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Abstract

The Benefits of Creating Comprehensive Models for Working Steady-State Economies, an Example of One and how the Covid 19 Pandemic can Help Promote the Steady-State Solution.

This paper suggests, among other things, how the Covid 19 outbreak will help implement the economic reforms that ecological economists and steady-state advocates promote. To do that it posits that, if the studies of many researchers and activists are combined to describe an actual model of a working steady-state economy, it could help the public understand what we're trying to do better than the individual studies we work on now. It took over 50 years for the public to be educated enough about ecology to create a critical mass of people who demanded action be taken on the climate emergency. But, the changes needed to correct the climate emergency can't happen quickly enough to be effective until a similar critical mass of people comes together to insist society changes from an economic growth model to a steady-state one. In short, the next big effort must be to market a comprehensive model of a steady-state economy and describing the nuts-and-bolts of a working steady-state economy will be much more effective in getting the public get on board with broad support. We don't have another 50 years to wait. The paper describes the societal mindsets that need to change to keep a steady-state economy going in perpetuity, the criteria any steady-state model must fulfill to function, and then includes one example of how a long-term economy could be structured as a starting point. Finally, this methodology gives a home for researchers of all disciplines to test their ideas against or, to suggest a completely original one of their own.

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Full paper

The Benefits of Creating Comprehensive Models of Working Steady-State Economies, an Example of One and how the Covid 19 Pandemic can Help Promote the tseady-State Solution.

Introduction:

"You never change things by fighting the existing reality.
To change something, build a new model that makes the existing model obsolete."
— Buckminster Fuller

I finished this paper the week the Covid 19 outbreak was declared a pandemic, therefore making obsolete the timing of my thesis, although making its implementation more urgent. (it also caused me to add an extra line to the already too-long title) I had spent three years researching and coming up with the papers ideas, which were based on the assumption that we still had time to make the public aware of what I proposed. These were the things they needed to know to help implement a new economic system that would help society avoid things like Covid 19. Now, while the information is still valid, and the timing has changed from soon to urgent, ironically the pandemic might actually have set up a situation where we could implement the economic rule changes much more quickly than I, or most ecological economists could have foreseen a few short weeks ago.

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This paper's theme is based on the work I did writing a book about steady-state economics, ***A Planet to Die For***. The book differs from this paper in that the longer work is written for the general public. This means it is not only written in accessible language, but also includes background chapters on economic history, population studies, the history of money,

banking, the perils of economic growth, alternative currencies and more. This background allows those who've never heard of ecological economics (EE) or steady-state economics (SSE) to learn and understand the need for and benefits of the economic changes toward which most in our new field are already striving.

This paper, on the other hand, is designed for those with a comprehensive economic background. It therefore concentrates more on introducing the nuts-and-bolts of how and why the steady-state model I'm going to describe could work, and why approaching the topic this way is beneficial. In any of the places I choose to include background, I will do so minimally and the background will be cited only to give a quick reference to what the steady-state concept is replacing and why it's important that it do so.

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Background: (It Can't Happen Here – Frank Zappa, 1966)

I think it's fair to describe the work women and men do on ecological economics (EE) and steady-state economics (SSE) as explorations into how humanity and the natural world can thrive together on the same planet in perpetuity. This is in contrast to our current economic-growth system, which calls for continuous monetary expansion which, although money is an abstract concept, requires that the laws of thermodynamics to be activated, resulting in the real-world growth of both human population and resource consumption. This paper proceeds with an acceptance of the fact that our current economic growth system cannot last in perpetuity and will lead to the ecological collapse of our current world-wide human civilization. This would be the largest self-inflicted ecological collapse of the countless collapses humans have caused since we evolved some two hundred thousand years ago. Those that do not recognize this situation could be said to be counterparts of the citizens of those many long-fallen civilizations who said,

echoing the 1966 Frank Zappa song, ***It Can't Happen Here***, and who genuinely believed that their societies would go on forever. I first wrote these words in January of 2020. Less than three months later, the Covid19 virus was in 60 countries. (Editing a week later, over 130) While this might not be 'the big event' through which nature puts humans back in line in a big way, personally my age and lung disease apparently put me in the category of highest risk. While I know research into important subjects must be done as objectively as possible, I must admit that the thought of being brought down by a pandemic has given me a new drive to work on my steady-state economic ideas, because… it IS happening here.

Personal fears aside, implicit in all news announcements about Covid 19 is that, whether it's a few weeks, months or next fall, when the pandemic passes it will be back to business as usual… back to economic growth. This, of course, is the exact opposite of what must be learned, if we are to avoid an even bigger pandemic in the future, and it is ironic that the measures governments are making to help people now are some of the changes activists like me and ecological economists have been suggesting for years. You will read about them as you read the paper. Perhaps then, the Covid 19 outbreak could be opportunity to implement the changes in society more quickly than we could have done without it.

However, we must be careful. The unspoken message currently by politicians is that after the current crisis passes we will go back to business as usual because 99.9% plus of the population lives with the mindset that economic growth is good and have never even heard the phrase 'steady-state economics' or knows what it is. Neither do they understand how population and economic growth has been at the root of all pandemics, plagues and social crisis down through the ages, and that economic growth is dependent on population growth. Perhaps then, if economic economists and activists can find a way to use this pandemic as a teachable moment to

leverage the need for economic reform to SSE, then this could be the silver lining in an otherwise terrible situation.

Even before Covid19 appeared, over 97% of scientists in related ecological fields agreed that the next impending ecological collapse has begun and will be irreversible by 2030 or so. This has caused what has been dubbed the "climate emergency" in which there is finally a critical mass of people around the world who have demonstrated through their votes and their participation in various public demonstrations that corrective measures must happen, and it seems politicians are at least making an effort to move on the demands being made. For this to happen it took over fifty years of scientists, activists and media personalities warning the public of upcoming ecological dangers. And this had to be done while fighting against those profiting monetarily and gaining societal control by the continued ecological destruction needed to increase monetary profit. But, indeed, a critical mass of people has now been sufficiently educated on the need for society to take action against the climate change emergency. However…

It is my belief that society as a whole will not be able to make the necessary changes to reverse the momentum of the climate crisis without also showing the public what is going to replace society's current economic structure. Yes, we can convince people that change is sorely needed, but without a vision of what might best replace the existing economic paradigm, after the initial agreement you may get from individuals on the need for change, you will soon be left with blank stares and impatience for you to follow up the "why" with the "how." This is why I am proposing that the next big message to be promoted should be a comprehensive vision of a steady-state economy and how it would operate. It is also imperative to show how everyday

people would enjoy much better lives, both materially and emotionally. This is absolutely critical to muster and to maintain their support.

