PART II

SUPPORTING INFORMATION

Moving beyond a basic understanding of U.S. dominance in world oil markets, we we must accurately identify our final options on a macro basis as well as personal preperation for a vastly different future.

The post-oil age looms large and complex. There is much obfuscation about the potential and limitations of finite fuels of all types. A transition to sustainability and/or renewable forms of energy is our only choice. There is no chance of seamlessly substituting dilute annual sun-light energy for millions of years of conveniently stored fossil fuels.

CHAPTER 3

Education and Personal Action

I have at least 300 books in my library that relate to, or directly address the end of fossil energy. Most are listed in the bibliography at the end of this book and several of the most pertinent are cited throughout the following chapters. **Only a few broadly connect the peak-energy-food-economic subjects with the steady growth of population and demand.** The classic references on the role of population in resource overshoot and societal collapse: Meadows, Bligh, Bartlett, Carr-Saunders, Diamond, Erlich, Grant, Hardin, Ruppert, Tainter, and more; have not made a meaningful impact on the main stream public. **The messages are too dire and there are many, many other voices offering solutions that are much more palatable.** Especially disconcerting is the conventional wisdom that population must continue to grow to provide economic growth and social security support for the elderly. For instance, in "USA Today"(2/21/2013) is an article with the heading: *Lower U.S. Birthrates a threat to our future, Lawmakers need to promote families.*

In addition, nearly all demographers perpetuate the conventional wisdom that a fertility rate of two children per female (2 cpf) is a"replacement rate" and a satisfactory goal for long-term survival. The methodology introduced in Chapter 6 of this book mathematically shows the fallacy of this reasoning when modern health care and old age are included.

A third group of vociferous activists (and publications) concerned with environmental and climate concerns rarely discuss peak oil and population. The best studies that combine all three subjects: energy, population, and environmental degradation; and their role in previous failures of civilizations (Tainter, Diamond, etc.), are relegated to the back lower shelves of book stores, out of mainstream view, conversation, and interest. Finally, an understanding of this "triple crisis" is completely missed and/or debunked by the classical views of economists.

Now, time is running out and we are faced with at least three major obstacles to any hope of perpetuating a vestige of our modern lifestyle:

1. The mainstream public is not hearing the complete and accurate story. A threatening hurricane, tsunami, or pandemic would be all over the news**. But the greatest challenge ever, the nexus between growing population and declining energy, both related to climate change, goes barely noticed.** The environmental and climate-change advocates seem to be losing ground with the American public, especially when economic growth and job creation are argued in opposition. **The energy-industry barrage of TV ads to convince the public that "there's plenty left" far out weighs the Cassandras who are more concerned about the future of modern civilization.**

2. **Many of the tiny (5 to 10%?) segment of the U.S. and world public who do understand and believe in the imminent decline of energy have chosen to retreat to the sidelines.** This may be because of hopelessness or just human nature to avoid the emotional, physical, and financial investments required to attempt to make a difference. **Inaction by those (you?) who understand the energy vs. population predicament will only facilitate the demise of modern civilization.**

   For the last ten years I have been writing and speaking to generate public concern about the imminent decline of fossil energy. In that time, the combination of population growth, environmental devastation, food shortfalls, fuel cost gyrations, and periodic economic recessions have exacerbated the human predicament throughout the world. The internet is rife with every aspect of these ominous rumblings, but civilization just keeps groping forward with no direction or concern for the future.

   As improved extraction technology and more non-conventional liquid fuels were made possible by higher prices, we in the U.S. enjoyed ten more years (days of grace) of our high-energy lifestyle. However, in this same time-span, dwindling residual wealth and growing debt accelerated the disparity between the remaining few who can outbid the growing poor. This last remission from our terminal illness will be totally wasted as we doggedly attempt to continue business as usual. It is probably only a dream that the concepts proposed in my humble effort, plus similarly alarmed voices, will make enough impact to give ourselves and our descendants hope for a future with the life we've taken for granted. At least, suggestions offered for personal preparations may help a few readers.

