Growth: From Microorganisms to Megacities

UTIMCO Summer 2021 Reading Brief

by Britt Harris

Author: Vaclav Smil does interdisciplinary research in the fields of energy, environmental and population change, food production, history of technical innovation, risk assessment, and public policy. He has published more than 40 books and about 500 papers on these topics. He is a Distinguished Professor Emeritus at the University of Manitoba, a Fellow of the Royal Society of Canada (Science Academy), and a Member of the Order of Canada.

Grade: **A** (An important but complex 600-page read. Read this book according to your interests rather than incrementally.)

Interview: The Intelligencer interview 9/23/19 can be found here

EXECUTIVE SUMMARY

- After growth no further net growth is manufactured. Things stop.
- Hydrocarbons unleashed a new era in human advancement. As this growth has unfolded, the world learned that the Earth's atmosphere has a finite capacity to absorb the related hydrocarbon emission. Earth may be reaching its natural outer limits.
- Two primary views on how the world should react are technology and simplicity.
- Smil foresees simplicity where we consume less, a lot less, or Earth may have too little left to carry us on.

Vaclav Smil is considered to be one of the top one hundred most influential writers in the world. The breadth of Smil's writing is astounding. Growth is an important but also a complex read. I would suggest identifying what your interests really are and reading this book according to your interests rather than incrementally. The subtext of the title is "From Microcosms to Megacities". My primary interests were populations, societies, economies and "What Comes After Growth?" It is on the fourth interest that I will focus this report.

What comes after growth?

The answer is that no further net growth is manufactured. Things stop. Often things devolve. Sometimes they cease to exist. Of all creatures to have ever walked on Earth, 99.9% are extinct. According to scientists the world has already recorded five extinctions. The first was Ordovician-Selorian 440 million years ago. The fifth was Cretaceous-Theory where dinosaurs died 65 million years ago.

The question implies that growth is not always continuous, that it can be fragile, that it might not always even be good; even that growth can be dangerous to a particular entity and occasionally to all of humankind. Smil, without being excessively dramatic, concludes that unless the world alters what it calls "good", a process has been set in motion that will greatly diminish the condition of the Earth and its inhabitants under the base case and could go much further in a worst-case scenario. Humankind could ultimately be destroyed.

For at least the last century, "good" has been defined as maximum GDP growth, maximum increases in our individual and aggregated standard of living, reduction of poverty and increasing leisure. Those countries, or individuals today, who have the greatest amount of material and natural resources are also generally the most powerful, the most influential and have a reason to believe they have the brightest futures as well.

200 years ago Earth was inhabited by less than 1B people and the biosphere was well maintained.

Stunningly, until approximately 200 years ago the world had never experienced the level and type of growth that we have become accustomed to, believe is normal and assume will last forever. During those centuries, the world's material wealth, its overall standard of living, a human's lifespan, the percentage who were poor, educated or entitled barely changed at all. The people thought primarily of survival and seldom of any personal or collective growth. Just 200 years ago the Earth was inhabited by fewer than one billion people, work was extremely physical, life was short, few were educated and travel beyond a few hundred miles did not exist. Wars were fought with muskets; slavery was common; disease was rampant and freedom belonged to no one other than a king, queen or despot. The Earth's temperature and its biosphere were well maintained.

Today 8B people inhabit the Earth and the biosphere has been degraded.

Today poverty has been dramatically reduced all over the world (still with further to go). The GDP of the US (as a proxy for the world) is estimated to have been between $58 million and $78 million in 1980 (NBER). Today, US GDP is $22 trillion and the world is approaching $100 trillion. Infant mortality has collapsed and life expectancy has soared. People move freely around the world by almost any means necessary. Agricultural production has skyrocketed (with proper distribution still too thin). Few live on farms having moved to cities where education has expanded greatly and democracy has operated more effectively. Our ability to defend ourselves against both tyranny and external enemies has vastly improved. Disease is enormously reduced (even with the current situation). Freedom is now the right of billions. The Earth's inhabitants are now over eight billion and rising, eight times its size just over a century ago. The Earth's temperature has risen and its biosphere has been degraded.

Why has the Earth's temperature risen so suddenly and the biosphere been so quickly degraded?