Let us contrast this idea with what is happening currently in most SSE and EE studies. I think it is a fair to say that many of the hard-working economists and activists who are occupied in their chosen fields of study focus on individual aspects of ecological economics in relationship to our current growth-economy paradigm. Perhaps it's because academically-trained economists grow up in a milieu of writing papers on narrow topics. I don't know. But what I do know is that without the active pursuit of a final vision of what a steady-state economy may look like, we can't progress far or quickly enough. Identifying a concrete and comprehensive target will always be more successful when communicating to the public than debating individual economic aspects in isolation. No business leader will start a complex organization without a vision of how all the different departments will interact to create a specific outcome. And while any system's design will always be fine-tuned along the way, a final and defined goal is always in mind. It therefore must certainly be the same with all the economic aspects being studied in a quest for a steady-state solution. Without a target, focus must by definition be scattered, even when we make valid discoveries by hyper-focusing on individual topics and subtopics.

I am in no way saying individual studies are unimportant. They are, of course, invaluable and must continue. They are the individual gears of a complex machine or, a bit of code in a complex piece of programing that must be accurately configured to work harmoniously within a larger program. What I am proposing, therefore, is that a new aspect of our studies be added; one that describes working steady-state economies and explains how different individual ideas deveopled by researchers can and must work together. This area of study will not only include written insights by ecological economists and activists, but also computer modeling to allow

trials of ideas virtually as they develop, philosophers who will hone the ideas to make sure they fulfill long-term social objectives and are conscientiously executed, and popular writers of science and sociology who will interpret and communicate researchers' findings to the public. This last aspect is important so that politicians and activists can move the public towards understanding and supporting a common vision, similar to what was done in getting across the need for action on the climate crisis, only faster. We don't have the fifty years it took to build consensus about the climate crisis.

These positive efforts seem to be in contrast to those with the greatest influence over the current growth economy. Their goal appears to be aimed at dividing public thought into competing factions. This dividing and conquering is done in both first and third-world countries alike, and employs a great number of strategies; the hijacking of the democratic process, the spread of misinformation, the reducing of social supports and incomes, the denying of education to whole swaths of populations, and also the blocking of participation in politics. These are but a few of current strategies for public control. And incredibly, these manipulations are being done in a way that many of those in the underclass, people most negatively affected by this suppression, actually support who those who manifestly don't have their best interests at heart against those who do.

I am therefore putting forth, as an example, a vision of how a steady-state economy could be organized. This big-picture approach puts together many of the individual ideas that researchers and activists have been working on for decades, and it is my hope that my or other's theoretical examples of SSE, with all the complexity of their moving parts and foundational principles, will give any number of opportunities for professionals to comment on, prove, disprove, improve, expand and make proposals as needed. I do not claim that what I propose will

be the way a society will actually organize itself in the long term. That is not my purpose, although I hope some of my ideas may find favor. My larger goal is that together we can create an arena for researchers to participate in envisioning an actual concrete way of organizing for the future; to not only prove that a steady-state economy is possible, but to have many researchers publish multiple examples of how it can be achieved. Also, these models can work as a place for researchers to test their ideas against and once it is incorporated, other researchers can build on it. It is my sincere hope that this methodology of describing an end goal for all of our efforts will find a home among the many other efforts of ecological economists, activists and steady-state proponents.

Finally, and this is very important to understand, I will describe this SSE example as if it's already replaced the current economic-growth economy. This is because there is an even bigger problem than coming up with an alternative economic model. After all, we already have enough of the scientific knowledge to correct our ecological problems, and there is certainly enough wisdom among current economic scholars, politicians and philosophers to write up a preliminary set of new economic rules. What we don't know how to do, however, is overcome the grip of those who currently have the greatest control of the world's economic infrastructure. They create the money, control its flow, fund most of the world's governments and their armies, and the reality is that we will have to overcome their pushback while we attempt to successfully introduce what I hope to be humane and functional measures to transition to SSE. But none of this can happen until we bring the public on board, and that can't occur before we and they see and understand a working vision of the future.

Note: I do make attempts to deal with how activist groups and progressive governments might attempt to overcome the opposition of those at the top of the current economic-growth

*pyramid in my book, **A Planet to Die For**, and may also do so in a separate paper in the future. For now, this paper is limited to introducing an outline of a working steady-state example.*

What replaces economic growth?

It is said that the most successful inventions imitate nature. After all, it's been finding the best way to do things for BILLIONS of years. The evolutionary process includes trial and error and the elimination of things that don't work, which only leave processes which are time tested. So, when talking about a steady-state solution for economics, which has as its core criteria of humans functioning within the natural world in perpetuity, nature is the place to look.

Many others, both modern and down through a number of centuries, have come at the question of 'what replaces economic growth' from a number of different angles and have given it different names. Adam Smith wrote how the economy would sooner or later settle in a final state of stationarity. John Stuart Mill used the phrase "stationary state" for the same reason. Thomas Malthus warned about how; "The power of population is indefinitely greater than the power in the earth to produce subsistence for man." As an Anglican cleric Malthus interpreted this situation as divinely imposed to teach virtuous behavior. In today's terms I would hope that "virtuous behavior" could be viewed as understanding how our greatest strength, our intellect, has become our greatest threat, and that we must summon the will to redirect our mental abilities, and more problematically, our collective will, to solve the problem. In more modern time John Maynard Keynes talked about "a quasi-stationary community." Nicholas Georgescu-Roegen used the phrase "steady-state economy", but removed all idealistic dreaming from the idea in his book, ***The Entropy Law and the Economic Process***. Entropy will get everyone in the end. Georgescu's student, Herman Daly, coined the phrase "ecological economics". Luigi Pasinetti's talked about a Structural Change and used the word "dynamic", and Richard Nelson

and Sydney Winter used the word "Evolutionary" in terms of economic change. There are many others and I apologize if I missed mentioning you. The point is that the idea of nature, evolution and steady-state has been developing in the minds of many of those who've been thinking about our modern civilization falling off the metaphorical cliff for a long time.

While the great thinkers I mentioned gave different names to what they were studying and predicted must eventually happen, I like to call the process which can replace economic growth…

Dynamic Change:

In nature, dynamic change is the universal process that fuels all forms of life to evolve in response to all the other changing lifeforms around them. An example is a forest or jungle. While staying relatively the same size, all the life forms within it use the natural wealth (the elements and nutrients within and upon the Earth) to sustain themselves while, over generations, each lifeform mutates minutely to try to stay in a form that will be able to both compete and work symbiotically with all the other lifeforms who are doing the same thing. This reconfiguring over centuries and millennia is why the flora and fauna on Earth now looks so different than millions of years ago. Except for the energy of sunlight, the vast majority of nutrients and minerals are the same as back then, but the vegetation and animals, while distant genetic relatives, all looks very different.

