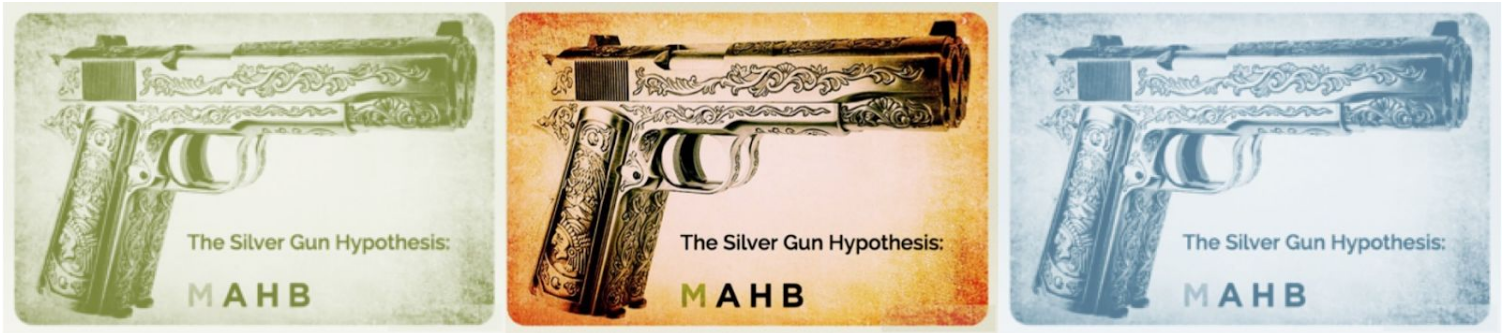


The Silver Gun Hypothesis: New Model for a Sustainable Carbon Economy

Delton Chen



[Introduction](#)

[Part I - Carbon is King](#)

Introduction for Part II — The Entropy of Carbon

The full paper for Part II will be presented in May 2019.

Welcome to Part II of the Silver Gun Hypothesis. In [Part I](#) we considered carbon's role in shaping the biosphere and the Earth's climate. In Part I we noted that all life is carbon-based, and that all living systems dissipate energy for homeostasis. These ideas were highlighted to prepare us for the Silver Gun Hypothesis, which includes a thermodynamic interpretation of the economics of climate change and an optimal policy solution for a safe climate.

'Brown economic growth' is a major driver of the climate crisis because it creates demand for energy, including fossil fuels, and it contributes to rising carbon emissions. Climate change forecasting by Garrett (2012), Nordhaus (2016), and Raftery et al. (2017), conclude that there is currently a negligible chance of achieving net-zero carbon emissions by mid-century because of brown growth (see Figure II-1). According to Raftery et al. (2018), brown growth is leading to 3.2°C of global warming by 2100 (2.0-4.9°C at 90% confidence), which is significantly greater than the 1.5°C/2.0°C ambition of the 2015 Paris Climate Agreement—the presumed threshold for a safe climate. A crucial challenge facing the humanity is a lack of agency in mitigating carbon emissions to achieve a net-zero carbon

balance by mid-century (see Figure II-2); or to achieve a net-negative carbon balance later in this century.

The Silver Gun Hypothesis provides a thermodynamic interpretation of the agency that can influence the Earth’s carbon balance. This includes the agency of complex organisms, the agency of human beings, and the agency of civilization through its economic systems. The Silver Gun Hypothesis is an extension of the Holistic Market Hypothesis (HMH) that was developed by Chen, van der Beek and Cloud (2017, 2019). The HMH was developed to assess the benefits of ‘carrot and stick’ carbon pricing, whereby the ‘stick’ is the standard carbon tax, and the ‘carrot’ is the Global Carbon Reward¹.

