



Limits to Growth: A View from Planet Talos

Posted by [Nate Hagens](#) on December 21, 2008 - 1:37pm

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Tags: [alien](#), [guest post](#), [original](#), [peak oil](#), [talos](#), [talosian](#), [wide boundary](#) [[list all tags](#)]

This guest post first ran over 2 years ago, in November 2006. How time flies...It's intent is not prescriptive but as a thought experiment to think what our situation *might* look like from a different (alien) perspective.

This is a guest post from [First Talosian](#), the senior member of the planetary expedition force from Talos. I am posting the correspondence as we received it, unedited. (there are spelling and grammatical errors). In it he describes his culture's perspectives on Earth's history and future with particular emphasis on our energy and ecological intersections. The graphics were added by me after reading his letter.

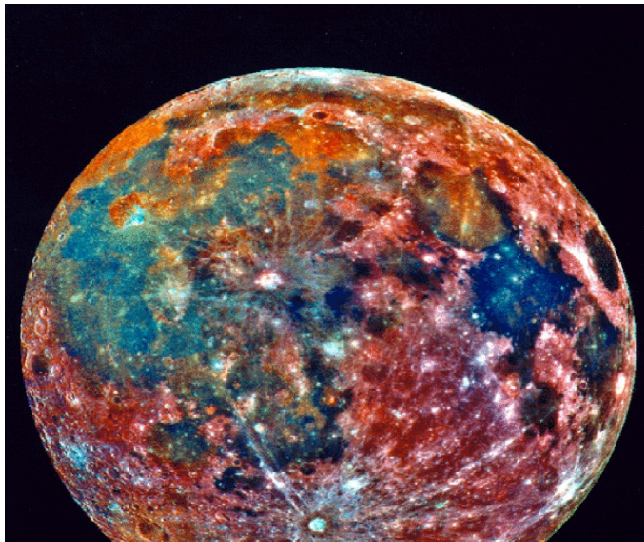


First Talosian of Talos

Greetings to all Homo sapiens and any others on Earth who can understand this,

Each 10,000 years, one of our vessels visits your planet to observe, learn and enjoy its rich diversity. We cannot breathe your air for long (the 'air' on Talos is 68% Oxygen) so we park our vessel during our visit and observe by spectral telemetry screens. (Our ship is 3 miles above western Ecuador, but is cloaked - even your 'advanced' military will not find it).

According to our records, your planet is [4,588,250,000 years old](#) (Talos is almost 7 billion). Our race is extremely old. We developed space travel about 800 million years ago and have been coming to earth for almost that long. To our knowledge, there are 19,056 planets in the universe (and there are actually 2 universes) that possess the genetic combinations that you call 'life'. However, your planet contains over 16% of all species in the universe (over 10 million) and as such has long been one of our favorites. Too, we are very smart (to our knowledge the smartest among interstellar life-forms.) Our brains evolved to be extremely large due to special conditions on Talos that no longer exist.