"How does this relate to economics and trade now?" some will ask (if they are being polite), or "A pipe dream!" others will say dismissively. And to show how their priorities have been conditioned to only think short term, many will complain, "We won't be able to meet next month's quota thinking like this?" Yes, we must be aware how the majority of people, so used to living in an established economic-growth system, might not see how nature's process of life

forms evolving over time can translate into an economic system to allow both humans and the natural world to co-exist. And, truthfully, when I decided to pursue developing an example of SSE, I didn't start with the idea of dynamic change or even know it existed. That came later.

To begin with, I started pragmatically by making a list of all the aspects of our economy that seemed to be causing problems, and then started researching each category and writing, not only my research, but also my thoughts on how things could be done differently. Initially the topics studied and then reassembled were things like the historical and current aspects of money, government finance, banking, taxes, international banking and development, population and land studies, and then the topics branched out from there. I worked for three years on this, almost daily.

About halfway through this time, I began to see how the topics I studied showed the potential to work together as a steady-state economic system. I was able to retain most of the same institutions and tools that our economic-growth system uses now to make the transition more comfortable for users, but with policies which spread out resources instead of concentrating them. There were some policies that have been proposed for decades but not implemented, like guaranteed incomes. Even the only major change that needed to be included to make the formula work was nothing new. It was just a reversion to how things were done before in many established economies. (spoiler alert: it's who makes money and calculates how much is needed) But, as it all began to come together, I began to see similarities to nature's methodology. I also observed that every one of my ideas had to fulfill a simple list of criteria (which I'll show soon) and what emerged then was a system whose constituent parts had the potential to work positively; competing sometimes and working symbiotically most times, in healthy long-term

loops, both for all citizens and nature. This was when I realized that a steady-state system really could be possible.

Admittedly, such a system would be organized in a way to take absolute control away from a small group of individuals and give over the means to live well to each and every individual in society. This would allow those who possess the talent and ambition to innovate without restriction and for those who want to just live contentedly, taking care of themselves, their family and community (as the majority does), they could do so. And, as a bonus this system will allow our human population to reduce by half every generation, until the point is reached where, instead of consuming more of more of nature, like now, we will just nibble around its edges. This is different from an economic-growth system, which as any competent economist knows, requires both population growth and natural resource consumption growth.

For those thinking how population growth is already slowing and will start to retract in the next three to five decades, if a pandemic doesn't do it to us quickly, I agree. This is what the scientific models show us. This is another reason to transition to SSE as soon as possible, because an economic-growth system can NOT support negative growth. We need a robust steady-state system to keep populations thriving happily as our numbers decrease. We must get ahead of the curve.

I admit, even after the above explanation, I can see how it might be difficult to see how dynamic change translates into an economic system. If this is true for you, don't worry. I believe as you read how the different moving parts I'm going to describe work together to perpetuate a long-lasting system, it will hopefully become clear.

Changes in our civilization's mindset to implement and sustain SSE:

Before getting to the nuts-and-bolts mechanics of the SSE system of this paper, I'd like to address something psychological. After all, most economic fundamentals are based on human psychology. And lately, with a firm grip on the world's media, those same people with their hands on the levers of economies can pretty much manipulate a population to possess mindsets which are not in their best interest. And, unfortunately, most people are widely unaware of how they come to receive what they accept as 'truths.' They've been fed them for generations and accept them like the air they breathe.

I bring the mindset topic up before explaining my steady-state example because it could be just as important for researchers who adopt the idea of promoting a SSE solution to understand why many of the people they try to talk to about it are so resistant to it.

What follows now are descriptions of what I have come to believe are the five most insidious mindsets that will hamper people from becoming open to the idea of changing to a steady-state economy. After people are aware of them, perhaps they will recognize their own visceral prejudices surfacing and be more receptive and open minded.

Mindset change 1) We must accept that humans are just another lifeform which has 'outstripped' its biology:

Since life began on earth, all life forms have been constrained by the other life forms around them. This constraint happens in many ways. Sometimes life forms must compete for resources to survive and sometimes they must cooperate. They do not do these things through conscious effort, but because of actions which were repeated over thousands and millions of generations, forming biological mechanisms and habitual responses. And still, it is a dance of life which continues in ecospheres that range from the size of puddles to whole watersheds, in

supposedly lifeless deserts, at the bottom of the deepest ocean valleys, atop the highest mountains and all along coastal shorelines. The fact that the dance continues demonstrates how the organism we call our planet's biosphere is still robustly experimenting to balance cooperation and competition so it, as a whole, and all of its constituent life forms, can survive and evolve.

Throughout time, over the last three and a half billions of years since life evolved on planet earth, many billions of species, both plant and animal, from the microscopic to the largest of creatures, have appeared, evolved along a line to where they are today, or gone extinct. Sometimes these extinctions happened because a mutation in natural selection didn't give its host the tools to compete, so that line of natural experimentation ended. Other times a life form's mutation was so successful it flourished to the point where it became a dominant element in an ecosphere, crowding out not only its competitors, but the other forms of life it needed to survive. This could result in overgrazing or a multitude of diseases caused by overcrowding. Whatever the reason, the result was that the dominant population crashed, leaving an absence in the local ecosphere. The environment then reset and the struggle of finding a place in the changed environment continued for the organisms left.

Humans and our societies were no different. We faced the same problems. And since humans evolved some 6,000 generations ago, a large and unknown number of human societies have risen and fallen, victims of the processes just described. However, during those thousands of years, and because of the unique brain nature's experimentation developed in us, we humans were able to pass on to future generations our accumulated knowledge and forestall many of the dangers we confronted. In other words, we learned and communicated in more complex ways than other creatures could.

We solved the problem of overgrazing by inventing agricultural techniques between ten thousand and thirteen thousand years ago. We overcame the apparent weakness of our bodies against larger creatures by inventing complex weapons and cooperative defensive strategies. And when diseases from overcrowding threatened population growth, we invented medical and engineering interventions. While one could believe that this has taken a long time, we must remember that ten thousand years is a blink of the eye when it comes to evolution. But in that time humans have covered the earth with, some believe, many thousand times more of us than there should be for us to be able to live in a healthy manner over the next centuries.

However, now that we can understand our history and how outstripping our biology is ultimately causing catastrophic events, we must use those same big brains to understand how we've gone wrong and find a way to convince the rest of humanity to cooperate in making the needed changes to put our species back in balance with the only world humans will have for the foreseeable future.

