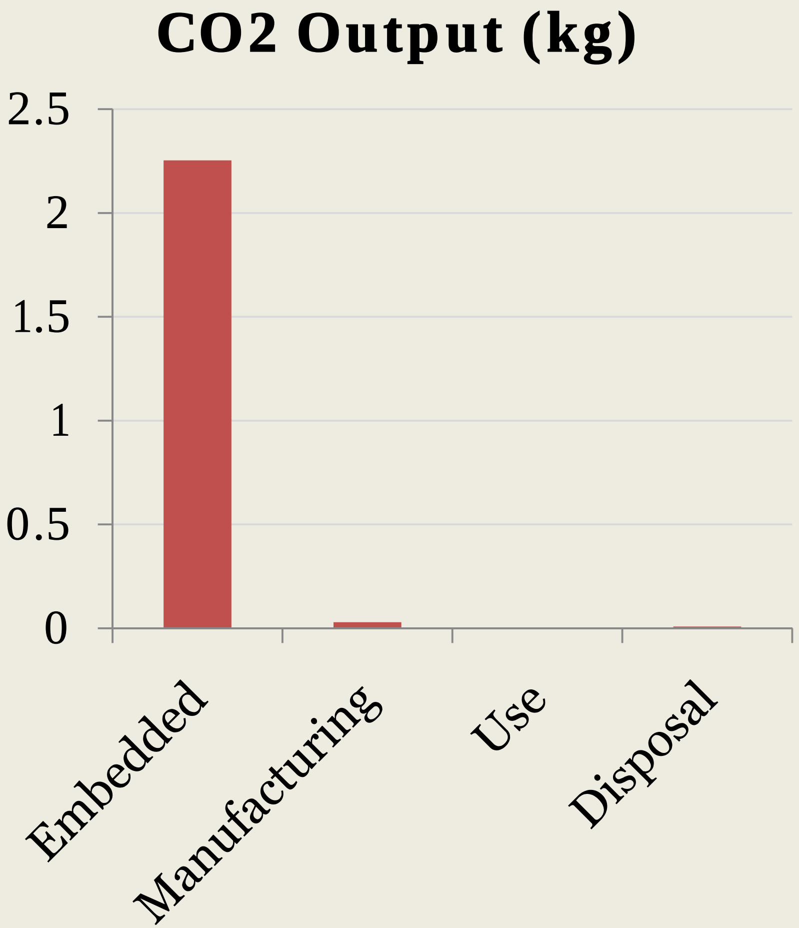
Noyes Street Café

- Reusable ceramic plate
- Reusable stainless steel utensils
- Total
  - Energy: 44.72 MJ
  - CO_2: 0.2912 kg