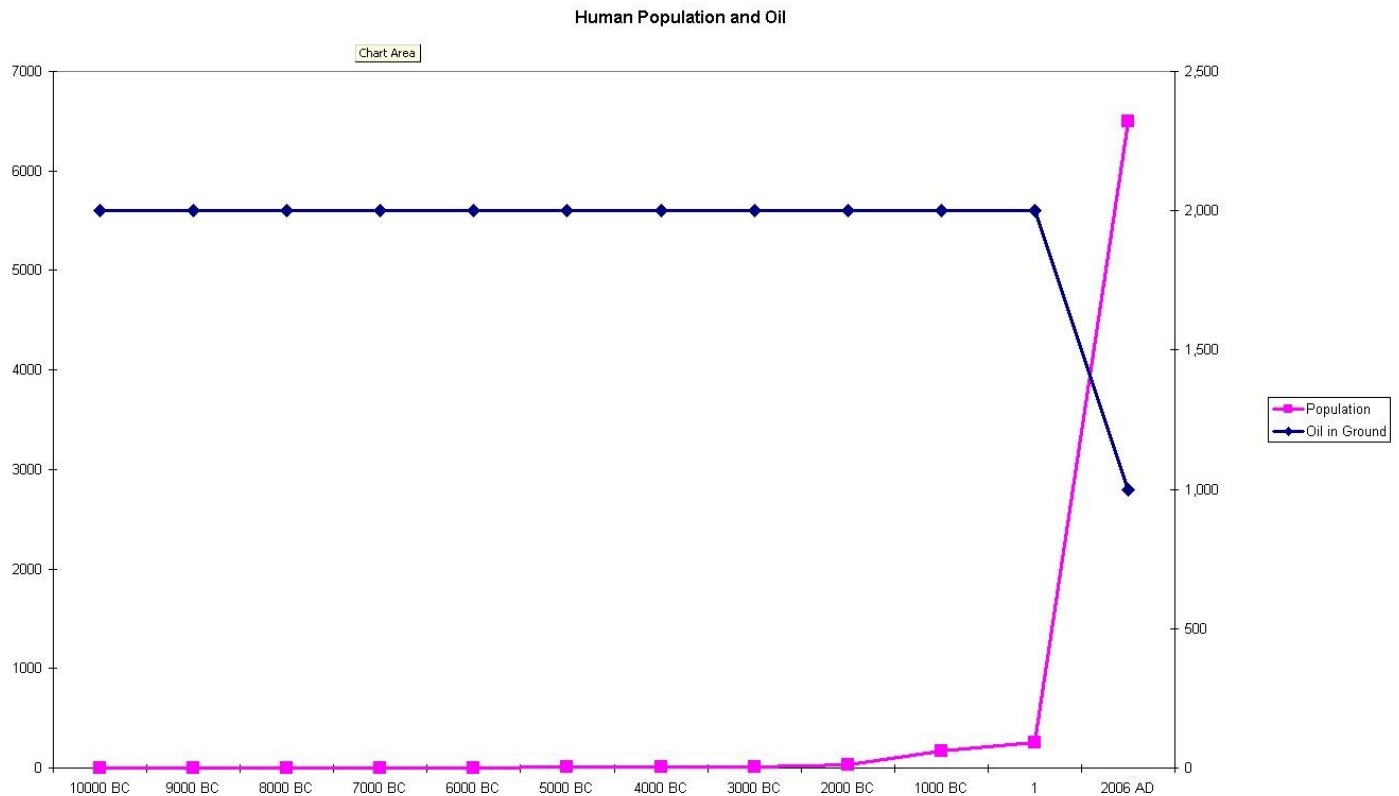


Our Planet Talos (very far away)

We continue space-travel to different galaxies to experience new sights and experiences, the memories and quandaries of which then circulate in our minds for millenia like a hundred sided rubicks toy cube. Otherwise we get bored quite easily and experience mental decay. Sadly, the females of our race died out 20 million years ago so we cannot reproduce. However, our scientists (in particular a genius even by Talos standards named Cornelius), discovered how to regenerate neurons with virtually no thermodynamic loss, thereby stopping aging almost completely. There are now 1,752 Talosians left, and for all purposes we are immortal on your human time scale. Too, we bleed and laugh and experience joy and pain just like we observe you do. A bullet or a bite from a jandar would be just as deadly for us. But we are cautious. Now let me continue.

This is my 19th visit to your blue planet. My first trip here was in your year 4,529,665,520,

which was just before the asteroid impact that removed the large mammals and well before the primate line began from the morphological isolation of [tarsiers](#), shrews or other pre-prosimians. But most of my visits have been in the last 2 million years, and this is my 11th trip in a row (110,000 earth years). On my last visit here 10,000 years ago, there were only about 1 million hominids on the planet- in a fraction of earths history your population has increased 65,000 fold. Let me continue. (human: insert graphics here)