Mindset change 2) Revisioning the goal for inventions for use in a steady-state world:

Ponder this: Every invention we humans have ever created has allowed our population to grow. I include in the definition of invention not just scientific discoveries and the never-ending developments in technology, but also human organizations. Governments, businesses, corporations, even money and economic systems, are all inventions which have spurred on the logistical capacity to administer larger populations. These intellectual inventions are just as powerful as some technology. Perhaps even more so.

In most societies growth = bigger = better = progress = good. This is the conditioned and accepted norm which most people grow up to believe. Subconsciously we accept economic growth as a self-evident positive truth not to be questioned. It is, however, not true. This thought

in itself, the mindset that growth is good, is an invention which we have been conditioned to accept. While inventions certainly gave a portion of humanity a more comfortable lifestyle than it had enjoyed over previous centuries, this was only possible because there was a much smaller human population and the resources of planet Earth seemed inexhaustible. It was true then and is still today, that the vast majority of us don't appreciate how our actions as a species are unsustainably degrading the ecospheres everything depends on. And for those who did appreciate what our civilization is doing, it was only a short time ago that we thought these problems would reach a global crisis during our grandchildrens' time. But we were wrong. It's happening now.

Here is another cautionary note about the way in which inventions that allow us to do more with less have been used. Inventions have been used by small groups to concentrate power, wealth and control for themselves. They were not used for the benefit of all. Therefore it is important to emphasize in this 'Inventions good or ill' section that another new and necessary norm which must be adapted into the conscious mind of that critical mass of the population is that inventions must be used for the overall benefit of society, not the enrichment of the few against the impoverishment the many.

If this idea, or any that your read, seem far-fetched, impossible, if you're muttering under your breath how I'm "dreaming in technicolor" or "just don't understand reality," I agree. But if this mindset doesn't change, our civilization will continue on the slide toward the existential cliff that scientists of so many disciplines have categorically determined that we're on now. In the past, civilizations which have fallen off similar cliffs, albeit from a lower height, may have had as an excuse a lack of knowledge of the forces of nature they were contravening. But we have no such excuse.

While everything I am mentioning I am mentioning will be an almost impossible thing to overcome in a timely fashion, it's important for readers to remember that the same creative thinking which allowed us to make and then use inventions for ill, can also be used to help us to rethink, rewrite and enact a new reality for the good. This is why I contend that humankind must alter this particular mindset into our collective consciousness a new way of thinking, that; the purpose of inventions is not only to be more productive with less, but they must also allow populations to remain low while helping to keep the whole of the human population's quality of life high through technology and societal agreements.

Mindset Change 3) An evolution in the concepts of reward for a steady-state world:

If you are a "Big C" conservative you're probably thinking I'm about to go all *Pinko* on you and advocate how your freedom to be rewarded for your efforts should be taken away. Actually, it's the exact opposite. I repeat; the exact opposite.

In the example of the steady-state economy you're going to read soon, it's still going to be the market that determines the upside of people's incomes. What is changed, though, is the ability of those in control of money to governor every aspect of the economy. But why can they do this now? The reality is, being good at working with money is a talent in the same way as other's having a talent for oil painting, playing soccer, or being a great carpenter, physicist or surgeon. But because people who are good with money have been able, over a number of centuries, to make money the central control of everything in this world, people somehow believe that being good with money makes those people smarter or more worthy than all others. It's absolutely absurd. Most of the doctors, teachers, scientists, lawyers, pharmacists, actually almost everyone I know, are very good at what they do. But that doesn't necessarily mean they're also good at controlling or building wealth. I've known some pretty terrific doctors and

lawyers who have been absolutely abysmal when it came to their own finances. But I'd rather have my monetarily-challenged doctor treating some ailment I come down with than a successful day trader. My favorite quotes on this phenomenon come from one of the wealthiest people on the planet, Warren Buffet. One reads, "I happen to have a talent for allocating capital. But my ability to use that talent is completely dependent on the society I was born into. If I'd been born into a tribe of hunters, this talent of mine would be pretty worthless." But in this world where our financial system does allow money to control almost everything, those with their hands on the controls of the economy can now do with money what past warrior kings did by force, coerce whole populations to participate in an economy designed to make that same moneyed class wealthier. The result is that very few of the majority get to do what fulfills them in a way that makes them happy.

Often when I say this I'll get the retort about how it was capitalism that lifted so many hundreds of millions of people out of poverty in the last century in the Americas and Europe and in Asia in the last fifty years. It's hard to argue with this as historical fact, but then I counter that this is obsolete news. The trends they're quoting started in the 1930s, after the Great Depression, and lasted to the mid to late 1970s. In not too many pages from now, I'll show how the share of income and asset ownership did shift somewhat to create a middle class during the 30s to the 70s, but since then, those numbers shifted back. The gap between haves and have-nots is once again growing, and it is happening at a time of the climate crisis. Together these two events seem to the harbinger of societal collapse. The speedy introduction of steady-state economics as the next phase of public awareness after acceptance of the climate crisis therefore becomes more important. And understanding how rewards does not make you a better person than others is a

key for people of talent learning to keep the balance between competition and cooperation, which is the human key to making a steady-state economy work long term.

On a very practical level, as you read the steady-state example, I admit what you will see is those who we called the noble class in the past and oligarchs today will have their ultimate control of the financial system, for it is control of this that made them their untouchable wealth. Minus that, they can 'earn' as much as they want but will not be able to cause the majority to be turned into poppers or surfs, and they will not be able to use their monopolies to stop others from competing with them.

Mindset Change 4) Stop planning only for months and years and do it for centuries:

Currently, companies must turn a profit every quarter and all adults must earn a living for themselves and their families every day, both without concern for the future. In this world there is truly is no long-term inter-century planning. And most curious is that, despite the acceptance of the reality of the climate crisis, the idea that its cause is linked to our current growth economy hasn't be made by the public or political leaders. I cannot remember one speech by one political leader of a party who is in power, or is close to it, about how we must change our economic system to have intergenerational goals. Acceptable speech themes are always about how they will usher in better economic growth than others. The reason for this is that in countries where those in charge of money have control over the political process, politicians will not be backed by large corporate donors if they deviate from that. This leaves the education of the public about changing to SSE in the hands of scientists, writers, film makers, activists and ecological economists. But, of course, this group of enthusiastic and well-informed people could never compete financially in marketing our message, and how to overcome such a disadvantage is one

of the topics I said was for another time. For now the objective is to describe how an SSE world could look when it's already in place. So…

People in the future world will not be faced with overcoming the powers that keep the world consuming for the sake of consuming and figuring out how they are going to get through their lives working in a system that takes more than it gives and degrades the planet we live in. The less burdensome mindset our progeny may live with, and the laws which enforce the world to allow the remain living by those believe reflects the thought experiments I engaged in when coming up with my steady-state example. I asked myself, "Given that humans began our journey of civilization some 10,000 to 13,000 years ago (that's when our forbearers invented agriculture), what is a list of topic headings that would outline the most important changes our present society must undertake so humans can thrive on a healthy planet for another 10,000 plus years?"

