

## The Oil Drum: Campfire

### Discussions about Energy and Our Future

#### Meeting Energy Decline Part-Way - Potatoes?

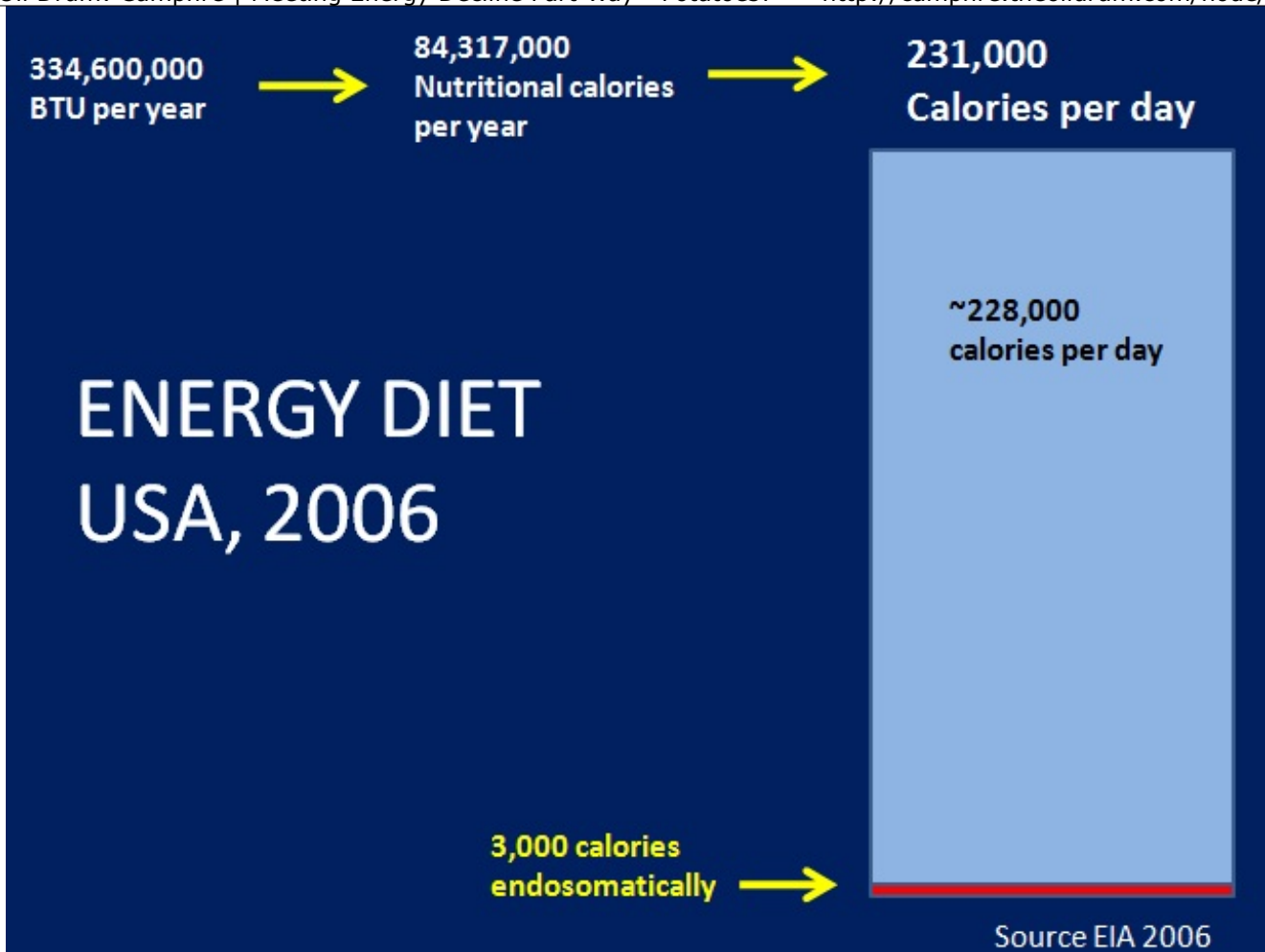
Posted by [Nate Hagens](#) on October 28, 2009 - 5:20pm in [The Oil Drum: Campfire](#)

Topic: [Miscellaneous](#)



Before 1999 I had never grown a thing in my life except for [chia-pets](#). I then bought a house in North Carolina which had an existing smallish garden of cherry tomatoes, spinach and blueberries, which over the next 4 years, I turned into a 360 square foot garden with numerous geometric shaped raised beds. This introduction to gardening was more of an art form to me - I didn't care about the end result so much. Fast forward 10 years and I have a larger, more serious garden. In addition to kale, corn, garlic, eggplant, tomatoes, wormwood, peppers, squash, beans, and peas, this year we planted 10 12 foot rows, 6 25 foot rows and 2 40 foot rows for a total of 330 row feet of potatoes. This post is about the energy return from my 15 bushel basket harvest and substituting gardening, at least at the margin, for fast neural hijack.

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In 2004, Americans consumed about 342,700,000 (3.4e8) Btu per capita, per year. ([Source](#)). This converts to about 86,358,951 [8.6e7 nutritional] calories per year ( [Source](#) ) or 86,358,951 / 365 = 236,599 [2.37e5 nutritional] calories per day. But humans only require something like 2,500 nutritional calories (of food energy) per day to survive, so it seems we (very roughly) use something like 235,000 (2.35e5 nutritional) calories per capita per day, for non-nutritional purposes like economic growth, waste, fun and leisure. I hypothesize that there are points between 2,500 and 225,000 calories per day that would still allow us on a per capita basis to live happier and healthier lives with less collateral damage than the current system.

