**FEEDBACK AND REVIEW**

**OF THE POST CARBON INSTITUTE COURSE**

**THINK RESILIENCE**

**By Ivan M. Johnstone BSc(Physics), BArch(Hons), PhD**

**www.insearchofsteadystate.org**

## INTRODUCTION

A few years ago, I enrolled in the Post Carbon Institute self-directed course *Think Resilience* which features 22 short video lectures by Richard Heinberg (link here). Registration is free. Participants in the course were asked why they were taking the course and what did they hope to learn. I continued to provide ongoing feedback to the Post Carbon Institute upon completion of each video. Doing so helped to crystalise my own understanding of resilience. The following record of my feedback to the Post Carbon Institute might also assist others to a better understanding of community resilience.

### CHAPTER 01: Introduction

#### Why are you taking this course?

I am taking this course because I have a deep and long-term commitment to promoting a peaceful transition to a genuine sustainable future. In 1978 I wrote a final year architectural sub-thesis called "In Search of Steady State" which explored the context of low energy settlement patterns in New Zealand. I have since devoted my architectural and then academic research career to the issue of sustainable housing stock dynamics.

#### What do you hope to learn?

Since October 2015 I have been updating my background in broader issues of sustainability with a view to writing an update to my 1978 sub-thesis. The resources I have collected are listed on my website here and these resources include several Richard Heinberg's books and YouTube videos. There is always more to learn on the sustainability front and I also have a keen interest in developing e-learning courses to promote a transition to genuine sustainability. Viewing the Post Carbon Institute online course will therefore be of additional benefit to me.

### CHAPTER 02: Energy

For me, the information that had the most impact was that transition is a process of energy substitution rather than addition and that that this process will involve the use of energy. The leading question is where is this energy going to come from. Expansion of solar and wind energy is unlikely to be sufficient to bootstrap further expansion, hence the need to use fossil fuels to enable substitution. But we should not use additional fossil fuels as this will accelerate climate change. Diversion of capital investment will be needed and maintenance of existing infrastructure may need to be deferred.

In addition to the above difficulties will be the issue of peak oil where more and more energy is needed to extract each unit of fossil fuels from the ground. A dynamic stock and flow diagram would be useful to convey the complexities of a transition from fossil fuels to sustainable energy supply.

### CHAPTER 03: Population and Consumption

The information that had the most impact for me was the difference in resource consumption between those who live in the United States and in Bangladesh. Also, of impact is the disparity of resource use within the United States. This suggests a grotesque level of conspicuous consumption by the one percenters in the United States.

Over the past 40 years less emphasis has been placed on the need for global Zero Population Growth. Even though the rate of population growth in underdeveloped countries has dramatically declined over the last 40 years, the population growth rates in these countries are still currently the highest in the world while at the same time these countries have the lowest per capita rates of resource consumption. If indeed a higher standard of living is needed in underdeveloped countries in order for these countries to achieve a replacement only level of births, then it would seem to be sensible for the developed countries to share global resources more equitably and assist underdeveloped countries to further reduce their rate of

population growth rather than insist on continuing with global economic growth to achieve the same ends. Continued global economic growth is unlikely to be possible if there is a need to keep 80% of current fossil fuel reserves in the ground so as to avoid climate change creeping above 2 degrees.

**CHAPTER 04: Depletion**

For me, Chapter 4 on Depletion is the most sobering chapter so far. Surely any sane person could not deny the need for action. I loved the analogy of scooping ice-cream out of a container. A damning point is made that we manage non-renewable resources (e.g., fishery quotas at national level), but we do not manage non-renewable resources and, instead, we rely on the market place for allocation.

A mention is made that recycling requires energy. A mention could be made that the process of dispersal (e.g. the wearing out of tire rubber on the roads and rusting of steel structures etc.) makes 100% recycling impossible. The oceans contain huge quantities of many minerals, including gold, but the energy costs of concentrating these resources are enormous because these resources are so dispersed.

**CHAPTER 05:**

Chapter 5 on Pollution and especially the issue of climate change is technically the most challenging to comprehend and also politically the most challenging to confront and follow with action. A good point is made that even though an average global temperature rise of 5 degrees Celsius may seem small and therefore inconsequential, there will be extremes of temperatures in different areas on Earth (and also extremes in rainfall and wind velocity – storms).