This resulted in a study of humanity's economic past to the present, and then a list of principles, benchmarks and laws outlining the needed changes in both the public mindset and basic societal and economic organization for the future, which this writing is all about.

If we take this 10,000 year tack, it is my belief we elevate the discussion. Now many who decide to study the problem of 'saving the world' in some capacity quickly start feeling they are standing before an insurmountable wall with no way to scale it. What follows for a great number of them is a feeling of hopelessness, soon followed by burnout and apathy. I know that feeling well. I've been there. And then a type of amnesia sets in where we forget the big problem we're facing and fatalistically go about our lives, helping keep the sausage machine turning. I went through this phase when my 60th birthday came about and ended up buying a six cylinder car. It was a hybrid, but six cylinders?

But a number of years later, when I was developing my example of a steady-state example, the experience and the insights I gained gave me a way to shed the apathy and sadness. Studying the history and looking at the bigger picture was like taking a number of steps from what felt like an impossibly high was and I began to get a perspective of the length of the journey we are continuing for our ancestors. Now the wall no longer seemed as high, or my personal responsibility to correct it single handedly so overpowering. Now each relevant topic about the journey behind and in front of us can become a less stressful conversation with those who both support and or oppose us because we have gained a bird's-eye perspective of how humans got to where we are. I call this gaining "The Elder's Perspective." This is when someone seeks to gain the scientific knowledge of where we came from, and then develops a holistic opinion of what is best for our human tribe and all the billions of other life forms living on this tiny planet. I believe we can also call this wisdom. And what follows when a person develops wisdom? Perhaps the philosophical strength-of-character to engage, participate in and promote long-term lifestyle changes, and also the ability to avoid burnout while facing such odd. Interestingly, when I have been in third-world countries and met happy families living in circumstances that would crush me, I recognize that attitude. As Jessie Jackson said, "Your attitude determines your altitude."

The overarching principal that all laws and individual's actions must sustain a human society for the next ten thousand years in a healthy manner is not a new idea. The Seven Generations concept, attributed to the pre-European North American Iroquois Nation, dictates that every decision made must take in consideration the welfare of people seven generations into the future. It's a concept that's been recognized by environmental movements for a long time. My proposal updates this, extending the target to as long as civilization has been around already,

at least 10,000 years. It's also important to understand when I say "sustain a human society for 10,000 years in a healthy manner," it means that even when the natural world has been allowed to regain global health, we must allow it to keep that way with no regard for humanity. That's because the health of the planet's biosphere must come first. After all, if we compromise the health of the planet in any way, we won't last.

Structuring every decision to not have negative effects going into the future is virtually as difficult whether one is considering it for seven generations or ten thousand years. But the seven generations concept was developed before we had a true scientific perspective of our origins, and when marketing this idea to a modern public, there could be a sweet synchronicity to mirroring the length of civilization's past into the future. Sometimes poetic visions can capture a culture's imagination, and a vision is necessary for any great enterprise or journey. And frankly, building a world-wide society that will last thousands of years is both.

Mindset Change 5) The hardest mindset to change… most people believe money is real.

I personally believe that money is among the greatest of human inventions. As opposed to barter, it allows people to engage in complex trading, large or small, and allows the inclusion of knowledge and services to be part of economies.

Of course, money isn't absolutely necessary to run a sophisticated economy. Some great civilizations, like the Incas, didn't have money, yet built great societies. Some science-fiction writers show in their stories how money won't be used in the future centuries, and maybe it won't. But for now, and into the beginnings of the steady-state future I hope we head, since almost the whole world is conditioned to use money, I believe a re-envisioned money, as well as financial infrastructure, can have an important and positive transitional role in the move to a steady-state economy.

Of course, like all inventions, money can be used for the common good or it can be used for ill. Guns made hunting easier, so food was more plentiful in the past, or they can kill people. It's the same with airplanes. You can move people and goods quickly about the world, delivering food, medicine, or get help to where the need is urgent, or drop bombs on people you call your enemies. In fact, the speedy development of both these inventions happened, not because of their social utility, but because of their utility as weapons. Computers can usher in a free exchange of ideas or an age when governments and big business spy on the citizens of their own and other nations. Money is the same. It has the potential to distribute the wealth of the Earth in some kind of equitable fashion, which is at the heart of my SSE example, whereas throughout the centuries, money has been put to work centralizing power into fewer and fewer hands. This was done by clever individuals developing what became international financial systems. And they've been very successful. So, while the most common phrase about money goes, "Money is the root of all evil," I would suggest it actually should read, "The way money is being used is the root of most evil." Not quite as snappy, but perhaps more accurate.

Today's reality is money is needed for almost everything, and it's a good parent who teaches their child the value of money early. We make sure our offspring get part-time jobs and make them pay for things with the money they earned with their own hands.

However, the truth is… money doesn't exist. It's a social contract, a belief system our loving parents initiated us into accepting without guilt on their part or suspicion by us. But the reality is most people, including our parents, didn't know money is a social contract or that the social contract even existed.

"You say money isn't real? Try living without it," some are muttering or shouting at these words right now.

My answer is that what is real is the social contract, and it is only embodied in the coins, bank notes, the cheques that we write, and now the digital numbers we transfer when we use our credit cards and pay our debts online.

The first principle of developing any civilization is to get more and more people going in the same direction, getting them to play a part in some plan, either voluntarily or by coercion. For the majority of human existence, 200,000 to 10,000 years ago, that was accomplished by feeding people from childhood and allowing them to be part of a tribe or group. It could be said that the social contract of, "you help hunt and gather, birth and look after the children, protect us from predators, etc," is actually an evolutionary cooperation contract that, if it didn't exist, neither would we. But as we humans began to outstrip our biology and formed larger groups, making members of a tribe do what a leader wanted became more difficult. There had to be something else, other than food, shelter and relative safety, to coerce people. Organized religion? Bingo. And to speed up this very brief history, some thousands of years later, money was added. Did some evil genius sit down and think money up? No. It evolved over time and obviously had the positive result of expanding trade. But like any tool, it was then corrupted by clever people and used for their personal objectives. Fast forward to today and without money you don't get food, shelter, safety… or anything without it. So, as opposed to the 190,000 years we spent in our Paleolithic past, where parents and tribal leaders taught us to gather, hunt and be wary of lions, else we'd die, today everything around us teaches we must earn money or not have a good life. In short, we are conditioned by this concept called money.