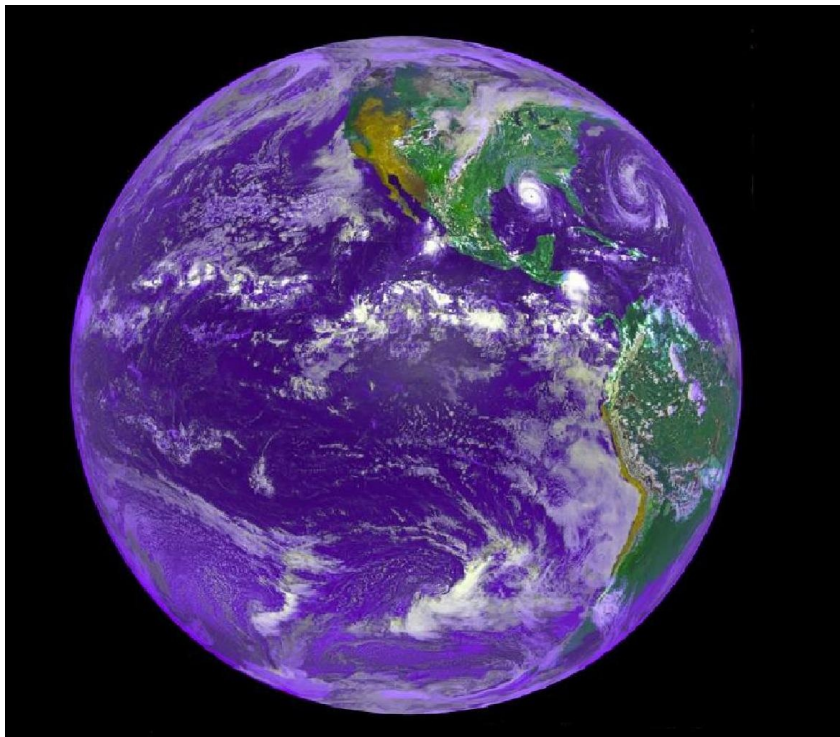
Imagine this is the 5,000th graph laid side by side - the other 4,999 would all look like the left part of this one

Click twice on the above graph to make it clearer

What stayed underneath your planet's crust for millions of years, is now being sucked out rapidly in order to maintain your current social trajectory. For us this would be tragic as we are extremely long lived and the 0-20 years in which you quarrel about when Peak Oil arrives is

irrelevant. Talosians long ago matched our consumptive needs with our planets unique solar flows, (even though we had to import certain technologies that enabled us to accomplish this).

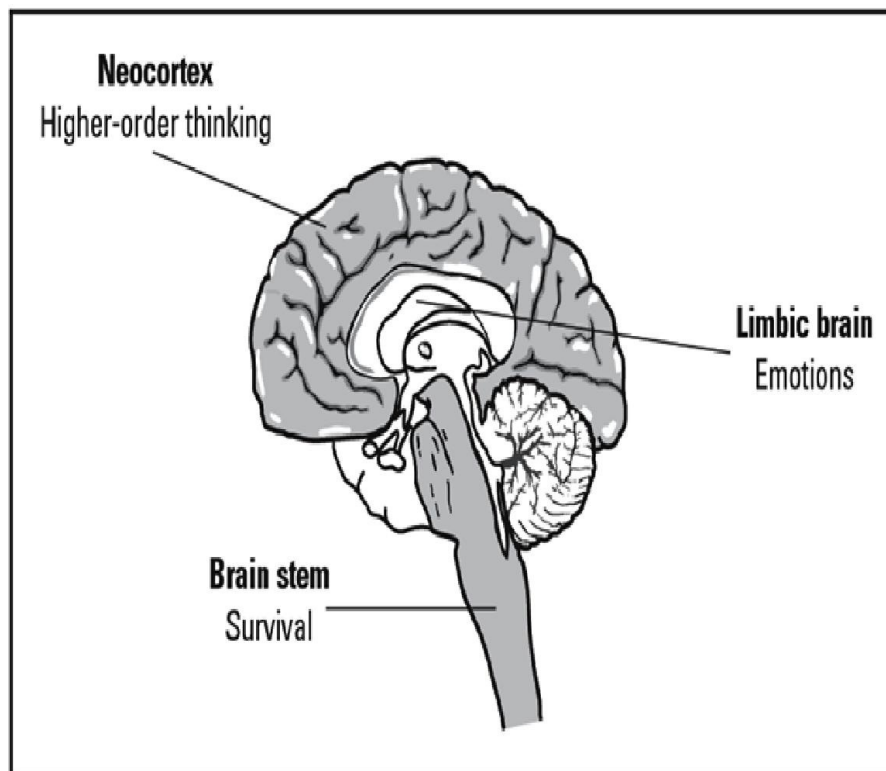
Our purpose on Earth is mostly benign. Other than the Talosian utility we get from observing your biodiversity and it's interactions, each time we come we replenish a supply of [DreamGrubs](#), which are only found on your planet, in Ecuador and Peru - we bring them back and breed them. Consumption of 15-20 of these grubs induces sleep followed by 3-4 days of vivid colorful dreams - dreams that for some reason always include having children, so you can imagine our desire for them. The grubs were once highly competed for but we are less than 2,000 now so have plenty to share. Our other purpose is less benign, but cannot be spoken of. Let me continue.