As such, I decided to produce 'some' (a small fraction) of my own calories - and the primary crop of choice was potatoes though we have about 500 pounds of winter squash as well. (Before the Great Famine, potatoes made up the bulk of the average peasants caloric intake, whose diets also included milk, oats, beans, barley, and bread). I ordered 50 lbs of seed potatoes from [www.seedsavers.org](http://www.seedsavers.org), including a 20 lb sample pack which contained 2.5 lbs each of 8 different varieties. I harvested about 15 bushel baskets of potatoes this year, even after including a hefty 'blogger haircut'. (Due to lack of time and other priorities, insufficient mulch, weeding and potato beetle vigilance probably reduced my yields far below their optimal levels). Furthermore, I gave many of seed potatoes away to friends and my dog, the gophers mice and chickens took their share. Still, potatoes are pretty forgiving and my harvest was decent, and rewarding.

Depending on the variety, there are about 60 lbs of potatoes in a bushel basket, which works out to 60\*400\*15 or about 900 lbs. One pound of potatoes, boiled or steamed, contains about 400 calories, so 900 x 400 = 360,000 kilocalories (Kcal). This is the approximate energy output. I

can calculate a rough Energy Return on Energy Invested by calculating my energy input, which is in the below table. (actually, due to previously mentioned internet affliction, a decent chunk of the caloric inputs for the potato harvest came from my girlfriend this year).

|                   |          |
|-------------------|----------|
| Digging Trenches  | 9 hours  |
| Planting Potatoes | 3 hours  |
| Weeding           | 16 hours |
| Mulching          | 3 hours  |
| Removing Beetles  | 1 hour   |
| Harvesting        | 23 hours |
| Storing           | 3 hours  |
| Total             | 60 hours |

This example neatly works out to a (fixed, narrow boundary) energy return of 20:1, higher than most alternative energies and even oil. Though I can't drive my car or fly a plane on potatoes, I at least know that along with help of the sun, soil and hydrologic cycle, I have produced some of my own energy budget for the year ahead. (360,000 calories is about 120 days worth of calories if all one eats is potatoes). In reality, I plan to gift many of these to neighbors and keep about 50-70 pounds to plant again next year as seed potatoes that I won't have to order. This is done by putting potatoes in a brown paper bag in a root cellar or basement and once a month turning the bag upside down, so as to 'trick' the potatoes into not sprouting early. I've never done this before.

Because I gave seed potatoes away and was too lazy to keep an accurate accounting other than total weight, I called a friend today, Mary of Blooming Hill Farms in western Wisconsin and asked her for details on production. She too ordered a 20 lb sampler from [www.seedsavers.org](http://www.seedsavers.org) but she kept track of how each of the 2.5 lbs of seed potatoes performed.

- 2.5 lbs of Kerr produced 45 lbs
- 2.5 lbs of LaRatte Crescent produced 115 lbs
- 2.5 lbs of Purple Viking produced 18 lbs
- 2.5 lbs of Yukon Gold produced 18 lbs
- 2.5 lbs of Red Gold produced 40 lbs
- 2.5 lbs of All Red produced 105 lbs
- 2.5 lbs of All Blue produced 52 lbs
- 2.5 lbs of Austrian Crescent produced 74 lbs

for a total of 461 lbs produced from 20 lbs of seed potatoes. (\*Mary said this was an 'average' yield and the rows nearest the water hose leak were much higher yield implying that water may have been a yield limiter). So this is about 23 times the starting weight.

What is the point of this post? Many reading here agree that the coming decades are going to result in lower energy availability per capita. Though there is plenty of energy, how much is

affordable, procurable per unit time, in a form that our culture has become dependent on, is an open question. Our current integration of oil, transportation, and food systems, is highly mechanized and efficient, but not without risk. Given the many possible post-peak trajectories, my caloric [shortfall risk](#) is not only reduced somewhat by having local access to food, but the % of food I eat that is non-processed has improved as well. So, by devoting these 60 hours to this one root crop, I've done a tiny amount of meeting energy descent part-way by netting some few hundred thousand calories from potatoes - about 1.5% of the average Americans annual energy footprint. Most attempts to make us less dependent on liquid fuels will use more of other energy and non-energy resources. We have enough of land and labor to dramatically increase our nutritional caloric consumption, if that route is chosen.

However, although I'd like to say the main reason I grow food is to increase my risk adjusted return in the future, the true reason is I do it because I like to. It gives me satisfaction to watch the progression of seeds to seedlings to plants to harvestable produce, primarily because these things happen on a timeline that is parallel to what my brain can manage without getting overtaxed or overstimulated. So many of our time options in today's culture accelerate our neural habituations. To choose some activities that may not make as much money or fun or social notoriety not only makes sense but in my opinion is imperative lest we become a society of schizophrenics. (schizophrenia results from *too much* dopamine.)

Jevon's paradox suggests that more overall use will accompany improvements in technology on the supply side. I suspect this is manifesting on the energy demand side of our resource equation as well. The more efficient and enjoyable our techno-gadgetry becomes, the more of our days are taken up using it: checking email, using Blackberry, or Iphone, or Twitter, or Facebook, or reading news online, etc. I enjoy much of this, but can see how there are few natural speed bumps with respect to how technology and information crowd out slower, more human, activities. Sure, I could have bought those 900lbs of potatoes for a few hundred bucks - and my hourly wage was less than minimum wage. But I personally had to draw a line somewhere in a society where what we perceive as societies goals, accomplishments and successes has been overly measured by dollars. So I chose to substitute potatoes for Twitter, and now have 15 bushels of tasty spuds to show for it. Perhaps the goal is to live the [Good Life](#), riding the wave of unexpected reward, meaning, and balance.

Comments, suggestions, and other ideas welcomed.



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