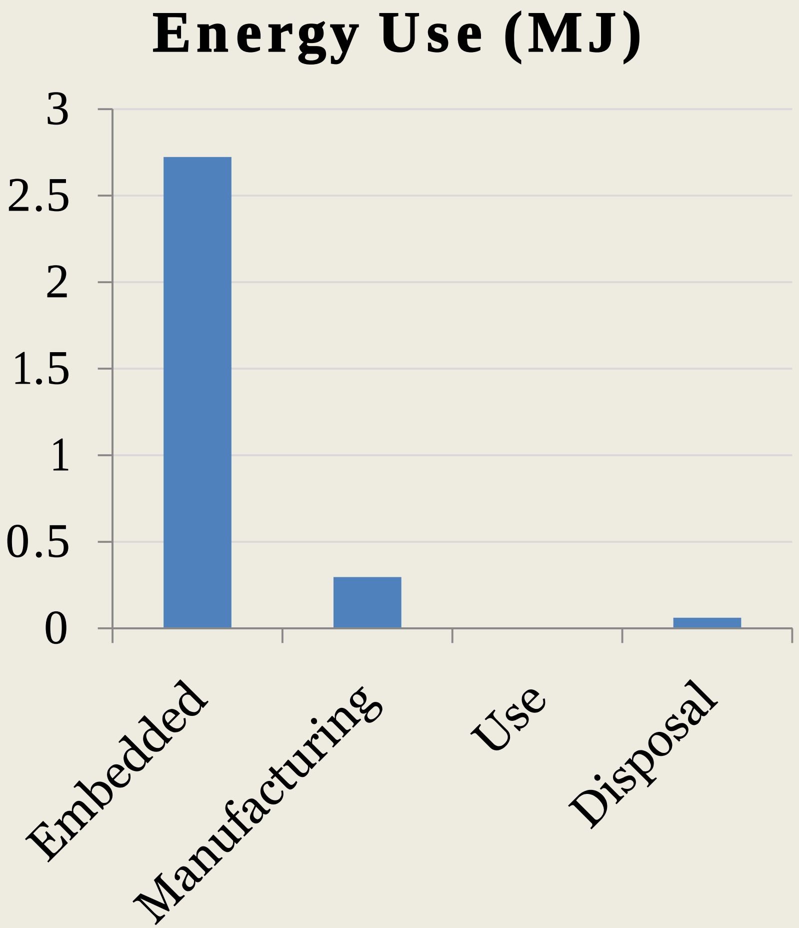
Noyes Street Café

- Reusable ceramic plate
- Reusable stainless steel utensils
- Total
  - Energy: 44.72 MJ
  - CO_2: 0.2912 kg



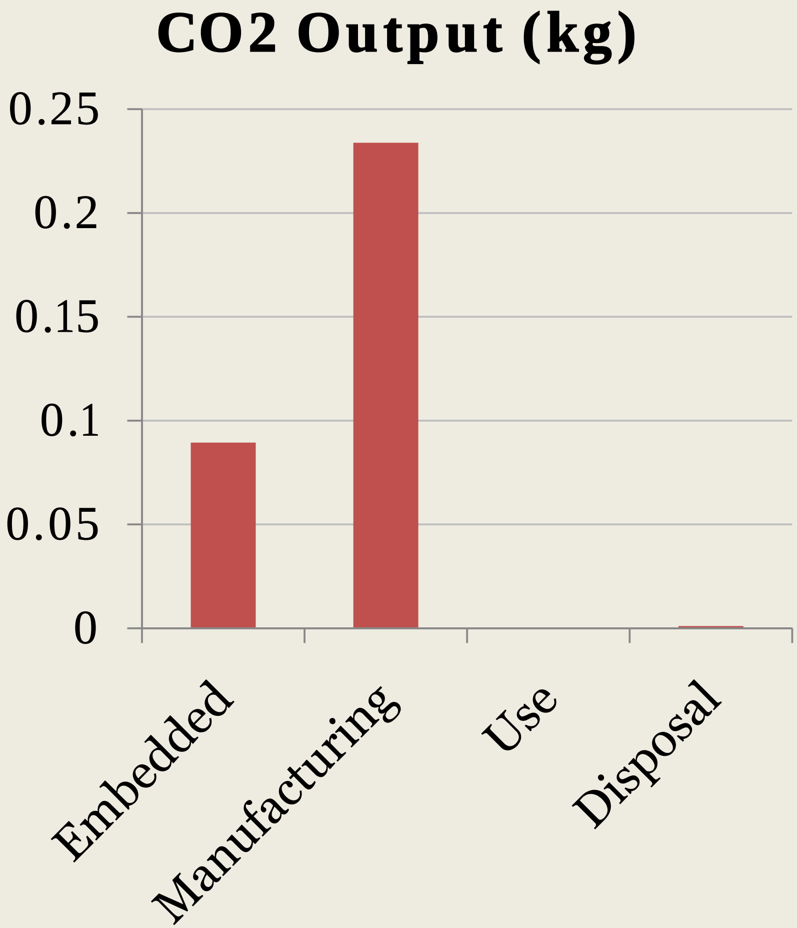
Leftovers

- Reusable Tupperware
- Reusable stainless steel fork
- Total
  - Energy: 3.551 MJ
  - CO_2: 0.1525 kg