And as for that social contract, besides the fact that most people aren't even aware that there is one, and probably because they don't know about it, the contract over the years has been rewritten by people behind the scenes. Tribal leaders, kings and then bureaucrats, bankers,

industrialists and their lobbyists, rejigged the way money is created, how the majority of us get it, and the way it flows. And now that governments must borrow money from private banks, leaving the general population to service this ever-growing public debt with their diminishing incomes, (more on this later) it even makes it harder for governments to do what governments are idealistically supposed to do, or must do if human civilization is to last ten-thousand years or more. And that is, make sure its citizens are looked after. They can't do it in third-world countries now and it's becoming more difficult in the first world.

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So, I've written about how our mindsets must change to hopefully make readers more open to the nuts and bolts section coming up, which could seem unrealistic when looked through the everyday eyes of a person living steeped with the beliefs of one living in an economic growth economy.

Just before we get into the specific description of the steady-state economy, here are those four short criteria I mentioned are necessary for any form of long-term economy to describe.

The criteria for any steady-state economy:

Just before we get into the specific description of the steady-state economy, here are those criteria which I mentioned are necessary for any form of long-term economy to survive.

1) Any steady-state plan must allow the natural world to heal and find a new long-term healthy balance separate from human beings. To accomplish this we will need to…

2) Lower human population to a number which is proven to allow the natural world to last in perpetuity. If we are talking lasting at least 10,000 years, we're talking drastic cuts. We must leave this to science, but I'm going to guess that our population size must fall to somewhere

between 25 million and 500 million. For hundreds of thousands of years its estimated that humans, before agriculture, had a population in the very low millions. This discussion, given religion, tribalism and the other biases which will clash with science, is going to be quite interesting.

3) The elimination of a financial underclass. While many might think this is being suggested purely for humanitarian reasons, I assure you, it is actually a practical long-term necessity for survival. This is because it is impossible to create a sustainable society where a percentage of the population goes wanting. It sets up long-term tensions and the cost of maintaining an underclass will always be higher than just sharing resources equitably.

4) Especially to begin with, SSE must be designed so all creative and ambitious people must be able to participate and be rewarded for adding to society. It is a tenant of capitalism that anyone who wants to succeed can, but it doesn't deliver on this promise. In today's world, one must be part of an organization which owns the rights to an idea or process, and even when people have good ideas to improve existing technologies, in most cases it's impossible to break into that industry and, when one does, they don't get their share of the profits. The planet is rife with talent whose contributions are not allowed to be integrated into it. Competition is systematically made very difficult. Therefore, any SSE must be designed so all creative and ambitious people can participate and be rewarded for adding to society. This is especially true if humans need to lower our population drastically. We will need to harness all the creative powers available to maximize dynamic change.

Relax, it's not that complicated:

Economies are fundamentally very simple things. They may be complex in the details imposed on them by the monetary laws at any particular time, but both growth economies and

steady-state ones are not, at their core very complicated. They don't possess that many large moving parts. This is reflected in that the background portion of this paper is almost four times as long as the actual description of the steady-state organization coming up.

In fact, all that needs to fundamentally change for this steady-state example to work is to redefine who creates the currency society needs and how that currency gets into society. Past these, there are some new laws needed to make sure all citizens have adequate income and other new laws needed to allow the natural world to heal itself naturally and stay that way. These seemingly simple changes will enable population numbers to be cut in half every generation and the natural world to find a new healthy balance. They will also set the stage for all humans of ambition and technical aptitude to contribute and be rewarded for their efforts, unleashing the ability to keep a highly technical and progressive civilization while our population drops.

Economics have worked for the good of society in the past. A brief case study:

I'll add one last bit of background before my SSE description. It's a very short history of how one country was developing an economic system that was working well and how that its promise was reversed. It is included because it employed a number of the same principals which my SSE model revives.

In the decades leading up to the 1970s, Canada created, debt free, the amount of money that very prudent and conservative government economists calculated would be needed to accomplish the business activity that was foreseen as possible in the medium term future. This fulfilled the economic "law" that there must enough money in an economic system to allow things to happen. In fact, between the 1930s, when the wholly owned and government-controlled Bank of Canada was created, until the 1970s, Canada built the infrastructure of an industrial country, fought a world war, built the TransCanada Highway and the St. Lawrence Seaway,

began funding socialized healthcare and more, all with only a stable ten BILLION dollar long-term debt throughout the entirety of the four decades.

The money created was put into the economy directly for government vendors, government employees, social services and infrastructure; things like hospitals, schools, roads, sewers, public buildings, policing, welfare, etc., all job-creating measures.

Then, in the 1970s, the World Bank convinced the vast majority of the governments of industrial countries to relinquish the making of money and to borrow it from private banks. If a country didn't already have a central bank, which most didn't, it was convinced to allow one to be created. One must be aware that almost all central banks on the planet are not owned by the governments which bear their name, but are either privately or publically owned. In short, they are profit oriented, not citizen oriented. Central banks were sold to governments as a progressive measure to promote monetary security, shared wealth and health for citizens. But fifty-plus years of history tell a different story

In the Canadian case, once the government started borrowing money the accumulated debt grew by a steady 20% per year until, in the early 2000s, it exceeded a TRILLION dollars. This has caused social services planning to be sharply curtailed, as in most other countries, because one of the top five expenditures of most national budgets is paying interest to banks on the debt owed to those banks.

Bottom's up to top down – never a good thing:

Another negative result of banks creating money, and very fundamental to the weakening of the middle classes in the second half of the twentieth century is that, as opposed to the government creating money and putting the money into the economy at 'the bottom of the economic pyramid', when banks create credit, they put the vast majority of money into the

economy at the ‘top of the economic pyramid’, into companies who can make the banks a profit. While the promise was that a share of the profits will trickle down to working citizens and the resulting taxes from business and workers will pay for all the government-run social programs needed, again, 50 years of this experiment proves the promise to be a hollow one. More accurately, it was always a deliberate lie.

Parts of a working steady-state model:

Government Creates National Currencies:

Therefore, a country with a steady-state economy will go back to making its own national currency, the only criteria being that there must be extreme discipline in not making more than is needed to accomplish the business that is expected for the period calculated. A description of the amount of national currency created and how it’s distributed is followed by a chart with the same information after a description of how it’s inserted into the economy differently than it is now.