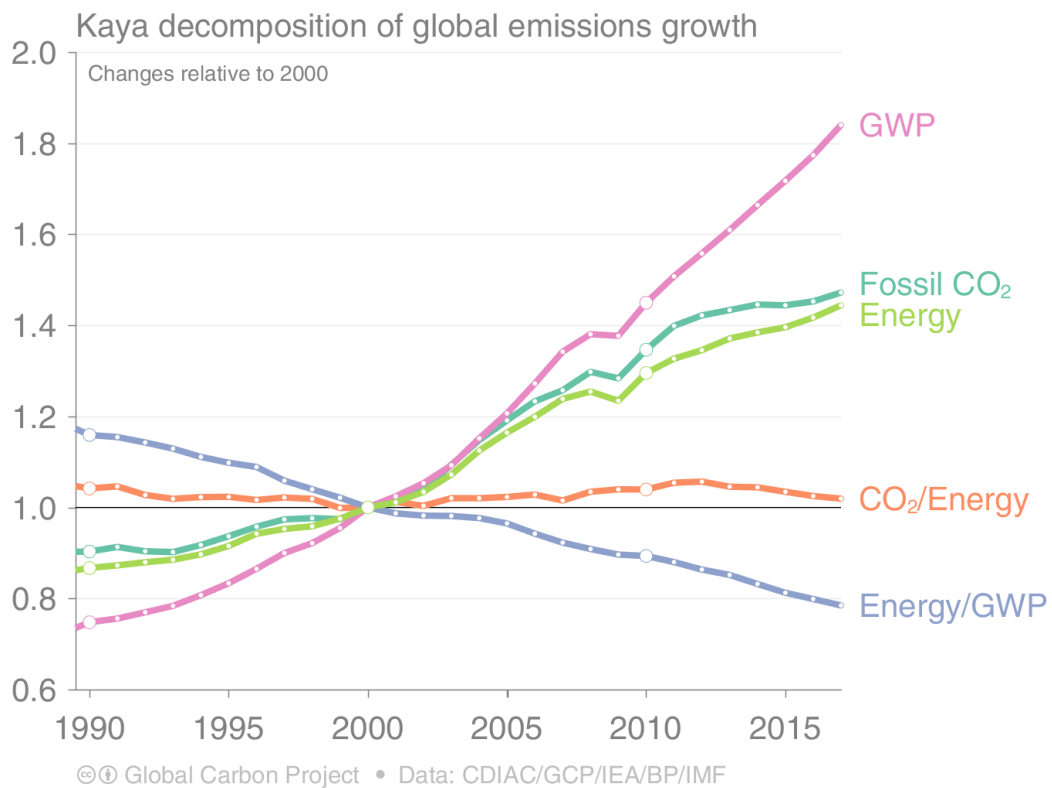


Figure II-1. Kaya decomposition of CO₂ emissions shows that Gross World Product (GWP) is being produced more efficiently in terms of energy, but consumption is not constrained and CO₂ emissions are trending higher. The data indicate that there is a relative decoupling of GWP from CO₂ emissions, but there is not an absolute decoupling (reproduced from globalcarbonproject.org).

¹ The name given to the policy for a carbon reward is the ‘Global 4C Risk Mitigation Policy’ (Global 4C).

