



3/21/2021: A Hungry World

There's an ancient Greek myth about Erysichthon, the King of Thessaly, who ordered all of the trees in the sacred grove of Demeter to be cut down. One of these trees was covered with votive wreaths, a symbol of every prayer that the goddess Demeter had ever answered.

Erysichthon's men refused to cut this particular tree down, so he grabbed an ax and did the work himself. Demeter responded by cursing him with Limos, the spirit of unrelenting and insatiable hunger.



With this curse, Erysichthon's cravings could not be satisfied. Food acted like fuel on a fire. And in an effort to feed his relentless appetite, he exhausted his riches, sold his daughter into slavery, and eventually devoured his own flesh.

Unfortunately, they didn't have meal replacement shakes back then...

Humans create myths to communicate the oft-hidden truths about ourselves, the universe, and our place in it.

Erysichthon's insatiable hunger is a reflection of mankind's innate rapacity... our constant craving for more... and its sometimes (often) destructive results.

This myth is apropos to our present day. The world is ravenous. It's hungry. Its appetite becoming ever more voracious.

It desires an increasing amount of energy, resources, compute, and even conflict.



Population growth * income growth = exponentially rising consumption curves

From 1970 through 2000 we saw a relatively stable average of 700 million people enter the global middle-class and cross the [Wealth S-Curve tipping point](#). Putting the short-term adverse economic effects of COVID aside, we're on the cusp of seeing roughly *4 billion* enter the middle class. This means, that for the first time ever, a majority of the world's population will live in middle-class or rich households.

This means we'll see an exponential rise in consumption across the board, for all goods. And this translates, of course, into an incredible thirst for energy since it's an input into practically every form of consumption.

Back in December, I shared in my note [Total Energy Flux](#) this bit from Vaclav Smil, Bill Gate's favorite author and a prolific writer on the history of energy.

With less than a sixth of all humanity enjoying the benefits of the high-energy civilization, a third of it is now engaged in a frantic race to join that minority, and more than half of the world's population has yet to begin this ascent.

*The potential need for more energy is thus enormous... The utterly impossible option is to extend the benefits of two North American high energy societies (about 330 million people consuming annually some 330 GJ per capita) to the rest of the world (about 6.5 billion people in 2005). This would require nearly 2.3 ZJ of primary energy, or slightly more than **five times the current global supply**.*

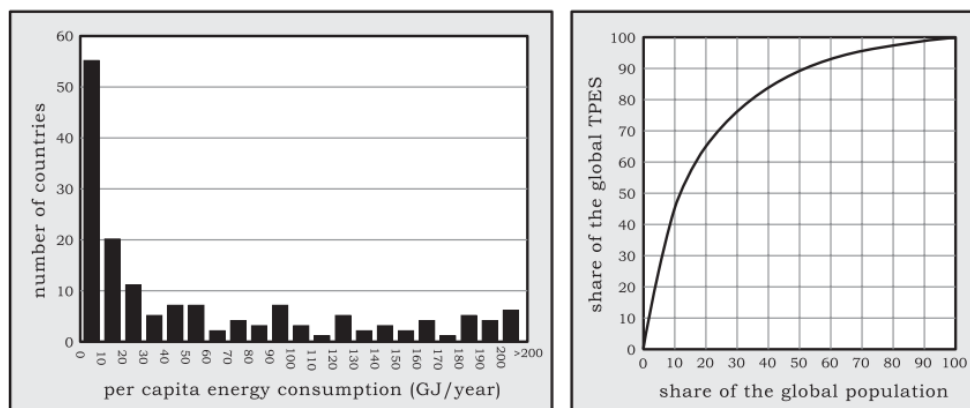


Fig. 35.6. Pronounced inequities of global energy consumption.



It's naive to think that we, as in humanity at large, will choose anything other than the "utterly impossible option"... Those just joining the middle-class for the first time will want to consume the same things which those of us in the West have long enjoyed, and rightfully so.