Governments put national currencies into economies through Guaranteed Incomes (GI):

A guaranteed income for every citizen is one of methodologies I was referring to when I said we would include a topic that has been around for a long time conceptually, but not been implemented. In this system, every month the government creates and releases a calculated amount of new money and distributes most of it directly into the economy through the hands of each and every citizen. This means that, instead of new money coming into the economy through banks and businesses, all the capital businesses need first goes through the hands of all citizens, changing the power dynamic. It actually the most crucial element of this SSE model.

In my longer book, I go on for a number of pages about the other positive benefits of guaranteed incomes; why it’s better for citizens and how it promotes the social dynamic change necessary to support ecological longevity. As this paper is being written for people attending an

ecological-economics conference, I expect that most participants are aware of this topic and even onboard with the idea. I therefore am dispensing with the list here, but include a comment here for those skeptical about putting money into the economy through the hands of its citizens in this way.

Guaranteed incomes are not a 'Nanny State' measure meant to turn citizens into docile sheep unable to fend for themselves. It's the exact opposite, it empowers them. For the vast majority it becomes just one source of income, along with their other jobs or businesses. And if some still believe guaranteed incomes will make people lazy, you should research the government studied that were done by both the United States and Canada in the 1960's and 70's. US trials supplied citizens in six states with a guaranteed income (New Jersey Graduated Work Experiment, The Rural Income Maintenance Experiment RIME, Seattle/Denver Income Experiment SIME/RIME). Canada did something similar in the towns of Dauphin and Mincome, Manitoba. The experiments were conducted slightly differently and there seemed to be a bias of, not how people's lives would be improved, but how attitudes about working diligently for employers be affected. The results included;

-Paid work only reduced on the average of 13%, less for men and higher for women. With the average workweek at the time being 40 hours, that meant a drop in paid work to 35 hours. This was because parents spent more time with their children. Also, dropout rates went down and graduation rates up. As well, adults went back to school to improve themselves and much more.

What happened to these studies? Nothing. They were shelved in the USA. And the data from the Canadian study wasn't even compiled until forty years later by three researchers at the University of Manitoba; Wayne Simpson, Greg Mason and Ryan Godwin.

But not all money goes directly to citizens:

A portion of the yearly government money created goes directly to support social services, the major ones being education, healthcare and infrastructure, like roads, public buildings, etc.

How a guaranteed income could be structured:

To further illustrate what I've described so far, what follows are specific numbers and a chart. To start, I chose to use some current real-world data, as far as population and the amount of money being circulated over the last decade. When the time comes to do this in practice rather than the abstract, the exact amount of money governments will create, the percentage slotted for guaranteed incomes, and the amounts paid for public services will eventually be determined by much research, debate and proper computer modelling. My model is here just to illustrate a process, the basic outline of formula, if not the actual numbers.

As well, keeping with the methodology of describing this Steady-State Economy, when it's in full swing planet-wide, we will give all people on the planet the same guaranteed income, although living wages around the planet are very different at present. Also, as most readers are probably from the first-world, I'm going to use close to current living-wage numbers which first-world people can associate with.

I've chosen to begin with two relevant real-world statistics from 2014; the Gross World Product (GWP) and the human population. In 2014 all business transactions on the globe totaled one hundred and seven TRILLION, seven hundred and fifty BILLION dollars US. ($107,750,000,000,000 – 12 zeros) There were also seven and a half BILLION humans on the planet at that time. (7,500,000,000 – 9 zeros)

In the chart below 70% of the money created is allocated to individuals as guaranteed incomes. The remaining 30% is then inserted into the economy to pay for social programs, such as healthcare, education and infrastructure and to invest in new, forward-thinking projects benefiting all of society that industry is not yet ready to fund itself (medical advances, technologies not yet envisioned, space travel, etc.)

As for the 70% of money created going to citizens, perhaps children and adolescents would get a smaller share, whereas adults would get a full share:

-A full share to adults 21 years of age and older.

-A 60% share to adolescents between 13 and 20, to help them learn to be independent.

-A 25% share to children 12 and under, administered by parents or guardians.

A guaranteed income might cover approximately 35% of the cost to live a comfortable life for a single person. Thus average people at the beginning of the SSE era would not have to work more than 18 to 20 hours per week to make up the money to live very well. People who cannot work for themselves outside of the established GI should then be eligible for social supplements.

What follows is a chart to show the numbers quoted above:

Total economy	**$107,500,000,000,000**	**100%**	**107.5 Trillion $ worth of Natural resources & service economic activity.**
$ for Population	**$75,250,000,000,000**	**70%**	**70% total of resource allocation**
Population Total	**7,500,000,000**	**World Pop 2017**	
	$ 10,033	*** Per person 21 & older (full share) 75% of the present population**	**Per year**
	$ 6,020	***Per person 13 to 20 (60% share) 11% of the present population**	**Per year**
	$ 2,508	***Per person under 13 (25% share) 14% of the present population**	**Per year**
	$ for Govt Services	**30%**	**% total resource allocation**
	$18,750,000,000,000	**$ 4,300 per person**	**per person Health care, education, infrastructure, special projects, etc.**

While a guaranteed income of $10,000 per year doesn't seem like a lot for an adult in a first world country right now, it's actually over four times larger than the aggregate income of all the individuals on the planet in the early 21st century. It also means a family of three could receive a guaranteed income of between $22,574 & $26,086, while families of four, between $25,082 and $32,000, depending on the ages of the children.

Note: I've capped the family size at 4, with only two children. Some believe there should be no support above that. However, more recent research suggests this is not necessarily something to be concerned about as, in the aggregate, prosperity limits the number of children people have. For now, this example does not restrict family size. The purpose at this point in the paper is to just prove that the system being proposed is viable. And, while you process these ideas and numbers, remember:

-most people earn incomes outside of their guaranteed income.

-there should be no reduction in guaranteed income when earning other monies.

-there should be no income tax levied against guaranteed income.

-healthcare, education and infrastructure are paid for by monies allocated from the yearly money-creation budget.

A delicious irony - Self-interest is part of the steady-state mindset:

Cynics say capitalism is built on the greed and self-interest present in the hearts of all people. Well, it's the same in a steady-state economy. However, in extreme capitalism, where an underclass is allowed, where education, political involvement and opportunity are curtailed, self-interest develops into individual greed. I posit that this will manifest differently in a steady-state society, where there is a secure income, education and security of the person. (secure income, education and security of the person is key) For, as people learn that it is they who are deciding the direction of their society by the way they spend their guaranteed incomes in the marketplace, their choices will skew towards what's in their best self-interest, the retention of a stable society. This is the capitalistic theory of self-interest put into real action, instead of just political platitudes.