3. The escalating tension (widening gap) between declining energy and expanding population may be so far established that no long-term solution is possible. **The best we could possibly hope for is to drastically reduce per capita consumption in the U.S. to, at most, 3 barrels per person per year (b/p/y) and simultaneously reverse population growth as quantified in Chapter 2, Figure 2, Scenario 6. These drastic moves would significantly extend the fossil-fuel era for a few more generations and support a nascent, much lower-energy future.** This would be in sharp contrast to the impending shock of overshoot, collapse, and mass chaos. The children born today and for the next few years could still have a small chance for the remnants of the modern high-energy lifestyle we took for granted.

Imagine the doctor coming from the hospital laboratory to the anxious patient in the waiting room: **"The bad news is you have a terminal illness and have only six months to live. The good news is that if you do exactly as I say, and drastically change your diet, lifestyle, and habits; you might, instead, have six years and possibly many more."** Most of the public would rather look for a comforting second opinion and continue without change. **The difference between this personal scenario and the imminent, world, energy-population macro-crisis is that typical individual response and inaction will take every one down together.**

Also, our problems are not limited to energy, population, and the environment. Continuing this logic path, I will quote from page 83 of my 2006 book, "The End of Fossil Energy":

> Eventually, even the ore for each material will become so depleted that all subsequent material requirements will have to come from recycling. By that time we will experience population reduction and drift slowly backwards from any semblance of an industrialized modern civilization. It may be that the 200 year fossil-fuel consumption curve is just a small blip in a much larger ten to twenty-thousand year finite-metal- resource epoch that spans the copper, aluminum, and iron ages of civilization. It could be argued that it is impossible for an advanced civilization to exist anywhere in the universe for longer than a few thousand years. The very unique circumstances and time required to concentrate metals and energy on a singular planet cannot provide enough resources to last longer than a few years in the cosmological time frame.
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> The time frame for space-travel may, in reality, be impossible. This is not a unique concept and is discussed further in Chapter 4. (Also see, *The Olduvai Theory,* greatchange.org)

To summarize again, there is absolutely no chance for a repeat of the fossil-fuel energy age in less than the next few hundred-million years, the time to store new concentrations of photosynthesized sunlight. If even that were to happen, our future descendants would still have to find depleted ores or use scrap remains of structural metals. By then, the earth's climate may be too altered for human life as we knew it.

As I wander among the stonewalls in rural Maine, I like to think that, about 200 years ago, the first settlers had enough food and surplus energy to clear the forests of wood and the fields of prodigious numbers of rocks and boulders. At least, back then, there was plentiful iron ore to make guns, axes, saws and stone boats for the oxen. Several centuries into the future, will our surviving descendants again come to equilibrium with the steady-state carrying capacity of the immediate surroundings, with or without the ores for structural metals and enough energy for smelting? **They, also might ponder the silent walls of stone intermixed with the remains of huge buildings and high-speed overpasses, and wonder what our life was like in the brief fossil-energy epoch**.

I also have a dream, that if we were smart enough to do everything just right, and planned enough time to prepare; we could, on a limited scale, and a regional to national level, **transition to a limited, solar-electric powered, high-tech society**. With minimal remaining oil and far fewer people constrained by low-energy travel to a smaller locality, could we carefully nurture a semi-modern sustainable lifestyle for generations to come? **This could happen with a mix of PV, wind, solar thermal, and hydro-power electricity.** We might even grow limited biofuels and lubricants in lieu of critical food to keep our machines rotating. For this to be remotely possible and still have concentrated energy necessary for personal transportation and agriculture, we would still have to resolve the battery-storage-recycling problem discussed in Chapter 5. And, of course, we'll have to muster the energy and manpower necessary to defend the borders of this unique surviving utopia. But of course, none of this will be possible unless we first significantly reduce per capita energy and population.