Smil himself frequently cites the work of Alfred Lotke who formulated the law of maximized energy flows. This law essentially states that all natural complex systems will, over time, operate in a way so as to increase their total energy use as long as there are available resources to do so. Human civilization, of course, falling directly under this description.

Hence the revelatory Greek myths... That, like Erysichthon, humanity suffers under the *irresistible* drive to consume, including potentially ourselves. And this drive is within us... coded into our *very* DNA, as it is within *all* of nature... intrinsically enmeshed within the basis of its evolutionary impulse.

As investors, we want to be long this impulse, especially since it's set to grow exponentially.

BofA predicts primary energy demand to grow 40% by 2035. Under this scenario, they believe the world will need \$48-53tn in energy investments over the same period to just keep up. And with an ever-increasing focus from our [Game Masters](#) on combating climate change, the bank estimates we'll see roughly \$70tn in investments to facilitate a low-carbon transition over the next 20-years.

These numbers are no small-beans...

Rising global income means a change in dietary habits. Wealthier societies consume more meat and dairy than lower-income ones, which subsists primarily on grain. Raising livestock is 7x more grain intensive than producing for a simple plant-based diet.

This change in dietary trends along with a growing global population means we'll see food demand increase anywhere between [59% to 98% by 2050](#) — a level of demand our scientific community is skeptical we'll be able to meet.



These are big numbers with big implications. This is why we're invested in companies such as BHP Group (BHP), Antero Resources (AR), Centrus Energy (LEU), S&W Seed (SANW), Bioceres Crop Solutions (BIOX), and Cresud SACIF y A ADR (CRESY). As they all sit at the *critical* nexus of this tremendous demand shift for energy, resources, and food staples.

Just as demographics and rising wealth are driving exponential changes in our demand for resources, so is technological advancement and its pervasiveness driving exponential demand in our need for greater computing power.

Semiconductors are the new oil...

We wrote about this trend last year in [Underwriting the Future: The Rise of Compute Power](#) where we pitched Micron (MU) [DOTM](#) calls which have gone from a buck to as high as \$16 just the other week... and they still have 9-months left till expiration.

There's a reason Taiwan Semiconductor (TSMC), the world's largest producer of leading-edge chips, guided for \$25-28bn in CAPEX spend for 2021, a 40+% rise over the year prior. Demand is projected to balloon....

Management pointed to high-performance computing (HPC) — think AI/ML — replacing smartphones as the critical driver of demand for semis going forward, which they expect to “moderate” the seasonality that's long characterized the industry. With “moderate” likely being a *major* understatement as AI compute in training models are already doubling every 3-4 months.

It's a very real possibility that in the not-too-distant future, nearly every business in every industry will have to utilize some form of AI just to keep up. Big data and AI will soon become the table-stakes just to play the game.

Two of my favorite stats to illustrate the extraordinary amounts of computing power needed to sustain our technological future are:

1. 90% of the data available in the world today was generated in the last 2 years — and it is expected to grow to 180 zettabytes (that is 21 zeros) by 2025. To put a



zettabyte into context, storing just one requires 1,000 data centers or about 20% of the land area of Manhattan. ~ Westfield Capital Management

2. A single autonomous vehicle will generate and consume 40 TB of data for every 8 hours of driving and 1 million autonomous cars will generate as much data as 3 billion people. ~ Intel

This is why we own names such as Micron (MU), Intel (INTC), and up until only recently, Murata Manufacturing (6981). And why we'll continue to look to add exposure to this space as technical entry points arise. There's literally no other industry with as strong secular and cyclical tailwinds.

You can say that the spirit of Limos is alive and well in the world of compute.

Conflict brings humility, humility produces comfort, comfort spawns conflict...

French Philosopher Blaise Pascal hit the proverbial nail on the head when he wrote "All of humanity's problems stem from man's inability to sit quietly in a room alone."

One would think a rising global middle class and technological creature comforts that our grandparents couldn't even fathom, would satiate man's desires and make for a peaceful existence. Alas, this is not the case.