Chapter 5 has a problem in that so much more content could be included, and yet it needs to be kept simple for the general public. In the following I may be anticipating content in future chapters. There have been early warnings about global pollution, for example Rachel Carson in her 1962 book “Silent Spring”, but delays in action have differed depending on the pollutant. We are still polluting the oceans and the atmosphere and yet we have had international agreement and action on removal of lead in paint and a ban on using certain gases in spray cans and fridges etc. so as to avoid further ozone depletion.

A major cause of delays in climate change action is due to the denial of the need for change exacerbated by deliberate misinformation by vested interests. There has been a large-scale marketing campaign to persuade the public that there is disagreement among experts that climate change is a reality. One point that the public at large is unaware of is that in order to avoid extreme increases in average global temperature, it is necessary to keep a large percentage of current known reserves of fossil fuels in the ground. In other words, there is a need not only to curb $CO_2$ etc. emissions, but also a need to have a quota system and limits on extraction from the ground. A continuation of previous levels of global economic growth is not possible under these conditions, but politicians and business leaders around the word still use the phrase “sustainable growth”. Even government department’s which should know better use this phrase. For example, New Zealand’s Ministry of Business Innovation & Employment (MBIE) uses this phrase on its website as at October 2016: “MBIE's purpose is to Grow New Zealand for all. ’Grow' relates to the economy. To achieve the standard of living and quality of life we aspire to, we need a better-performing economy that delivers sustainable growth.”

**CHAPTER 6: Political and Economic Management**

For me, the most memorable statement in Chapter 6 was that political systems tend to become corrupted and decay over time and that current infrastructural pressure is forcing unprecedented levels and rates of change. I take issue with the statement that the Great Depression was caused by a crisis of over production. This statement is overly simplistic and debatable. Further Chapters may possibly address the related and contributing issues of the formation of corporations, stock market controls, the role of debt in the economy, and the banking system and the printing of money etc. Overall, this Chapter is of excellent value.

I suggest the following two classics be included as reading resources: “Energy and Structure: A Theory of Social Power” by Richard Newbold Adams 1975 and “Energy and Society: The Relation Between Energy, Social Change, and Economic Development” by Fred Cottrell, 1955.

I have had a look at the list of Course Content and it seems that more detailed issues of economics might not be addressed in following Chapters. If so, then the following books could be considered for inclusion depending on the targeted audience:

*Capital in the Twenty-First Century* by Thomas Piketty, 2014.

*Debt: The First 5,000 Years* by David Graeber, 2011.

*The Ascent of Money: A Financial History of the World* by Niall Ferguson, 2008.

*Where Does Money Come From? A Guide to the UK Monetary and Banking System* by Josh Ryan-Collins, Tony Greenham, Richard Werner, and Andrew Jackson, 2nd Edition, 2012.

*Zombie Economics: How Dead Ideas Still Walk Among Us* by John Quiggan, 2012.

*The Spirit Level: Why Greater Equality Makes Societies Stronger* by Richard Wilkinson and Kate Pickett, 2009.

*The Illusion of Progress: Unsustainable Development in International Law and Policy* by Alexander Gillespie, 2001.

*The Corporation: The Pathological Pursuit of Profit and Power* by Joel Bakan, 2005.

*The Bubble Economy: Is Sustainable Growth Possible?* by Robert Ayres, 2014.

*Inside Job: The Financiers Who Pulled Off the Heist of the Century* by Charles Ferguson, 2012.

**CHAPTER 07: Belief Systems**

I am so pleased that the content addressed in Chapter 7 has been included in the course. This is where I take issue with the oversimplified and repeated statement that infrastructure determines superstructure.

The role of technological discoveries that enabled changes in infrastructure (the discoveries of fire, the wheel, stone tools, metallurgy, the horse stirrup, the plough etc. etc.,) has been under-emphasised. An excellent account of this is contained in three volumes of *A History of Technology and Invention: Progress Through the Ages* edited by Maurice Daumas, Translated by Eileen B. Hennessy, Publisher John Murray, London, 1962.

Belief systems are changed when discoveries are made and when human civilisation becomes aware of new possibilities. Subsequent changes in infrastructure made possible through discoveries reinforce changes in the belief system of the general population. The initial change in the belief system was in the mind of the discoverer(s). I once again take issue with the statement that overproduction was the cause of the depression.