Your beautiful Planet

Congratulations, first of all, to your human ancestors. They successfully out-competed thousands of other species for resource acquisition and were able to squat in the most productive ecosystem areas. Wondrous creatures we remember from past millennia like saber-tooth tigers, mastodons, and daplingle wolves (you are yet to find their skeletons), were muscled out by the recent global advance of your tribes. After you split from the main primate line 5 million years ago and then

rapidly developed a larger and larger neo-cortical region during the [climate volatility 500,000-1,000,000 years ago](#), your ability to think, imagine and create has become unique on your planet. However, your basic neural impulses originated from the same phylogenetic pathways as all creatures on earth, and as such a Talosian would view your culturally implied superiority over other sentient genetic combinations as misplaced. The primitive 'reptilian' brain that activates your fight or flight responses and regulates your neural-endocrine cascade system is over a half a billion years old and shared by all earth creatures that move away from painful stimuli and towards food, energy and warmth. Your emotions, part of an intricate limbic system that fears, hungers, wants, sleeps, plays and feels satisfied has largely the same sea-horse shaped structure (with the exception of its interplay with the frontal cortex) as all other terrestrial mammals,. Too, it must be so, as you evolved from them. It is your neo-cortex that separates your behaviours and potentials from the other mammals and the size of it that further explains your recent success relative to the other 310 primate species. Let me continue. (human -insert graphics here)



The Triune HomoSapiens Brain

On this visit to earth I am experiencing unpleasant sensations. This is the first time my crew feels fear at what we will discover here on our next voyage. Homo sapiens has clearly won the earth resource lottery ticket. Through the incredible, but mathematically probable, relentless success of your ancestors, your neural circuitry through natural selection has become wired to locate, concentrate and consume resources. All creatures do this, but you have become the best at it. Because you are the best, your activities are squeezing out other species you compete with, that don't possess your large brains. Only in the current generation has this propensity begin to run up against boundaries in both inputs (resources) and outputs (homo sapiens waste products).

The fossil fuels that you have built modern human tribes interactions around, are running out. They started running out the first day you decided to harness them. We knew that one day one of several species on this planet would puzzle out how to access and utilize the highly concentrated forms of energy buried beneath your planets surface- we have had many debates and dreams of

how this species (which we now discover is human) would utilize this bounty. You are still a young species, and your rational, cognitive systems are as yet not strong enough to overcome your emotional urges from hundreds of millions of generations of selection as mammals and more recently the tribal competition and social cooperation that selected for [brain expansion during the Pleistocene](#). With wiring so geared towards sharply valuing the present over the future (what your econo-humans call 'steep discount rates'), it was somewhat to be expected that the oil and gas would predominantly be used as quickly as possible once found. What has surprised us, is how little of this energy has been spent building infrastructure that will sustain your species once the fossil remains fully deplete. Of even more concern to the Talosians on our ship, is how little of this energy has been spent protecting and sustaining the other species that did not win the fossil lottery. In fact, it seems some historical roles have been reversed.