From page 129 of my same book, referenced on the previous page:

> In conclusion, I offer a quotation from a lecture series titled, "Of Men and Galaxies" given (then) 39 years ago in 1964 at the University of Washington by cosmologist Sir Fred Hoyle:
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> *It is often said that, if the human species fails to make a go of it here on earth, some other species will take over the running.* ***In the sense of developing high intelligence this is not correct.*** *We have, or soon will*

> *have exhausted the necessary physical prerequisites so far as this planet is concerned. With coal gone, oil gone, high-grade metallic ores gone, no species however competent can make the long climb from primitive conditions to high-level technology. This is a one shot affair. If we fail, this planetary system fails as far as intelligence is concerned. The same is true of other planetary systems. On each of them there will be one chance, and one chance only.*

Assuming you've read this far, by now you have begun to grasp the enormity of the interrelated synergism of finite energy (especially peak oil), food for a growing population, environmental degradation, egregious American liquid fuel consumption, and economic collapse. You will probably also need to work-through the expected stages of reaction to serious news: denial, depression, acceptance and now the best response, becoming proactive. **How can you, as a concerned individual, make a difference and improve our chances?** If nothing else, becoming involved will provide a good feeling of action, and meeting others with the same mission. Having thought about this question for many hours and years, I will offer **my best suggestions for immediate personal involvement;** in some order of importance, although all are absolutely necessary.

PERSONAL ACTIONS

If you have not already done so, immediately begin to plan serious food and energy independence for you and your immediate loved ones. A crack in the fragile world house-of-cards can occur at any time, maybe in 2016 as an Iranian confrontation, growing terrorism, another Arabian Spring spreading to Saudi Arabia, or the collapse of the European Union. **The music could stop at any minute.** Watch the news and the price of oil, up or down. In any event, **don't be too far from your personal chair.** Don't plan on running to the bank or calling your broker. Rest assured, no one will come and rescue you when everyone is diving for cover. You will be on your own. The electrical grid, a natural gas pipeline, food in the grocery store, money in the bank, and/or fuel at the gas station may suddenly become unavailable. **The following suggestions are offered to help you prepare for the coming tsunami:**

Start your own garden

Read Chapter 8. Find at least 200 square feet of soil and sunlight. Get down and dirty. There are thousands of grow-your-own books, websites, and magazines. Start with the permaculture movement. Join similar localization activity. Phase out the

lawn and even the flowers. Grow things you can eat. Learn about diet, health, storage, pests, open-pollinated seeds, calories, beans, and other plant proteins**.** The next step might be to get a few chickens for eggs. This will be fun and exciting. You will be joining millions who have seriously started this pro-active path and are already healthier for it. The "Victory Garden" movement in WW II is a precursor.

Build your own stand-alone PV solar survival system

No grid tie or generator is required. Minimal requirements are one or two 100 watt PV panels, charge controller, a 40 amp surge protector (fuse), and at least (4) deep-cycle 12v storage batteries connected in parallel with about 100 ampere hours of storage in each. This will provide about two kilowatt hours of storage at 50% depth of discharge to preserve battery life, and surge capacity for lights (LEDs!), refrigeration, entertainment, and communication, **but no heating.** Appropriate meters for incoming and outgoing current (amperes), and system voltage will show what's happening. Our ancestors would have been amazed. A 1000 watt (1500 watt surge) 12 volt DC to 120 volt AC inverter will provide minimal power for 120 volt requirements. Total retail cost: panels, $300.00, batteries $400.00, inverter and charge controller, $250.00, everything else, $250.00. Altogether, not much more than $1200.00. Much more on this subject, including battery limitations, are covered in detail in Chapter 5, "A Solar-electric Future."

Be self-sufficient

It's always common sense to have a year's supply of food, especially non-perishable bottled, canned, and dried; to supplement the produce from your new garden. Don't forget seasonings, honey, tea, and coffee. With a solar-powered freezer, the surplus from your garden can be stored for years. Accumulate as much as possible of dried goods, paper and cleaning products, matches, candles, propane bottles, bullets, and (lots of) batteries of all sizes. Necessities may become more valuable than worthless paper money. Don't forget books, games, sports, arts, crafts, and music.