The discovery of oil, its vast supply spawned multiple innovations and a population that increased eight-hundred-fold. The greatest productivity the world has ever known was suddenly unleashed. Initially the incredible future impact of this discovery was completely unknown (both positive and negative) as was the Earth's capacity to absorb the rapidly accumulating plume of the hydrocarbon discharge. Over time the power of hydrocarbons to dramatically spur innovation and to rapidly improve the lives of millions was discovered. Initially the United Kingdom and the Europeans took the lead with the US not far behind. Both countries rose in stature and modernity while releasing hydrocarbons aloft. In the 1980's European emissions peaked, followed by a similar peaking in US in the 1990's. Both regions have since seen incrementally declining new emissions for the past twenty and thirty years. Both countries, however, still have much further to go.

Together they comprise just over one billion people, one eighth of the world's population. If this was all the world was confronting, the potentially concerning global outlook would be neither as severe nor as grave. However, for that to be true the remainder of the world would be consigned to a second-rate life when compared to the early movers in hydrocarbons. This would be an inequity on a global scale.

China has been industrializing its economy as it recovers from its long period of humiliation (ending with the start of communism in 1949). By 1980 it was launching its second major economic acceleration. China set out to bring an additional 1.4 billion countrymen onto the world's industrial stage and out of abject poverty. They have been extraordinarily successful and have become the second largest country in the world.

Today China is spewing more hydrocarbon emissions into the Earth's atmosphere than the entire rest of the world combined. While they begin to install solar into their fuel supply, and seek to meet their Paris Accord commitments, they also continue to build a new coal plant approximately once a week. For China to continue to bring its people out of poverty and to simultaneously meet the economic and military challenges of a still superior US (albeit by a rapidly decreasing margin), they must make continuously extravagant use of today's cheapest and most available source of energy. In this way, the global race to lower global emissions is a bit of a conundrum.

Earth has a finite capacity to absorb hydrocarbon emission.

The key points to understand are these. Hydrocarbons literally unleashed a new era in human advancement. As a result, the world's standard of living, its population, and its growth have all vastly surpassed anything that humanity has ever experienced before, and everything that all but the most wild-eyed forecasters could have projected. As this massive advance has unfolded, the world has also learned that the Earth's atmosphere has a finite capacity to absorb the related hydrocarbon emission.

The world may be approaching that natural limit.

There is now reason to believe that we and the world are approaching that natural limit. Both the emissions laying silent in the heavens and those new emissions rapidly joining them today may soon intrude upon our atmospheric shield enough to disarm our ability to prevent an alarming rise of the Earth's temperature, one so high that it could significantly destabilize the entire world.

Two primary views on how the world should begin to rapidly react: technology and simplicity.

Trust in technology and global ingenuity has served us well for all the time that we and other global citizens can remember. We literally know of nothing else. This view takes little heed of warnings that the world may ultimately prove to have finite resources that will, and must, limit future growth. For Smil, these are the techno-optimists who plan to be a savior. These many do not accept that the concept of an era "after growth" may be valid. Their optimism is enormous, only exceeded by the enormous funding they may receive to prove their worth. Smil hopes that we can call this the base case, but with seemingly very little enthusiasm.

Smil foresees simplicity with a new society consuming less.

Simplicity is what Smil foresees. His belief is that a new society must be forged. A society that no longer worships the impossible god of continually increasing consumption. He believes that the word "sustainability" is widely misunderstood. He rejects the concept of a future singularity out of hand. Humanity is, or soon will be, in "overgrowth", a rising consumption level that exceeds what even our enormous Earth can support without leading itself into highly unknown and potentially disastrous territory.

Smil writes that we only have one solution left to us. We, the riders on planet Earth, must change our behavior and end the long era of overgrowth and excessive consumption. Smil believes that we should consume less, a lot less. After a long period of unprecedented global growth our Earth is reaching its natural outer limits. She has given us so much that she may have too little left to carry us on.

Smil, the great scientist chooses to end his lengthy book with two compelling scriptures.

"Where there is no vision the people perish." Proverbs 29:18
"So whoever knows the right thing to do and does not do it, for him it is sin." James 4:17