I am not sure whether the role of GDP will be addressed in subsequent chapters or not. An excellent book which addresses this issue is *The Little Big Number: How GDP Came to Rule the World and What to Do About It* by Dirk Philipsen, 2015.

I forgot to include the following books on energy which contain a plethora of hard and practical data: *Energy in Nature and Society: General Energetics of Complex Systems* by Vaclav Smil, 2008 and *Sustainable Energy without the Hot Air* by David MacKay, 2009.

**CHAPTER 08: Biodiversity**

For me, the most disturbing information in Chapter 8 was the decline in microscopic soil communities. The claim that obesity is caused by the decline in microscopic biodiversity in the gut doesn't ring true. Does the presence of microbes in the gut reduce the absorption of food and therefore prevent obesity? No, microbes in the gut assist absorption of food. There are a number of well-established causes of obesity which do not involve high or low levels of microbes in the gut.

In reference to services provide by ecosystems, a good example is the pollination of plants by bees. Our agricultural system relies on pollination which we can manually do ourselves at high cost. A related issue is that global populations of bees are in decline. Comparison of the biomass of microbes and insects on the land and also plankton and fish in the seas would be useful in a biomass pyramid diagram. An energy flow pyramid with top carnivores at the apex followed by carnivores, herbivores, and producers at the bottom would clearly show the dependency of all higher-level species including humankind on producers at the bottom.

Food production might be addressed in a later Chapter. If not, then the food chain issue of eating meat needs to be addressed. The developed countries eat animals which are fed on grain which can be eaten directly by humans. Large herds of cattle produce methane which contributes to climate change. In the future we will need to eat less meat and feed lower down on the food chain. We will also need to grow our food locally without reliance of fossil fuel-based fertilisers.

**CHAPTER 09: Collapse**

I am reasonably well read up on the collapse of civilisations. For me, the most striking aspect of Chapter 9 is the number of different theories as to the cause and process of collapse. Given that these events happened well in the past and that there is now limited evidence for historical triangulation for a number of theories, I am inclined to follow the theories which are physically and logically based rather than fanciful speculations (not that any were referred to in the video).

History is difficult. What triggered the start of the First World War? The assassination of an individual? Surely not. There would have been multiple factors at work and there are many theories about an event that happened only a century ago, nonetheless many thousands of years ago. There is evidence that collapse of civilisations did occur in the past, even though we may not know all the details of why. The main thing is that our current civilisation is not immune to collapse and that humankind is currently heading towards collapse based on hard scientific evidence and logic.

The recommended books to read related to Chapter 9 are of excellent value. I recommend that the following book be added to the list: *Ekistics: An Introduction to the Science of Human Settlement* by Constantinos A. Doxiadis, 1968. I do not agree with his concept of a future global city – Ecumenopolis – but his coverage and analysis of the growth and decline of cities is superb.

**CHAPTER 10: Thinking in Systems**

I have a long background in systems thinking having used Vensim DSS in research since 1998. Nonetheless, I found the content of Chapter 10 to be refreshing. I strongly agree with the focus on the Goals, Rules, and Mindset approach and that the underlying paradigm of economic growth is at the root cause of climate change. I also strongly agree that only a crisis – actual or perceived – produces real change. Everett Rogers book – *Diffusion of Innovation* – is new to me, but not the concept. I look forward to reading his book.

I recommend that a diagrammatic rather than a PowerPoint bullet point presentation of systems thinking is best. In other words, use of stock and flow diagrams and the bath tub analogy. John Sterman in his book *Business Dynamics: Systems Thinking and Modeling for a Complex World* on page 29 makes the point that the human mind without a prior background in systems thinking and training is unable to "…simulate mentally even the simplest possible feedback system, the first-order linear positive feedback loop.' Albert Bartlett makes the point that most people cannot conceptualise the true extent and impact of exponential growth. We may suspect that there is more to a system than just the individual functioning of the parts, but we need training in systems thinking and the tools to truly understand the system as a whole.