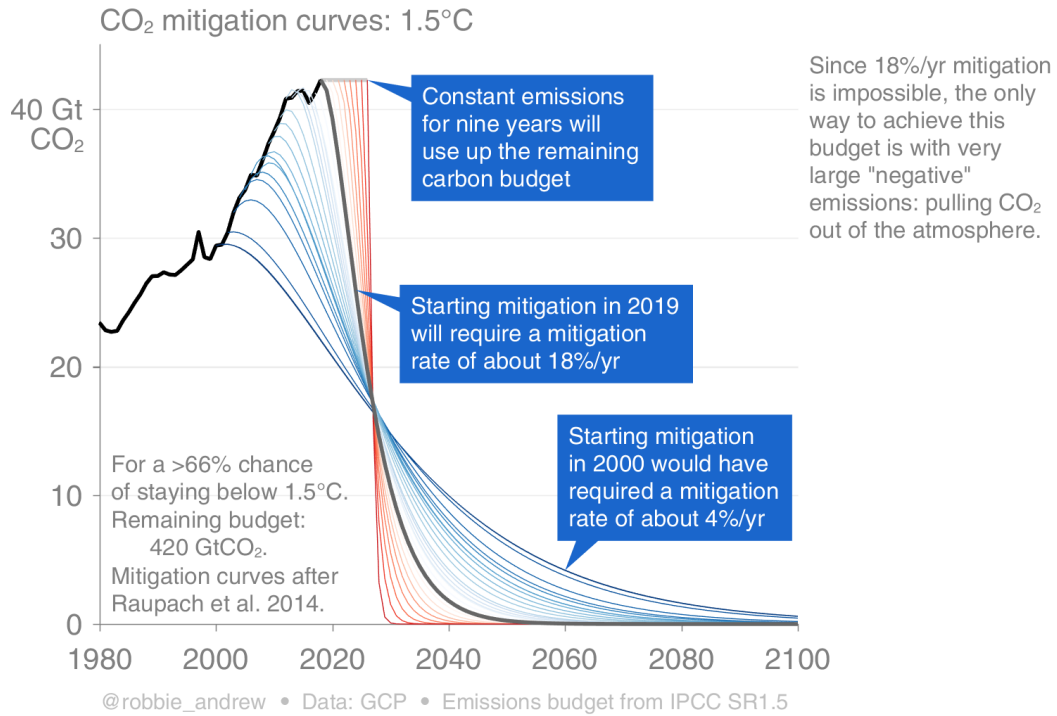
A novel feature of the HMM is the conceptualization of ‘carrot and stick’ climate policies as biophysical networks with ‘complementary-and-opposite’ economic relationships. The HMM is unorthodox because it makes the claim that complementary-and-opposite carbon pricing is related to the ‘entropy of carbon in the environment’. Entropy is a thermodynamic concept and is not included in classical/neoclassical economic theories, methods or policies. A second novel feature of the HMM is the application of a money-energy relation developed by Garrett (2012), and this relation is used to make a connection between carbon pricing and the allocation of usable energy in the economy.

The aim of the Silver Gun Hypothesis is to complete the thermodynamic analysis of carbon pricing that was initiated by Chen, van der Beek and Cloud (2017, 2019) with the HMM. The Silver Gun Hypothesis provides the additional theory that explains why ‘carrot and stick’ carbon pricing can be used to achieve carbon neutrality, and to explain the origins of ‘complementary-and-opposite’ relationships. The Silver Gun Hypothesis is promising in that it provides a potential solution to major economic conundrums related to climate change, including (1) the growth versus degrowth paradox, (2) Jevons paradox, (3) high versus low time-discounting of climate damages, (4) tragedy of the horizon paradoxes, and other related conundrums.

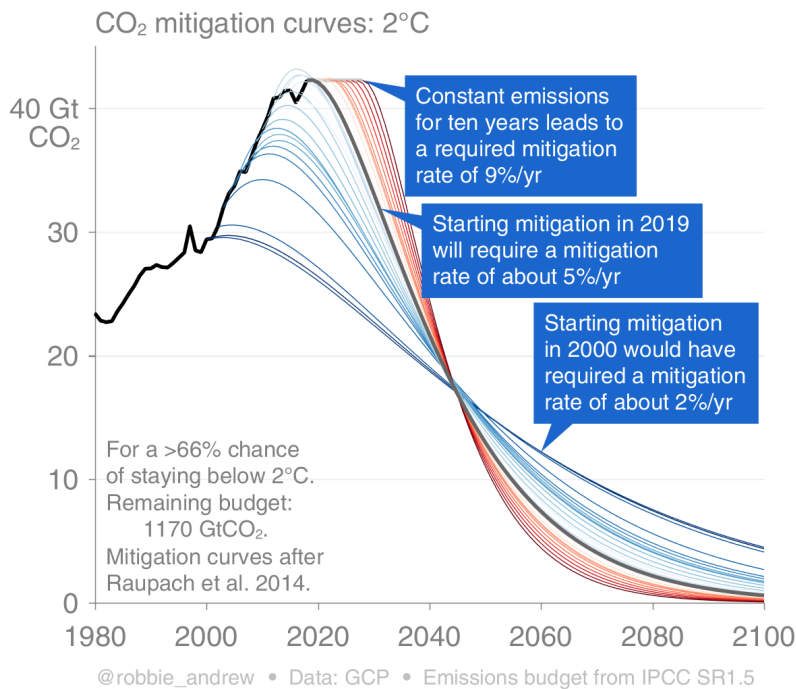
Scientists and economists are encouraged to discuss the Silver Gun Hypothesis

Subsequently, the Silver Gun Hypothesis offers an explanation for ‘why’ the economy is heading for high carbon emissions, and ‘why’ orthodox policies are inadequate for achieving a safe climate. An exciting feature of the Silver Gun Hypothesis is that it invites a direct comparison between economic systems and living organisms. If the hypothesis is found to be reliable, then it could be a breakthrough in evolutionary biology, climatology, and economics.