Role Reversal

Talosians have much knowledge of things, but it is our policy not to interfere with other planets own evolutionary processes. Even this correspondence to www.theoil drum.com is a borderline violation of our Central Committees' bylaws, but as First Talosian, and a childhood dreamer of Earths beauty and diversity, I have chosen to share some of our thinking, with the intent that it might influence people to view Earths' situation with a slightly different lens - perhaps lessening their discount rate and thinking more of the future. Our long lives make our brains run more like computers (zero discount rates), as opposed to drug addicts (very steep discount rates). Without trying to label or judge human value systems, we have come up with the following observations of planet earth and her supply and demand situation for energy. Let us proceed.

ENERGY

99% of the species ever to live on planet earth are no longer with you - their 'technology' was not adequate to supply sufficient usable energy as their environment changed. This is what faces human systems now, but of all, is the simplest problem to address. Energy is germane for the energy services it provides. Human choices for a certain way of life dictate how much and of what form of energy you need. The two previous human generations designed speed-vehicles and tall structures and a vast network of economic comparative advantage trading depots, all requiring large inputs of inexpensive liquid fossil fuel to move items to where they were needed. This was all built on your assumption of perpetually negligible transportation costs. This was a trajectory that was shaped before you were born. But it falls on your generation to recognize it as unsustainable (and perhaps undesirable, though we don't 'know' your preferences). Given that all

of the highest quality fossil fuels will be consumed in one human generation (2 at most), there only exists one sustainable supply side strategy. And that is to transmute remaining stocks of fossil energy into renewable forms. You have fossil stocks of fuel (S) and renewable flows of energy from the sun (R). From the perspective of a long lived species, continuing to promote and pursue infrastructure and systems that require high net energy fuel sources that will deplete within a generation shows the inferior intelligence of your species (my apologies, rather, it highlights your evolved response to heavily overweight the present). Here is how we view the energy side of your problem.

Earth still possesses fossil resources $F_1, F_2, F_3...F_n....$ where F_1 =high quality oil, F_2 =tar sands, F_3 =coal, etc.

Earth has potentially harvestable renewable sources $R_1, R_2, R_3..R_n...$ where R_1 might be wind, R_2 =solar PV, R_3 =hydro, etc.

$X = \text{Energy Output} * (R / (S + R)) / \text{Energy Input} * (R / (S + R))$

To view your situation from a net energy perspective is superior to abstract economics, but sustainability of the strongest form would preclude any fossil fuel usage, unless to create regenerational infrastructures. The sum total of new energy schemes for your species should maximize for $X(X_1, X_2...X_n)$, which in effect is producing the largest renewable output for the smallest fossil input. For interests of sustainability, to create diesel fuel from coal in this formula is only a stopgap measure, as all your fossil input does not create renewable flows. Once S is gone, X will equal the sum of all $R_1, R_2...R_n$. Put simply, you want to have the highest renewable energy return on your remaining fossil resources not used for basic needs. However, before you do this in earnest, we 'recommend' that you examine your **end goals first** - this will prevent 10 earth years and 300 billion barrels of oil burned attempting to create the same ends you now aspire to, before discovering the dead end. Let us continue

THE PURSUIT OF HAPPINESS

Satisfaction, for all creatures is generating a neuro-endocrine-hormonal balance that feels right to them. Evolution has shaped brains (through a relentless fitness filter) to maximize copies of genes sent to the next generation, and to help those genes (in the form of offspring) survive. Humans (and Talosians, and squirrels) are born equipped to learn certain behaviours easily and other things with difficulty or not at all. Humans cannot take down wildebeests with their fingernails. Squirrels cannot type HTML code. Prepared learning does not suggest your paths are predestined. A squirrel does not automatically know how to crack a nut, but once he tries it several times, he is better at it than most species could ever be. It appears to us that homo sapiens scientists are fast discovering the importance of the brain/behaviour link. If we could only trust you and breathe your air, we could teach your neuro-economists some shortcuts towards designing institutions that would be better fits for your biology.