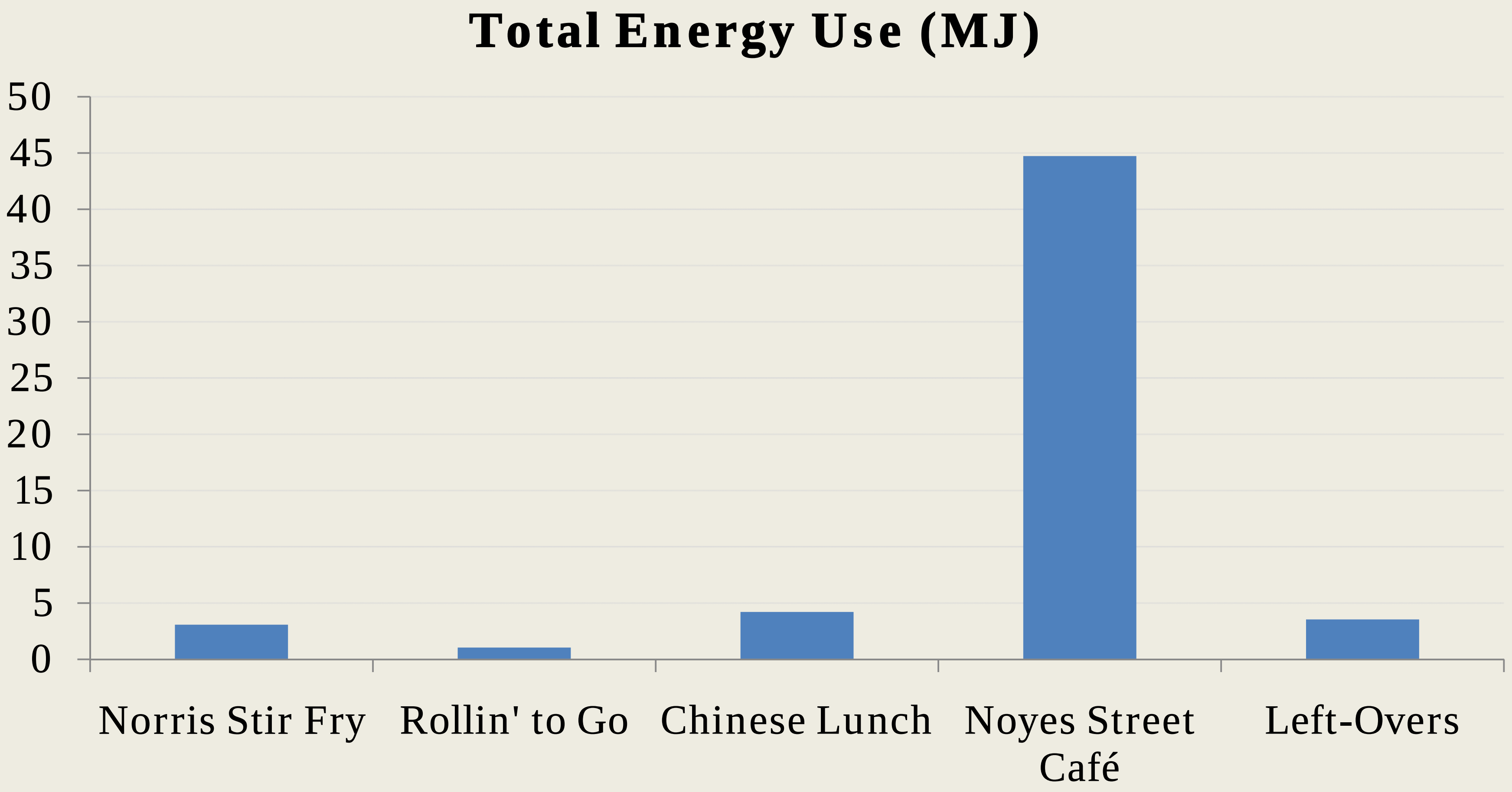


Leftovers

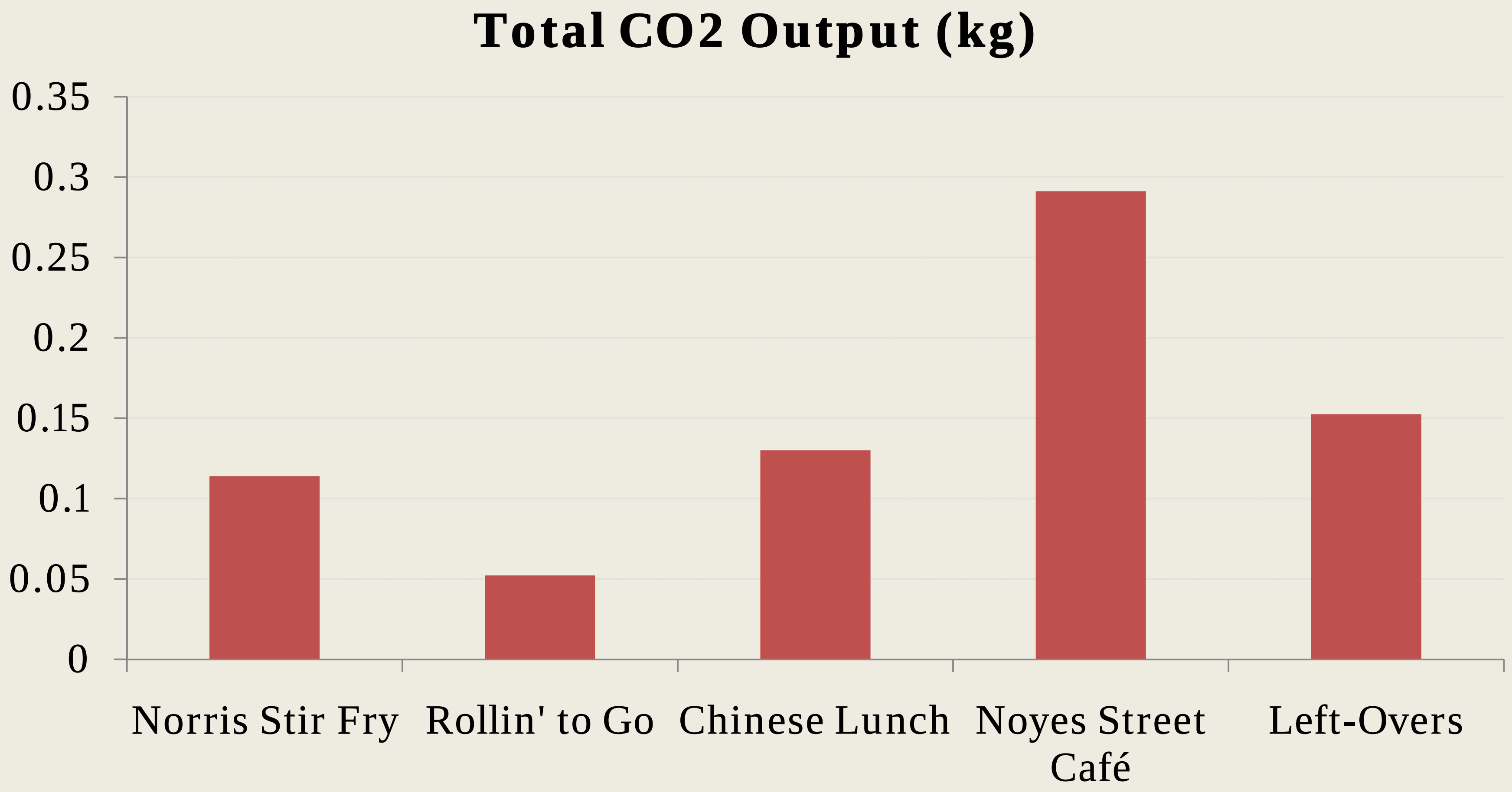
- Reusable Tupperware
- Reusable stainless steel fork
- Total
  - Energy: 3.551 MJ
  - CO_2: 0.1525 kg