Important to note is that thermodynamics does not explain ‘how’ systems work, including organisms and economies. Thermodynamics is a branch of physics that explains ‘why’ systems work in terms of the physical causality provided by energy potentials and changing entropy. It appears that entropy is the missing link that explains why orthodox climate policies are failing to address brown growth, and why the political establishment is failing to resolve the climate crisis.



(a)



(b)

Figure II-2. Global CO₂ emissions since 1980 show that the world economy is poorly conditioned to remain below (a) 1.5°C or (b) 2°C of global warming. A radical and systemic change to the world economy is needed to achieve the ambition of the 2015 Paris Climate Agreement (reproduced from globalcarbonproject.org).

References

Chen, D.B., van der Beek, J. and Cloud, J., 2017. Climate mitigation policy as a system solution: addressing the risk cost of carbon. *Journal of Sustainable Finance & Investment*, 7 (3): 1-42.

<https://www.tandfonline.com/doi/abs/10.1080/20430795.2017.1314814>

Chen, D. B. (2018). Central Banks and Blockchains: The Case for Managing Climate Risk with a Positive Carbon Price. In: *Transforming climate finance and green investment with blockchains*. Elsevier. A. Marke, Ed., Chapter 15.

<https://www.sciencedirect.com/science/article/pii/B978012814447300015X>

Chen D.B., van der Beek J., Cloud J. (2019) Hypothesis for a Risk Cost of Carbon: Revising the Externalities and Ethics of Climate Change. In: Doukas H., Flamos A., Lieu J. (eds) *Understanding Risks and Uncertainties in Energy and Climate Policy*. Springer, Cham

https://link.springer.com/chapter/10.1007/978-3-030-03152-7_8

Chen, D. B. (2018). Utility of the Blockchain for Climate Mitigation. *The Journal of British Blockchain Association*, 1 (1): 1-9.

<https://jbba.scholasticahq.com/article/3577-utility-of-the-blockchain-for-climate-mitigation>

Chen, D. B. (2018). The Silver Gun Hypothesis: New Model for a Sustainable Carbon Economy. <https://mahb.stanford.edu/?s=the+silver+gun+hypothesis>

Garrett, T. J. (2012). No way out? The double-bind in seeking global prosperity alongside mitigated climate change. *Earth System Dynamics*, 3, 1–17.

Nordhaus, W. D. (2016). *Projections and Uncertainties About Climate Change in an era of Minimal Climate Policies* (Cowels Foundation Discussion Paper No. 2057). New Haven, CT: Yale University.

Pigou, A. C. (1920). *The Economics of Welfare*. London: Macmillan.

Raftery, A. E., Zimmer, A., Frierson, D. M., Startz, R., & Liu, P. (2017). Less than 2 C warming by 2100 unlikely. *Nature Climate Change*, 7, 637–641.

Zappalà, G. (2018). *Central Banks' role in Responding to Climate Change: Monetary Policy and Macroprudential Regulation*. Thesis. Università degli studi di Padova. Dipartimento di Scienze Economiche.

<https://goo.gl/dDnZw7>

About the Author

Dr. Delton B. Chen is an Australian engineer who holds a Ph.D. from the University of Queensland for his hydrogeological study of Heron Island, located in the Great Barrier Reef. Delton is a modeler/analyst in groundwater, hydrology, hot-rock energy, and greenhouse mitigation. Delton is co-founder of [Global 4C](#) and the lead developer of a policy to mitigate climate change with a Central Bank Digital Currency (CBDC).

Collaborations

The following Google Group is set-up for discussing and collaborating on the Silver Gun Hypothesis:



<https://groups.google.com/forum/#!forum/silvergun>

Contacts



possibleplanet.org



global4c.org



climateprotection.org

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