Prepare for domestic heat and hot water

Have at least several weeks of potable water available. Install a domestic water system that will collect rain water or use your survival electrical system for pumping ground water. Keeping warm will be a huge challenge. The brief resurgence of "fracked" natural gas will suffice only for electric utilities and buildings fortunate enough to be on a functioning pipeline. Our sudden "one-hundred year supply" of "fracked" natural gas is totally impossible. You should prepare for a low-energy future by significantly

downsizing your heated area and all water systems to avoid freezing. Heavily insulate a much smaller living area, not the whole house. Install solar hot water and solar-thermal heating to capture and store as much energy as possible. Accumulate plenty of winter clothes and blankets. Plan on a primary or back-up heating system that is independent from fossil fuels or an electrical grid. Firewood is still the best defense and can be stored for years. You can't make your own pellets, and it would require too much precious PV electricity to run a pellet stove. For a cost comparison; at $3.50/gallon, fuel oil provides 35,000 btu per dollar. Dry firewood for $200.00/cord gives twice as much value, or 70,000 btu/dollar. Electric heat is 100% efficient, but at $0.15/kwh will yield only 23,000 btu/dollar. Natural gas at $10.00 per 1000 cubic feet gives about 80,000 btu per dollar. Minimal air conditioning is more feasible in the summer when long days can provide the necessary PV power.

Most important of all, get involved and forward this story

Personally project, in every way possible, the facts and urgency of the developing population/energy crisis. This theme is repeated throughout this book and is a most serious call to action. **If we begin immediately, and do not break the communication chain, we can use exponential networking to reach vast numbers in a very short time. The versatility and ease of electronic communication might help but only if we use it**. My library on energy, population, and environment is huge but gathers dust. These are not new subjects. Now, however, the convergence of science, numbers, and time is knocking at the door. **We can give in to fast-unfolding history, or not give up and still try to make a difference. Why not? We have nothing to lose but our, and our kid's future.**

THIS BOOK, THE SEQUEL TO TWO MANUSCRIPTS

I, a humble author, retiree, and activist, am only a messenger with a disturbing crystal ball and comfortable familiarity with numbers, farming, and energy. As stated before, my own calculations and my library of books are the foundation for my call to action. There are many titles (and web sites) but **only the choir is reading the score.** The traditional channels of publishers and retail stores, or Amazon and the web are not making an impact. E-books are only ordered by those already involved. The internet is hopelessly overwhelmed with every blog-theme and counter-theme imaginable and we're buried in printouts.

My 2014 plan was to mail an 8" by 10" spiral-bound "4th Edition" manuscript, in hard form, directly to recipients as long as I could afford the time and money.

No publishers or distributors were needed. **I attempted to condense everything related to the energy-population-environmental triple crisis into one self-published document**. It was divided into a preface and nine loose chapters which may have been redundant; but each, or the entire manuscript could be reproduced locally. This Chapter 3 was included to explain the proposed ground rules necessary to reach a vast number as quickly as possible. We must break out of traditional channels of communication.

The power of the exponent

To reverse the direction of our energy-intensive dead-end trip will, in itself, require a huge amount of human energy; the sum of a little bit from each of many. **If this scheme has any chance of expansion, you the reader, must make it happen and keep it moving.**

In the 4th edition in a manuscript form, I proposed the following:

1. First, the recipient could add his/her own input, comments, name, and new contact information.
2. Single chapters, or the whole spiral-bound manuscript could be locally reproduced. **Chapter 3 should be included in entirety to explain the basic forwarding scheme and the need for exponential projection.** Each two-page sheet, black and white, costs about ten cents at a local print shop. The entire one-hundred pages (fifty sheets) plus spiral binding and a glossy cover should cost not more than ten dollars. The media -mail postage including packaging cost is another three dollars.
3. To start, I printed 350 copies and mailed them directly to my own list.
4. **If you, or any one else who wants to become involved in this last-ditch effort, copies of this final 5th edition book can be ordered from Amazon for $15. Or, I will send a copy directly to you as long as I can keep up. Just send your contact information, including address, to the email on the cover letter.** I will acknowledge your request, preferably by your e-mail address and take care of your order ASAP. I don't plan to make a cent but can only do so much on a retiree's budget and time. I will find help as needed as this effort gets moving.

5. Obviously, if there is any chance for the sheer numbers of this movement to get rolling (and I have to believe it can, it's our only hope), new reproduction and mailings must be done downstream. This is a grass roots movement that must be self-perpetuating.
6. **If each recipient were to forward just ten copies of the manuscript or book within a month, and only five of the ten recipients continued the chain on each following month, on the twelfth month 244,140,625 copies would be mailed. The total sent out in one year would be over three-hundred million! Get involved. Join the movement. Please, don't let down everyone who does make the effort. Your descendants will thank you.**