Comparison for Single Use



Comparison for Single Use



Reusable Options

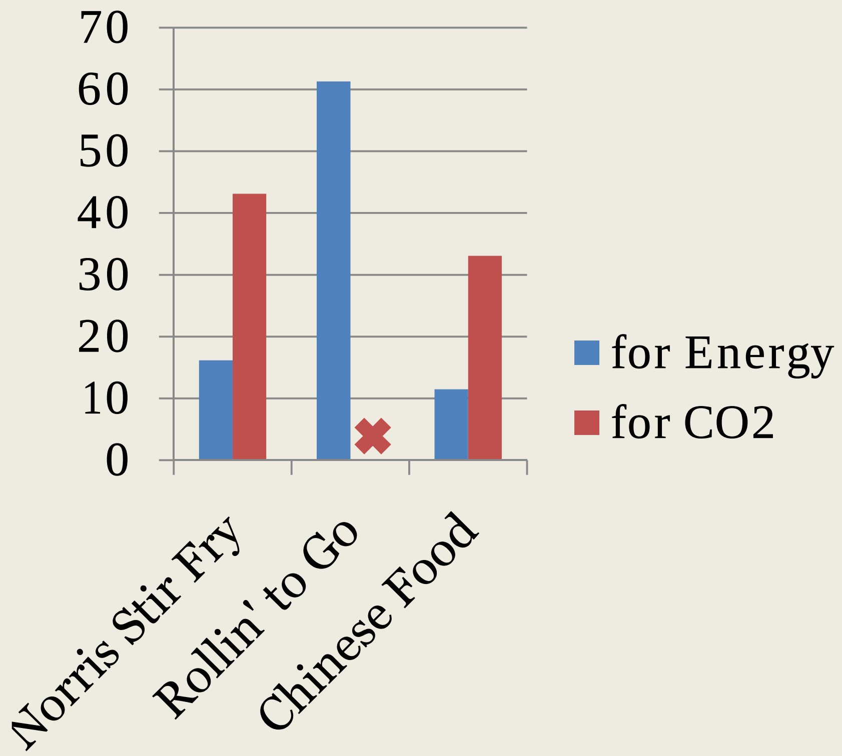
- Some of the previous options however are reusable
- Values per meal change greatly under this consideration.

- If we wash dishes 7 days a week with a load of 25 sets we get an energy cost of about *.3129 MJ per wash*.

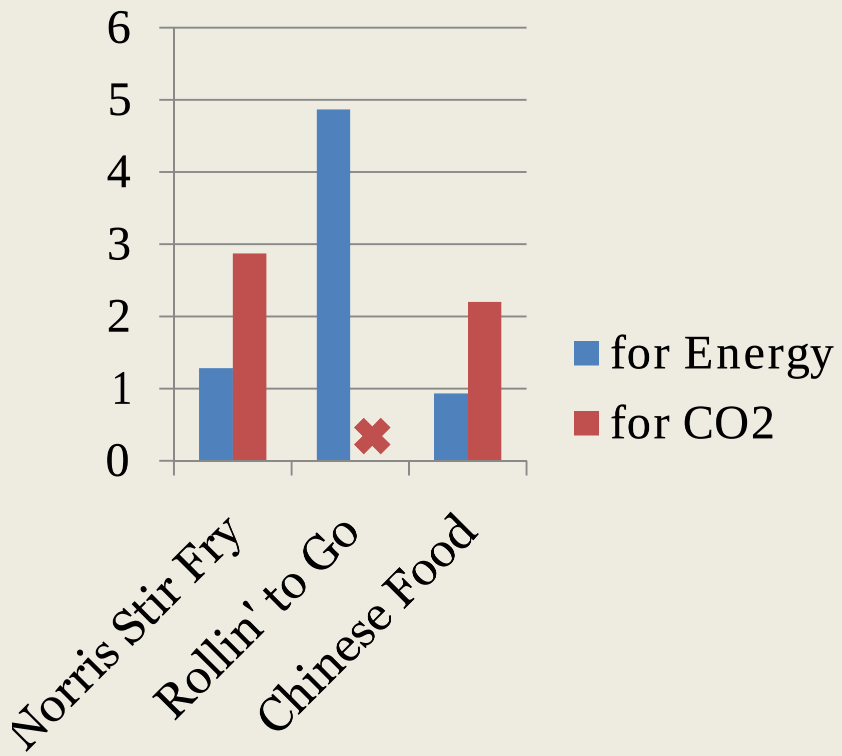
- We can calculate the number of times we would have to eat and wash our reusable options to break even in either energy use or CO_2 output.