It may be in order to have a reading list for advanced readers. If so, then I recommend: *Business Dynamics: Systems Thinking and Modeling for a Complex World*" by John Sterman, 2000; *Systems and Models: Complexity, Dynamics, Evolution, Sustainability* by Hartmut Bossel, 2007; and *Modelling the Environment: An Introduction to Systems Dynamic Models of Environmental Systems* by Andrew Ford, 1999. There are also a number of online courses on systems: here and here and here

**CHAPTER 11: Shifting Cultural Stories**

Making comment about what is memorable in Chapter 11 is difficult because I already have a solid background in what is covered and addressed in this Chapter. For what it is worth, I wrote the following in my 1978 sub-thesis "In Search of Steady State":

> "Regardless of the temporal accuracy of any energy forecast, with a finite energy stock reserve there comes a transition stage when energy supply can no longer match the energy demands of an increasing population demanding an increasing consumer level of life. … we do not face an 'Energy Crisis'. Mankind continually comes across limits in every sphere of life. The eventual depletion of easily accessible high-grade energy is but one of many limits. A crisis develops when humankind does not accept his limits. We do not face an 'Energy Crisis' - we face, instead, a 'Values Crisis'. The real problem that humankind faces in the near future is the transition from a 'Growth Context' to a 'Steady State Context' and the attendant teething pains of accepting a value system change which is necessary to enable this transition to take place without strife and grief.
>
> Each individual should be aware that one's own value system is the product of a value system held by most for many generations. A growth philosophy has been useful during the growth and development phase of human civilisation. Further development does not imply further growth. Each and every one of us needs to re-examine our own value system within the context of the inevitable

change …Each and every one of us should be prepared for initial value system pre-judgement and dichotomies during this internal as well as external transition period."

In 1979 a summary of my sub-thesis, Ekistics and Energetics: A Sustainable Future Planning Approach was published in the international journal Urban Ecology. In this summary I advocated the integration of the two separate disciplines of Energetics and Ekistics to enable an orderly planned transition from growth to steady state settlements. My publication included a summary table which compared the attributes of Growth versus Steady State settlements and the direction of change required to achieve long term Steady State.

I note that resources for Chapter 11 provide only links to the CASSE and Transition Network websites and no books. I recommend the following books on Steady State and Ecological Economics:

*Ecological Economics: An Introduction* by Gareth Edward-Jones, Ben Davies, and Salman Hussain, 2000.

*Ecological Economics: An Introduction* by Michael Common and Sigrid Stagl, 2005.

*Ecological Economics: Concepts and methods* by Malte Faber, Reiner Manstetten and John Proops, 1996.

*Ecological Economics, Second Edition: Principles and Applications* by Herman Daly and Joshua Farley, 2010.

*The Principles of Sustainability* by Simon Dresner, 2nd edition 2008 is an excellent summary.

On the consumer front, *The Logic of Sufficiency* by Thomas Princen, 2005 is highly relevant to the content of Chapter 11.

On the population front, *How Many People Can the Earth Support?* by Joel E. Cohen, 1996 is essential reading.

As a matter of interest, Thorstein Veblen wrote about conspicuous consumption in his book *The Theory of the Leisure Class* in in 1899.

**CHAPTER 12: Culture Change and Neuroscience**

I have found the content of Chapter 12 to be interesting and I agree with much of the content. However, I am also surprised that some of the content has been included and I have a degree of disquiet about the approach of persuasion developed in this Chapter. Even to someone who is already a convert to the principles of Steady State Economics, an argument based on the results of neuroscience smacks somewhat of social engineering. There is also a somewhat evangelistic flavour to this Chapter and I have concerns whether the first half of this Chapter will be a turn-off for a number of participants. I am left wondering what the remainder of the course will consist of and be based on.

There is a brief reference to discounting in Chapter 12. In my opinion the current practice of discounting and the issue of inter-generational equity deserve greater coverage. For the advanced reader I recommend the book *Time, Discounting & Value* by Colin Price, 1993.

Rather than rely on an argument based on neuroscience, I recommend a moral persuasion approach based on ethics and equity. An essential book for advanced readers is *A Theory of Justice* by John Rawls, 1971, revised edition 1990.

The book *Managing the Commons* by Garrett Hardin and John Baden, 1977 and the message of *The Tragedy of the Commons* held sway in the 1970s. I was also sucked into to this argument back then. After reading *Governing the Commons: The Evolution for Collective Action* by Elinor Ostrom, 2015, I am no longer convinced. This book demonstrates that Humankind is well capable of cooperative action. There is no need to use a risky and what could be an off-putting hard wiring of the brain type of argument to persuade others that this is possible.

