

Gulfstream G450 at your beck and call. A home, condo or apartment in ten major exotic destinations, with a (leased) luxury fleet of cars at each, a coterie of servants to follow you around, memberships in every exclusive club, all you could possibly eat, wear, play with and see for a lifetime. And Hell, throw in a yacht. Then you could sail around sipping expensive wines imagining ways to spend the other \$950-million dollars.

When the Wall Street bailout sailed through the Congress I was *mortified* that few really took any notice of what had been done. That \$800 billion is the approximate amount it would take to build every single structure (and its infrastructure) in the entire state of Massachusetts—Every private home, public building, road, bridge, courthouse, street, waterline, electrical line, sewer, power generating plant, gas station, highway, overpass, playground, airport, dam, farmhouse, cell tower, prison, library, school, museum, dock, hotel, firehouse, store, sidewalk, tunnel, waste treatment facility, railroad, light pole, traffic signal, police station, restaurant, warehouse, lumber yard, grocery store, hair salon, bar, manufacturing plant, parking lot....all of it. And you could throw in the most expensive public works project in the history of the US...the Big Dig, which costs as much as 2.25 Panama Canals.

Spent another way, \$800 billion would pave the entire state of Massachusetts in concrete, 12" thick (including steel reinforcement bar). Some think this would be a better use of the money.

The Panama Canal—the largest construction project in history at the time— cost \$375 million in 1913 dollars. The CPI from that time to today has grown 21.2X, making the cost in 2008 dollars about 7.95 billion dollars. So \$800 billion today would buy from scratch, 100 Panama Canals.

Here's another, perhaps more practical purchase—

The approximate cost of constructing a twin track 10,000 km maglev train system including 300 kph trains, tunnels, bridges and stations, between major US cities is about \$800 billion. Average construction cost would be about \$USD 50 million per kilometer. About 1200 maglev cars would be needed. The rolling stock would cost only US\$20 billion.

Actually, like most big mass transit systems, it would not be able to pay its own way, but at least you'd see where your money went.... and how fast.

Some more Really Big Numbers:

How Big is the Universe?...No Really....

One could start a Cosmology class with the interesting question—
How many grains of sand are on all the beaches on Earth?

The calculation goes something like this:

If a volume of a cubic millimeter contains 10 grains of fine sand,
Then a cubic meter contains $1000 \times 1000 \times 1000 \times 10$ grains of sand. (Or $10E10$ grains of sand in a cubic meter).

Now, our "average beach" (watch me wave my hands around...) is 100 meters wide and 30 meters deep and 1,000,000 kilometers long or so (when you wrap it around all the land, every island, and inlet bordering any body of water anywhere), so this is $100 \times 30 \times 1,000,000 \times 1000$ cubic meters (Or $3 \times 10E12$).

Multiplying the cubic meters of sand by the number of grains in a cubic meter yields $10E10 \times 3 \times 10E12 = 3 \times 10E22$ grains of sand on all the beaches on Earth.

Now it turns out that current best measurements are approximately 150×10^9 galaxies $\times 200 \times 10^9$ stars per galaxy = $1.5 \times 10^2 \times 2 \times 10^2 \times 10^9 = 3 \times 10^{22}$ stars in the universe.

Don't look surprised...the point of this is *not* that these numbers are the same, in fact we have done some juggling of numbers to make this come out right. Nobody knows what an "average beach" is for example. And the number of stars per galaxy and the number of galaxies in the universe is always open to revision upon better measurements. But the numbers are believed correct to within a factor of 2 or 3.

So what? Well, this is a perfectly good answer to Fermi's Paradox, which proposes that aliens should be here if there were any in our galaxy, since on average they would be millions of years more advanced than Earthlings, they would easily have populated the whole galaxy. So where are they?

Many use the familiar Drake Equation—to try to arrive at a reasonable estimate of how many intelligent civilizations there are in our galaxy. But here's my backwards calculation of the number of intelligent civilizations: Let's assume there are 15,000,000,000 (fifteen billion) intelligent extraterrestrial civilizations--in the observable universe. Then only one-in-ten galaxies have one, and any hope of ever detecting one may be hopeless, or stated another way; and given these numbers, there is a 10:1 probability that we are alone in our galaxy.

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