Break Even Uses

Noyes Street Cafe



Leftovers



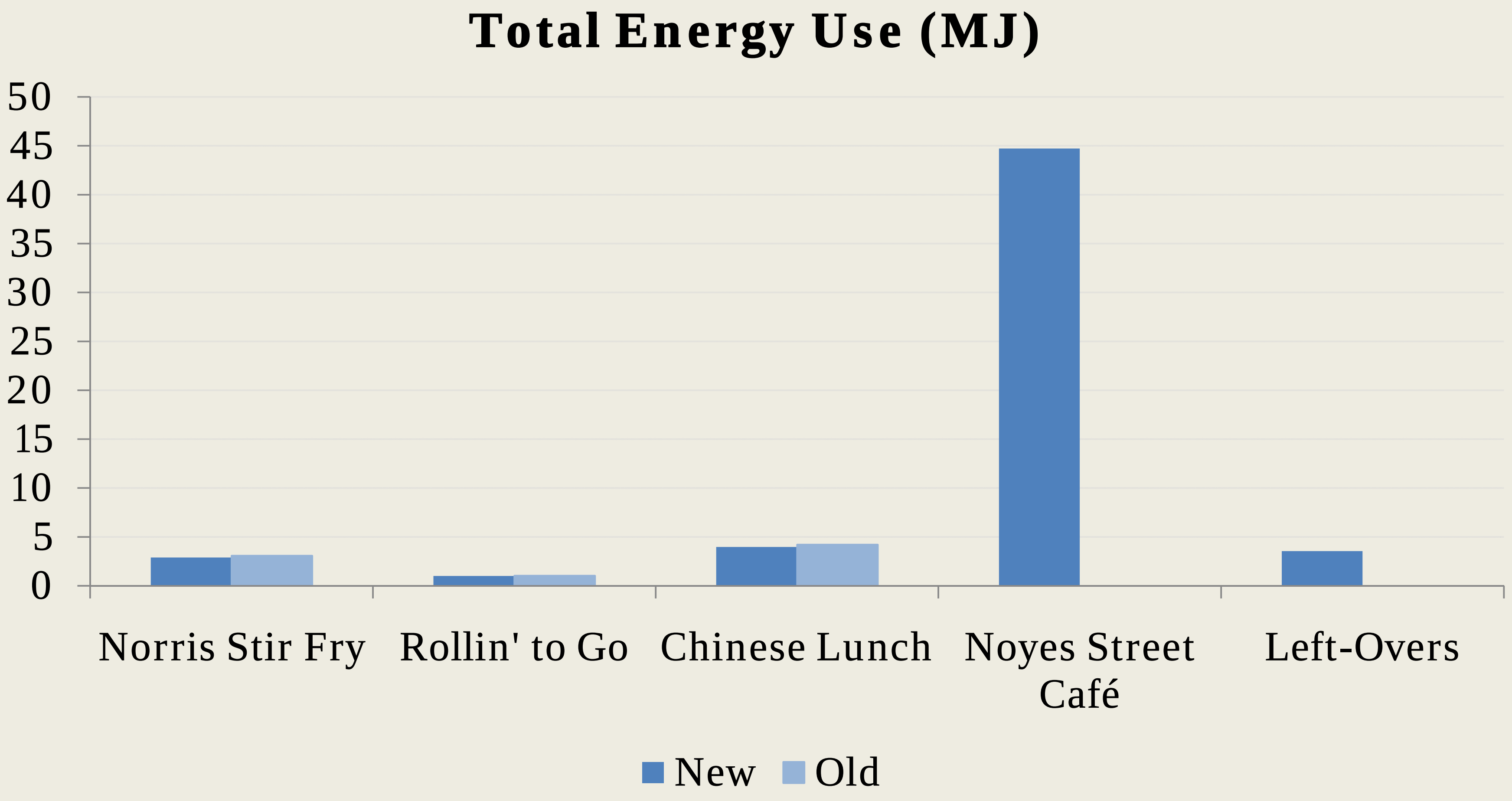
Using Refuse as Biofuels

- Refuse has the potential to be burnt for energy instead of being land filled.