**CHAPTER 13: What is Resilience**

I have found Chapter 13 to be an excellent and superb introduction to the principles of Resilience. I especially like the references to Adaptive Cycles and Panarchy.

Going by the titles of subsequent Chapters and the content of Chapter 13, it seems that the focus on Resilience in subsequent chapters will be at the community level. This is as it should be if the community at large is the targeted audience of the course. My own personal interests and concerns also include issues of sustainability at the national level. These issues include the following:

- Globalisation
- Alternative welfare indicators to GDP
- Banking system and controls over printing of money
- Stock market controls, accountability of corporations, discounting practices
- Taxation
- Democratic process
- Debt
- Economic education

As an aside, the taxonomic system of Ekistics developed in the book *Ekistics: An Introduction to the Science of Human Settlements* by Constantinos Doxiadis, 1968, is well worthwhile looking at. "The goal of Ekistics is to achieve a balance between the elements of human settlements – Nature, Man, Networks, Shells, and Society – in order to guarantee happiness and safety for Man". The book on town planning and design *A Pattern Language: Towns, Buildings, Construction* by Christopher Alexander et al. 1977 is also well worthwhile having a look at.

**CHAPTER 14: Community Resilience 21st Century**

I am most impressed by the content of Chapter 14. The messages that resilience and sustainability are both needed and that climate change action is not sufficient are good strong messages. A set of sound strong arguments are presented as to why stakeholders should participate and take responsibility to create a resilient community at a local level. I found this presentation to be uplifting and motivating.

I refer to the statement "In reality sustainability is not a steady state because nothing in nature persists unchanged. A sustainable society must be able to adapt to new conditions." I think better wording would be "In reality sustainability is not a stationary state …." Some people believe that a steady state economy would be a static economy. This is not correct as there would be constant changes taking place within the economy. People would be born and eventually pass away, new businesses would be established, thrive, and then disappear, and new buildings and infrastructure would be constructed, maintained, and later on demolished to make room for new buildings etc. etc.

In an idealised steady state economy, the level of the population and resource use would remain constant over time. In reality these levels would fluctuate with the long-term rider that even an idealised steady state economy cannot last forever as pointed out by Nicholas Georgescu-Roegen in his 1971 book *The Entropy Law and the Economic Process* on page 296. Georgescu-Roegen concludes on page 304 "If we stampede over the details, we can say that every baby born now means one human life less in the future" and "… man's nature being what it is, the destiny of the human species is to choose a truly great but brief, not a long and dull, career".

The content of Chapter 14 is an excellent follow-up to Chapter 13. I see no need for additional content.

**CHAPTER 15: Six Foundations**

The course content in Chapter 15 is beyond my background and expertise. Community resilience requires people with social skills who can motivate and organise the community to talk to each other, negotiate, and pull together with a common purpose. I very much like the structure that the Post Carbon Institute has developed for building community resilience. There are a number of memorable statements that I have taken on board. One of them is "Transformational efforts are purposefully disruptive to the system changing some of its structures so that it can build resilience in ways more suitable for a new reality that is simply non-negotiable.

There is no additional content that I can think of that should be included in Chapter 15.

**CHAPTER 16: Globalisation**

I am more conversant with the content of Chapter 16 than Chapter 15. I think that the most memorable message for others is that although there are benefits to the owners and shareholders of production in pursuing efficiency, there are also costs that are carried by communities. I like the statement "Most of the payoffs go to the company that's pursuing the race to the bottom, but the costs go increasingly to society as a whole".

The photograph of the container ship being towed along by a parasail is fanciful. More practical modern sail assisted technology is currently in use. I query the hydrogen powered bus as a good example given that hydrogen is not a genuine substitute for fossil fuels, but is instead a "transporter" of energy. The energy

content of hydrogen is less than the energy required to produce hydrogen and where is that energy coming from? Use of hydrogen requires an additional energy conversion and subsequent energy loss. There are also safety storage problems.

I recommend the following book to be included in the resources section:

*Rigged: How Globalization and the Rules of the Modern Economy Were Structured to Make the Rich Richer* by Dean Baker, 2016.