One of the best books I read last year is titled "Transformations of Myths Throughout Time". It consists of a series of lectures given by Joseph Campbell. It's a fantastic read if that's the kind of stuff that floats your boat.

Anyways... one of the stories Campbell shares is about the Hill Tribes people of New Guinea (shown in the photo below). This photo depicts a ceremonial battle the Hill Tribe routinely conducts.



The thing is is that the battle is *deadly* serious. They carry out these ceremonial attacks against their neighbors until they kill at least one man from the opposing tribe. They then go back and wait for a counter-attack in which the opposing tribe will battle until one of their men is also killed.

The fascinating thing is that none of the Hill Tribe people lack food or property. In fact, they live in relative abundance... And, as a result, the men are left with *nothing* to do other than sharpen their spears and play out deadly war games with fellow tribes — their answer to occupying idle time.

This might sound absurd but it really shouldn't. It's not like we in the modern world are much different. Our recent history is replete with pointless wars... We just play these ceremonial war games on a grander scale, with more pompous dress and grandiloquent narrative.

More convincing? Sure... More necessary? Most of them, no.

Man's appetite for mischief and conflict is infinite if his time and energy are not preoccupied with other means. This is just another truth about humanity that the Greeks reflected in their myths and which Jane Goodall also discovered while studying



our chimpanzee counterparts. It all makes more sense when you remember we're only two chromosomes apart.

We're moving into a period that is ripe for greater conflict.

Whether you subscribe to Peter Turchin's [idea](#) that the overproduction of elites leads to rising intra-elite competition that gradually undermines the cooperative underpinnings of society; or Martin Gurri's [school of thought](#) that technology has categorically reversed the informational balance of power between the public and the elites, along with the institutions they manage, which has led to a negation of the center by the fringe.

Maybe you prefer viewing things through the lens of Bridgewater's [Debt Cycles](#), or generational theories like the [Fourth Turning](#) hypothesis and [Kondratiev waves](#), or geopolitical ones such as our shift towards [deglobalization](#) or the Thucydides trap, etc...

Regardless, the trend in social contentment is heading lower. And any student of history will recognize these signposts.

When human societies reach these historical forks in the road, the majority of people go one of two ways. They either, (1) become nihilists who peddle in conspiracy and actively promote anarchy through direct or indirect methods; such as voting into power a human wrecking ball. Or they, (2) develop complete and total obeisance to the state, and look to those in power for solutions to their ever-growing list of grievances, both real and imagined; in essence creating a totalitarian government.

The first path leads to conflict through the intentional destruction of the existing power structures. The second leads to *eventual* conflict through iatrogenic policy measures born from arrogant elites who pretend to lord over systems they scantily understand.

Lucky for us, the future isn't yet written and we maintain self-determination... But, like the poker player plunked down at a table of professional sharks. We're playing short-stacked, are more than a few drinks in, and were just dealt 2-7 off-suite... the odds just ain't looking too good.



So a wider dispersion of socio-economic outcomes should be assumed. Greater volatility in our normalcy expected. And larger-tailed events (both good and bad) prepared for.

This is why we have companies like Ammo Inc, (POWW), Manolete Partners (MANO), and Altria Group (MO) — numbing out and escapism is a sister theme — in our portfolio and are actively looking to add more to play this secular development.

All the above are the broader inter-connected macro themes we've been positioning for and which we'll continue to seek out asymmetric bets on.

This note is the start of an ongoing series we're going to kick off into different aspects of this general trend.

We'll explore the impact and subsequent investment opportunities of a world saddled with a level of demand for food that's twice as large as what we have today... We'll dive into the consequences of our growing energy needs along with bets we can make to exploit these trends... We'll discuss some of my favorite theories on what drives conflict cycles throughout history, and we'll review likely policy responses as well as their repercussions (think inflation/deflation) and ways to protect our portfolios.

It's a lot. Which is a fitting amount for a world cursed with an insatiable hunger. Let's hope we don't end up Erysichthon.

Your Macro Operator,

Alex