Every day you each attempt to attain the same total brain cocktail (and this is simplified) that caused your ancestors to meet with evolutionary success (have offspring). While this may not be your conscious goal, in a world full of high energy fuels, the competition instinct manifests in planetary consumption. Such may or may not move you up the human mating ladder but is clearly a [bad thing for some](#). As a species, you would be well served to select activities that give you the same 'total brain cocktails' as you were designed to experience, but cognitively choose them from lower energy footprint options. Humans get this cocktail from activities such as sharing, eating, solving problems, novelty seeking, sex, competition, love, cooperation, playing games, etc.

In effect, both individuals and society should attempt to optimize

B/R, or Total Brain Cocktail / Resources (of which Energy is an important one) If you get the same feeling of excitement or contentment from building a chicken coop with your family as a shopping center with your real estate team, or playing parcheesi with your neighbor as playing a golf tournament in Las Vegas, you will be pursuing darwinian happiness. The trick is acknowledging that your intelligence is not strong enough to overcome your emotional systems, and then using your intelligence to plot a course through that neural minefield. Let us continue.

But humans, like Talosians, also can imagine a future, sometimes with hope and sometimes with dread. The above equation B / R is a precursor to what humans might call happiness (or an econo-human might call 'personal utility') It is a combination of your current brain cocktail combined with a discounted present value stream of all PERCEIVED future brain cocktails. If you engage in wild hedonistic pleasures, you are getting much of the former, but knowledge and experience in the neocortex tell you that your future is being eaten into by dangerous sex, drugs, spending money, or the like. Humans inherently optimize the equation:

$$U = B_t + (B_{t+1})/(1+d) + (B_{t+2})/(1+d)^2 + \dots (B_{t+x})/(1+d)^x$$

which states that Utility equals your current 'neurotransmitter cocktail' plus all future such cocktails that you expect (at the current moment) discounted by a discount rate d . For most animals on your planet the discount rate is near 1, meaning they don't know there is a future - so for sub-primates at least, the above equation simplifies to $U = B_t$. Humans still have steep discount rates of up to 20% (meaning that events beyond 10 years hold virtually zero weight in daily decisions) but you still possess the potential to delay gratification in ways that earth's other creatures cannot

Since Talosians are long lived species the impact of B_t of the present moment (the first term on the equation) is greatly reduced. For humans to access future thinking however, you are limited by your wiring. To take advantage of knowledge of this, you can:

1. given a choice between consuming now or consuming in the future, you should make the perception of a future with nothing to consume seem less appealing, therefore weighting the 'saving' mechanism and delaying consumption.
2. reduce the discount rate in the equation. Since you are genetically constrained, this could occur through cultural changes in mores and values.
3. become addicted to a drug, thereby radically steepening your discount rate so that the future seems very distant, less important and therefore less painful.

I suspect that the event you are calling 'Peak Oil', which a Talosian would just call 'half-time', will produce many humans in all 3 of the above categories. Let us continue.

EARTH POPULATION

Most thinking humans would look at the above population chart and wonder how high it can go, especially given the coming resource constraints. How do you value a human life? How do you value an animal's life? How do you value other species who do not have as developed a neocortex as your own? What price is a lion? What price are all lions? These are questions your society may face - you will likely think that clearly one human life is worth more than the life of one lion - but what about one human vs 1000 lions? Or one human versus the entire lion species? And what is the end goal for humanity? To have the most humans as possible? To have the most 'happy' humans as possible (acknowledging this might be less than the most humans). Is having 6 billion happy creatures preferable to 12 billion miserable ones. This gets at the quality of life issue and at some point or other these questions will be looked at on your world. To run pell mell into an

ecological overcapacity situation without examining them will end badly. While the situation is still manageable, humans are ingenious and clever, but when it becomes unmanageable, I fear you will revert to less cognitive behavior. I ask these hypothetical questions, because our society has been through this all before. Here is how we did it on Talos (the second time around)

We maximized, using the previously stated formulas:

$Bt * P$ which equates to Darwinian 'Happiness' * Human Population

A weak form of this formula for your planet might only include homo sapiens in the population. A stronger form would assign a sentience quotient to all other species that have the ability to feel pain, joy, and experiences. A dolphin might be equal to 4 dogs and a monkey might be worth 7 dolphins and a human might equate to 9 monkeys, or some such. Mathematically,

$$P^* = \text{Sum } (A \Rightarrow Z)(C)^*(B)^*(P)$$

where A thru Z are all Earthbound sentient species, C is their sentience factor, B is the evolutionary brain cocktail (from above) and P is their population. In this stronger form, we maximize P^* . This seems the only fair way for the most advanced species on a planet to incorporate the value of its planetary neighbors. (Talos once had almost 1 million species and our drive to develop warp capability raised the temperature beyond what most species could tolerate.) Perhaps human value systems are unique, and the continued existence and freedom of other species is a benefit in its own right. I do not know, things have changed a bit since my last visit.

PUTTING IT ALL TOGETHER - THE ENDS

$$X \Rightarrow U * P$$

Given the ultimate renewable energy flow, you should want to maximize the utility of the population, or given the utility of the population, you should maximize the ultimate renewable energy flow. I wish you luck.

In a generation your fossil fuels will have been largely used. It is of some urgency that you prioritize use of the remaining high quality fuels, while a global infrastructure still readily functions, to turn these fossil stocks into renewable flows. But before you do this, you must examine your end goals. Can you experience happiness consistent with your evolution by consuming less energy? Can you find ways to value the future at least a little bit more than you do now? Can you articulate what is the goal of life on earth, scientifically? Does that articulation include other life forms, that are bystanders to the rabid pursuit of more fuel and planetary thermodynamic throughput? The answers to these questions will dictate what types of energy infrastructure will be needed and guide energy investments going forward.

To a Talosian, the way that humans rank things is strange. Your daily hierarchy is money-luxury-energy-food-water-environment. On our planet, we have the exact opposite ranking system, and money is just used to purchase luxury items (like grub-drug). However, our planet twice witnessed ecological disaster on a large scale, with green life forms nearly disappearing. Subsequent generations of Talosians worked together to prioritize fragile ecosystems that now provide life support functions for our remaining population and 38 other species.

I advise your tribal units and their tribal units above them to imagine an earth without everything you see in it now. Erase from your minds for the time being all the Wal-marts,

Disneylands, KFC's and concrete. Imagine waking up tomorrow and creating a world where things worked, people were happy and healthy and the environment was safe. I am not human so don't know what that would look like - perhaps the world you have created is just so. - If it isn't then determine and clarify what you desire. What makes you happy. What are the sustainable things that bring most holistic fulfillment as individuals, as tribes and as a species.

What are your values? Do not confuse your values attached to a seemingly fixed infrastructure with your true values. Once you elucidate clear values, rely on a combination of self-actualization towards these values on a local scale and on social contract theory on a macro scale. Your species has been shaped to follow rules set by the predominant culture and rulemakers. Determine your ends/values democratically, and have your human governing body use science to create the social contracts that most efficiently map a plan from today to tomorrow. This plan should balance the two goals of maximizing the likelihood of attaining your new ends, and minimizing the chances of slipping down the historical slope of war and chaos.

Determine the ends first without the momentum of the current means to guide you. Once you outline and put mental color on new ends, engage your best scientists and citizens to make it so.

I can not, nor would I, judge and choose a human value system. You must consider this and choose for yourselves. But do not do so from the static world as you see it today. Envision the world as you want it to be first. Then draw a path from today to tomorrow. And start soon.

Let us close
In Sincerity,
Ember Dyadicon
First Talosian
Nov 2, 2006 (Actually 4,588,250,000)

Post-scripte-I was charged with delivery of this note. Everything Ember said was to convince you to save the climate so he can keep on harvesting DreamGrubs. If climate change alters their ecosystem he is going to be pissed.

Thaddeus Grommaker
Assistant to First Talosian



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