**CHAPTER 17: Economic Relocalisation**

A number of issues are raised in Chapter 17 that are addressed in the 2016 Dean Barker book I recommended in Chapter 16 - *Rigged: How Globalization and the Rules of the Modern Economy Were Structured to Make the Rich Richer*. The most memorable information in Chapter 17 for me were the statements that "80% of the real American economy is small and local", "The wealthiest economies are precisely those with the highest percentage of locally owned business", and "Levelling the playing field requires educating these policy makers to the real costs of destroying local enterprise and local jobs". The remaining positive message is that there is a current groundswell movement towards localisation of the economy.

There is no other content that I can think of which should be included in Chapter 17.

**CHAPTER 18: Social Justice**

I am well versed with the issues addressed in Chapter 18 and I have recommended a number of books in previous chapters that directly relate to these issues. I absolutely agree with all the statements made in this chapter. Chapter 18 is the most political of all the Chapters so far and, for me, the tone is spot on. However, those who lean to the right may beg to differ. The issue of equality may be a moral issue, but a sound argument is made based on empirical evidence and logic that continued inequality cannot be sustained in the future.

The issue of money flowing to lenders is over-simplified. It overlooks the creation of money by banks and that while debt can grow exponentially, claims to future resources cannot be realised when resources are limited.

Given the political nature of Chapter 18, I recommend a selection from the following YouTube videos be included in the resources to back up the statements made in the Chapter:

*How equal do we want the world to be? You'd be surprised* - Dan Ariely
https://www.youtube.com/watch?v=2tCcoSRZqVY

*Stealing Africa .... Why Poverty*' - https://www.youtube.com/watch?v=ULrEEDEseEg

*The End of Poverty* – Documentary https://www.youtube.com/watch?v=_xpKKHcC8eU

*The Ethics of Globalization and the Globalization of Ethics* - Michael Ignatieff
https://www.youtube.com/watch?v=vwIsU-YnbHE

*The Price of Inequality* - Joseph Stiglitz (Nobel Prize in Economics
https://www.youtube.com/watch?v=gKOJqnAET9A

*The Tax-Free Tour (VPRO Backlight)* – Documentary https://www.youtube.com/watch?v=d4o13isDdfY

*The Theory of Justice by John Rawls' - Interview with Joe Oppenheimer*
https://www.youtube.com/watch?v=5A9o0fFBtVs

*What the 1% Don't Want You to Know* - Paul Krugman on Thomas Piketty
https://www.youtube.com/watch?v=QzQYA9Qjsi0

**CHAPTER 19: Education**

I found Chapter 19 on Resilience Education to be quite thought provoking. Yes, young people do need an education that "emphasizes systems thinking, adaptability, creativity, and practical skills". My personal experience of teaching is at only university level. I doubt whether the state education system in New Zealand currently teaches systems thinking and adaptability to young children prior to going to High School at the age of 13. However, there is definitely a greater and increasing emphasis on creativity and self-directed learning for young children now than during my own childhood back in the 1950s and early 1960s. I have taken on

board that “Resilience education can be adaptable to a wide variety of contexts and doesn’t have to be rooted in a traditional educational environment”.

E-Learning forms a part of self-directed studies. Some books I can recommend for e- learning developers include:

*E-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning* by Ruth Colvin Clark and Richard E. Mayer, 2008.

*E-Learning by Design* by William Horton, 2006.

*Tools for Thought* by C.H. Waddington, 1997 is a classic which was written as a popular guide to new ways of perceiving and thinking about the world.

The following PhD theses may be of interest:

*Whole Systems Thinking as a Basis for Paradigm Change in Education: Explorations in the Context of Sustainability* by Stephen Sterling 2003, PhD Thesis at the University of Bath.

*A Criteria-Based Evaluation of Environmental Literacy Plans in the United States* by Karena Ruggiero, May 2016, PhD thesis at the University of Tennessee, Knoxville.

I have at the following NZ specific report which I am happy to email to the Post Carbon Institute:

*Environmental Education in New Zealand Schools: Research update 2015* by Rachel Bolstad, Chris Joyce, and Rosemary Hipkins, New Zealand Council for Educational Research, Ministry of Education, 2015.

**CHAPTER 20: Community Resilience Essentials**

I am well versed in the four bases of Food, Water, Energy, Money and I agree with all the statements made. The statements which resonate the most for me is the need to electrify – our city of Dunedin in New Zealand used to have electric trams which were phased out to electric trolley buses and then to diesel buses – and the need to have local money systems.