It could be the same for those who work in the banks, investment companies, service providers and manufacturing firms who will also have to make their living in a steady-state economy. If they can only raise much of the capital they need from the public, it is in their self-interest not abuse their customers or degrade their sources of supply, as most do now. This is the dynamic change of nature translated into social dynamic change, a balance of cooperation and completion mixed with individual self-interest – but enlightened self-interest. And because each

person has a fair and safe share of the planet's resources, each is now now a free actor, an independent thinker and citizen, just like capitalism espouses.

A few other rules or changes to make SSE function:

Here are a few other fundamental changes that need to occur to make SSE work. I'm sure there are more, but perhaps they are the 'details' which devils like. And if you think these fundamentals are too harsh, remember, they are the simple reverse of the fundamentals which have have allowed a concentration of power into fewer and fewer hands over the years.

What happens to banks?

As described, when governments make the national currency and put it into the economy through guaranteed incomes, it rises up through merchants, suppliers and service providers to banks and investment companies from which it is is then loaned out or invested. There is still a very necessary role for banks and people with bankers' talents to fulfill, the responsibility of lending out the money their depositors and investors put in their care. The choices bankers and investment experts make will determine the success of innovation and prosperity as time goes on.

As this is an article written for people with an understanding of economics, you may be wondering what happens about fractional lending.

No more fractional lending;

Fractional lending occurs when banking systems lend out between nine and ten times the amount of money that is required to be held back as reserves, typically 10% in most developed economies; After one bank has loaned out 90% of a deposit, when the borrower puts that money is put into a second bank, the second bank can lend 90% of that as well, and the process

continues on smaller amounts until the whole banking system has lent out nine or ten times more than the original deposit. Theoretically, the new credit is categorized as temporary money and when loans made with that money are paid back, the principal part of the loan is destroyed, or taken completely out of circulation. However, most loans are in long-term instruments of ten, twenty and thirty years, often being renewed, which means money turning over and causing ecological decay for long periods. Fractional banking will be phased out and replaced by governments' debt-free money, created every month of every year and distributed as GI. While computer modelling must be done, as the new GI money amounts circulating could actually end up higher than historical fractional money amounts, there should be no shortage of capital in the system for banks to lend after funds rise up the economic pyramid from consumers and service businesses to the banks. Hopefully, this allays the concerns of some.

Destroying money used to buy virgin natural resources:

Since a prime objective of any Steady-State Economic system is to reduce natural resource consumption, any monies spent to extract natural resources will be destroyed. This discourages their purchase to a minimum. That is, money spent to purchase virgin natural resources will be taken out of circulation. Money used to recycle material and money used for services and labor will not be taken out of circulation. That is because we want to encourage recycling and labor and discourage the consumption of natural resources; things like oil, natural gas, trees, wild animals, newly mined minerals, and the virgin energy needed for extraction of resources and recycling.

Who processes virgin raw materials?

While money is created and distributed by governments, and the quantities of natural resources allowed to be harvested are specified and monitored by government agencies, I don't

see the resources being extracted by government corporations. Just like today, mining experts, engineers of all disciplines, scientists, physicists, even space explorers for space mining -- people who are the best at what they do -- will do the work of extracting, processing, warehousing and distributing raw materials. Although the money paid by manufacturers for raw materials will be taken out of the economy, just like today, extraction companies will bid to do the work. History has taught us that it is more efficient to let the creative minds inside private companies do the work that sustains society, as long as safeguards are in place to prevent the subverting of the long-term goal of building a society which can flourish for thousands of years.

And let us also be aware that, as the human population begins to lower, much of the economy will be the reclamation of the infrastructure built up over the last millennium. Roads, bridges, buildings large and small, vehicles, all are there for reclaiming, repurposing and even putting back into the wild. It will most probably be the same top talents organizing this in addition to "harvesting" the virgin natural resources.

Negative birth rates required to achieve a long-term steady-state human population:

Without a doubt, our human population size is the number one criteria of change that will either allow us to continue the ride on planet earth or get us kicked off. And while the following point has been made several times already, it may be prudent to emphasize it again here; the most effective way to reduce and maintain a low human population is to make sure that all citizens have secure incomes, homes, healthcare and opportunity. This has been demonstrated historically. At the beginning of the 20th century, what's called the Total Fertility Rate (TFR - the average number of live births women have during the childbearing years) was well over 7 children per woman. As prosperity seemed to grow after the Second World War, by the early 1950s, the TFR had dropped to 4.95. By the end of the 20th century, the TFR was 2.36.

Extremely prosperous and progressive countries, like Singapore, reported a negative TFR of .82 in 2016. This is the good news. Things can happen relatively quickly. *(Note: there are still very poor countries, all run by autocratic governments have TFRs of 6 and 7)*

However, we need negative population growth. The reality is that, barring pandemics and natural disasters to reduce our population, humanity will need negative TFRs for between two to three centuries to voluntarily get our population well under a BILLION people, and probably lower. A steady-state economy, one in which people lead secure lives, will therefore be the number one mechanism to achieve this.

A possibly humorous note: While the next few generations' task is to get our species to reduce our population, and the next ones after that to continue the process, it is interesting to contemplate the mindset of a future generation were they've achieved that much lower number of humans. After generations of a culture emphasizing the need of a negative TFR, what will it take to convince people to then increase their TFR to the intergenerational maintenance level 2? Oh well. First things first.

Topics not touched and Conclusion:

I said at the beginning of this paper that most researchers write on narrow topics, but I was purposefully doing otherwise. As I get to this last section, it becomes ironically obvious why research is usually done with a limited scope. Every topic I've included in this paper deserves of much more space than I can give it. And there are so many topics that could have been useful, but I left them out. One of the major topics I cut, but want to at least mention, is Alternative Currencies. I can foresee the need for citizens to trade for things that the national currency I've described won't cover. This will be especially true as the 21st century unfolds and automation takes over so many jobs. But I won't even begin this topic, or a number of others, and hope that

the information in this paper has come close to achieving its objective of proving that a steady-state economy is at least possible. I also cut out most of the history of economics, a topic lay people should be aware of when entering the ecological economics arena. However, again I presume economists and ecologists will know most of this. I'm also not including other important topics; my suggestions as to how we can get the transition to SSE started, what to expect as pushback from the established financial powers, how to fight against their assaults and, my favorite topic, if and when humanity does achieve SSE, what that future world could look like. This paper is about the very narrow idea of how gathering and combining the work of many researchers into what could be a steady-state economy should be the next big message the public has to learn if humanity is going to survive.

-end of paper-

Questions, comments, and economists able to add or correct information, contact me as per below. I'm especially interested in those who would translate these ideas into pure economic language, formulas and computer models.

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