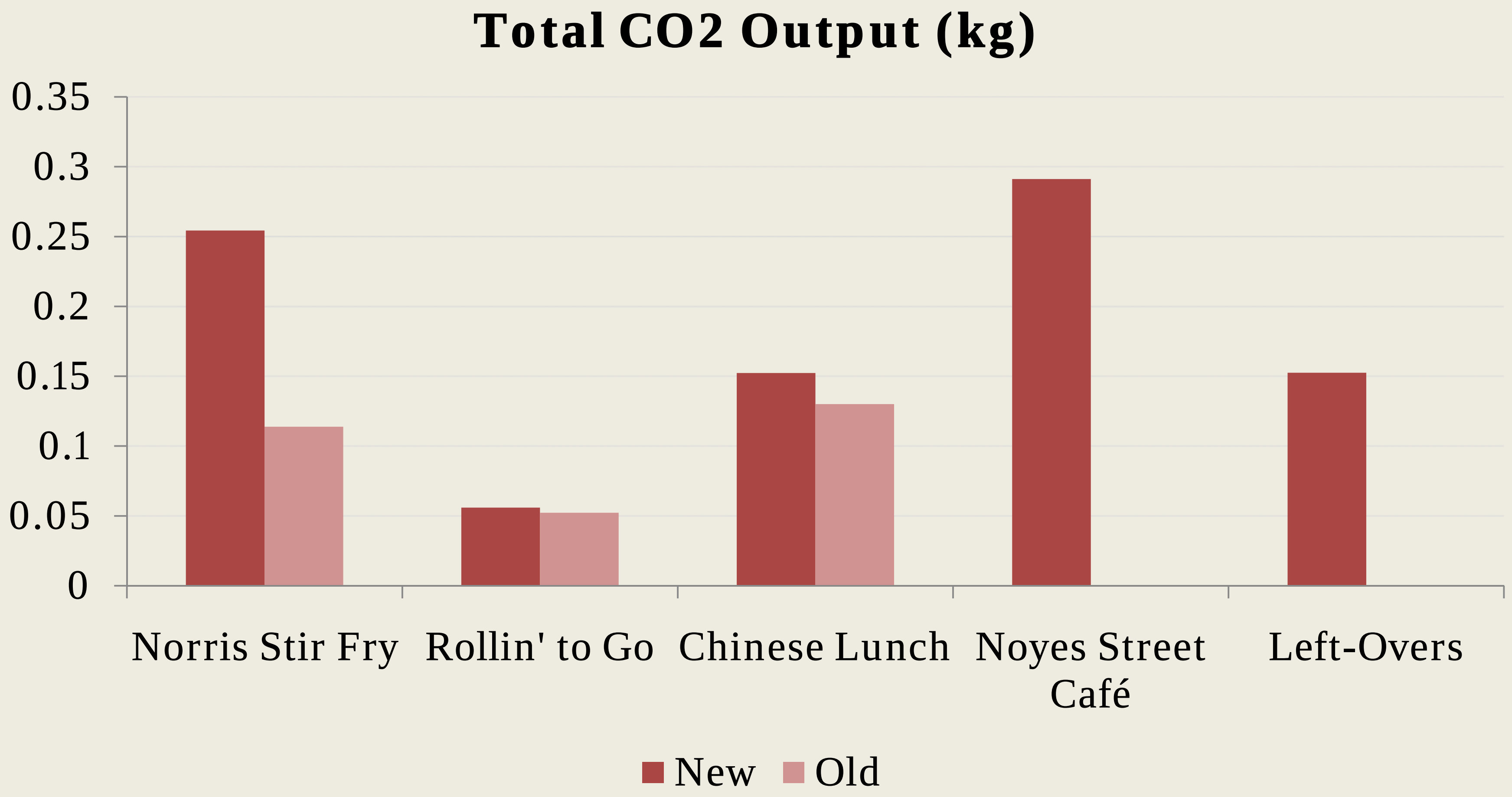
- We made the assumption that half the disposable materials are burned to produce electricity with 30% efficiency.

- We saw a general decrease in energy use values with an increase in CO_2 output.