In New Zealand 80% of electricity supply is generated by hydro and geothermal and yet we do not have a national electric based railway system connecting any towns or cities. Instead we have Rio Tinto at the bottom of the South Island in Tiwai Point producing aluminium and drawing off a large percentage of our electricity supply. New Zealand tourist promoters would like the outside world to believe that New Zealand is clean and green. Instead, many of our lakes and rivers are polluted by dairy cows and fertilizer run-off. Apart from Kiwi Bank, all our other banks are now Australian owned. Short term bank savings at the ANZ Bank generate 2.3% interest which is about our current level of inflation. ANZ Bank personal loans cost 15% interest and VISA Credit Cards cost 19% interest. The Farmers Credit Retail card cost 25%, all with inflation running at 2%. A local money and banking system is a no brainer.

There are stacks of books and YouTube video on the above issues, and I have read and viewed stacks. One book I feel compelled to recommend is:

*The Urban Farmer: Growing Food for Profit on Leased and Borrowed Land* by Curtis Stone, 2016.

**CHAPTER 21: Major Sectors**

Once again, I am well versed in areas addressed in Chapter 21 - manufacturing, transportation, buildings, land use, and public policy – and I agree with most of the content, but not some statements made in the areas of buildings which also relate to land use. These incorrect statements are the ones which resonate the most for me.

Before becoming an academic I worked as an architect for 11 years. With a previous degree majoring in physics, building physics, building economics, and housing stock dynamics are my specialty areas of research. As an academic I taught construction, building economics, and property development in the Department of Property at the University of Auckland for 11 years. In my construction and building economics lectures I taught the principles of sustainable design for both housing and commercial buildings and the husbandry of buildings over the full life cycle.

In Chapter 21 a statement is made that “The Bullitt building was designed to last 250 years rather than the typical 40-year lifespan. Commercial buildings in the United States and other developed countries may have an economic life of only 40 years – this is due to the economic process of land use succession- but most modern commercial buildings have a potential service life of well over 100 years and possibly 200 years. It is

the structural system that ultimately limits the potential service life of any building and I very much doubt that the Bullitt buildings uses an innovative structural system that far exceeds standard modern structural systems.

Another statement I take issue with is “Economic inequality can be fought with land use actions that discourage gentrification and support housing development”. Gentrification extends the economic life of houses and, by doing so, reduces the resource costs of sustaining the dwelling services that these houses provide. Gentrification may dislodge low-income tenants from what has become or would eventually become a neighbourhood of under-maintained housing. Any under-maintained building has a shorter service life than well-maintained buildings regardless of the process of land use succession. Dislodgment of low-income tenants is a social issue. Provision of affordable housing is made more difficult when lack of suitable capital gains taxes promotes speculation in the housing market which raises the price of all housing.

I recommend the following classic on buildings:

*How Buildings Learn: What Happens after they’re Built* by Stewart Brand, 1994.

**CHAPTER 22: Review, Assessment and Action**

Chapter 22 is an excellent summary of an excellent course on Resilience and Sustainability. I am so pleased that I subscribed to the Post Carbon Institute course series on “Think Resilience”, even though I am already well versed in many of the issues that have been covered.

What did I like the most about this course? That is a difficult question to answer as there were so many Chapters that I enjoyed and with which I struck an accord. Even though the course covered a wide range of complex topics, I found the course content to be clear and well well-reasoned. Richard Heinberg has once again been a superb presenter and, in my opinion, he has struck the right tone even for those who might find some of the content to be contentious. One big advantage of the course is that the videos can be used as a basis for local community workshops.

Richard Heinberg encouraged enthusiastic participants in the course to undertake a Resilience Assessment of their community. What strikes me is that the task of undertaking a Resilience Assessment of any community is a daunting task even for those well versed in the issues. Those up to the task will be in the minority.

With current continuing lack of sufficient action to mitigate the impact of climate change and the fragility of our just-in-time globalised supply chains, I am now more than ever convinced that communities not only need to undertake Resilience Assessments, but also need to undertake Contingency Planning. City Prepping forms only a small component of Contingency Planning.

Ivan M. Johnstone

30 December 2021