Comparison for Use with Refuse Burning

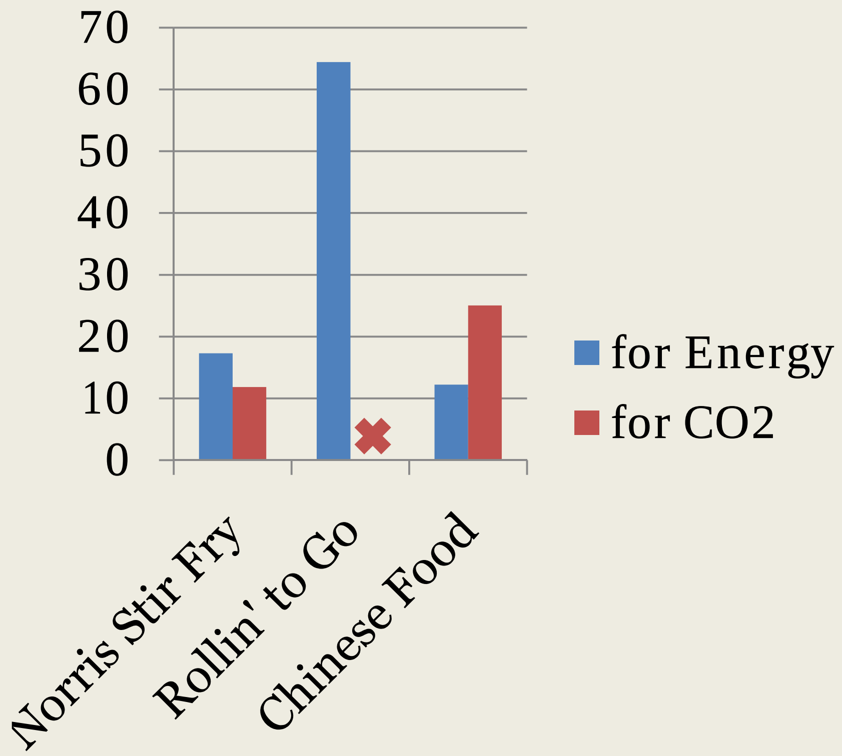


Comparison for Use with Refuse Burning

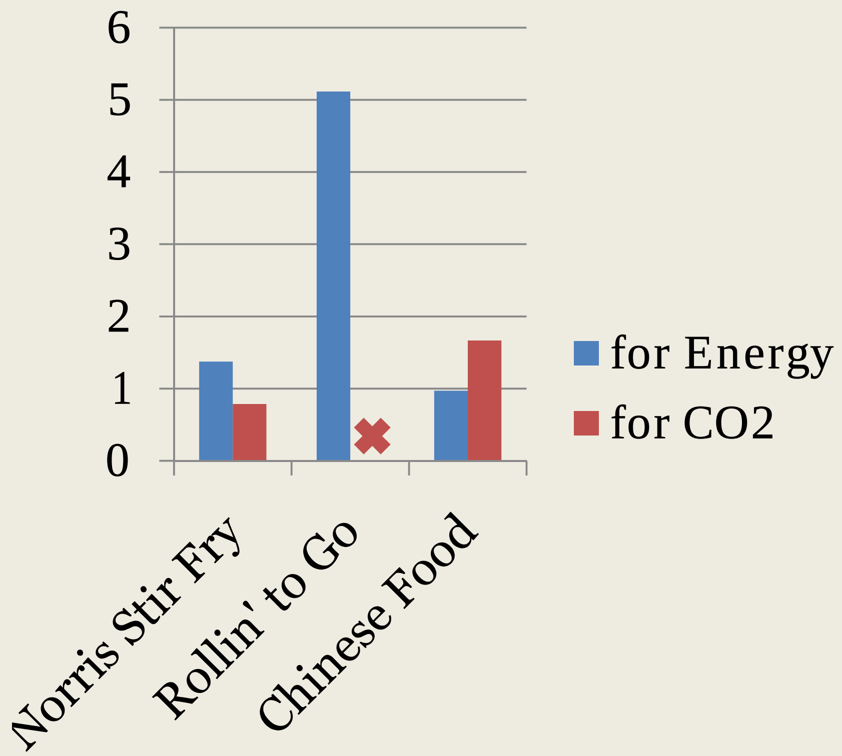


Break Even Uses for Refuse Burning

Noyes Street Cafe



Leftovers



Conclusion

- In conclusion, we can see that:
  - The best option for low energy use and low CO_2 output is **eating leftovers.**
  - That reusable **plates and silverware** is also excellent but may have to be **used many times** to compete with the better disposable choices.
  - Of the disposable choices, Rollin' to Go is the best and the Chinese lunches are the worst in terms of energy and CO_2.

Questions?

Team

- Piotr Blaszczak (Presenter)
- Matt Jones
- Kyle Osberg
- Brian Wasserman

Picture Sources

- In order of viewing
  - http://weblogs.baltimoresun.com/entertainment/dining/reviews/blog/BambooChopsticks.jpg
  - http://shannonstanley.files.wordpress.com/2009/03/brown-paper-bag.jpg
  - http://suzycantcook.files.wordpress.com/2006/11/takeout.JPG?w=401&h=301
  - http://www.flickr.com/photos/disneymike/2881630490/
  - http://www.tiresias.org/images/clasp_tupperware_1.jpg