

Daniel Schmachtenberger “Bend Not Break Part 1: Energy Blindness”

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Episode 05 January 26, 2022

(Conversation Recorded on January 14, 2022.)

On this episode we meet with founding member of The Consilience Project, Daniel Schmachtenberger.

In the first of a three-part series, Nate and Daniel outline the macro risks and pathways for civilization to 'bend' and avoid 'breaking' in coming decades.

In the Part 1 conversation, Schmachtenberger flips the script to interview Nate about the urgent problems his research and work on energy, money, and growth confront. Nate explains how we can come to understand energy blindness and the overlooked role of oil in consumption, production, and progress since the Industrial Revolution. The dominant narrative of human progress prioritizes capital and labor – but the omission of energy and materials leaves out a key component to understanding how the modern human ecosystem functions.

Further, Nate discusses how a growth economy will inevitably lead to increased energy production and consumption, and how new energy technologies like renewables end up creating more energy output, not less. Putting everything together, in outsourcing our decisions and planning to a market dependent on growth, we have not so metaphorically become an energy hungry superorganism.

Finally, Daniel and Nate look forward to answering: What are ways for us to prepare for a post-growth economy? How can we stay balanced in the face of existential crises? What type of policy can help shape a future that is yet to arrive, and how can we get ahead?

About Daniel Schmachtenberger

Daniel Schmachtenberger is a founding member of [The Consilience Project](#), aimed at improving public sensemaking and dialogue.

The throughline of his interests has to do with ways of improving the health and development of individuals and society, with a virtuous relationship between the two as a goal.

Towards these ends, he's had particular interest in the topics of catastrophic and existential risk, civilization and institutional decay and collapse as well as progress, collective action problems, social organization theories, and the relevant domains in philosophy and science.

Video



Show Notes

01:45: Daniel's website and other works

<https://civilizationemerging.com/about/>

2:30: Nate's work on Macro-issues

<https://read.realityblind.world/view/975731937/i/>

Reality 101 Energy Videos

Economics for the Future - Beyond the Superorganism

2:45: Daniel's work on micro-issues

<https://civilizationemerging.com/>

5:30: consilience project

<https://consilienceproject.org/>

8:40: Marvin Harris - cultural materialism

<https://anthropology.ua.edu/theory/cultural-materialism/>

11:20: Energy is the currency of life and a core driver of nature

<https://www.wiley.com/en-ie/Behavioural+Ecology:+An+Evolutionary+Approach,+4th+Edition-p-9780865427310>

Lotka: Contribution to the Energetics of Evolution

12:12: Climate warmed and stabilized, propelling agriculture and creating more energy surplus

<http://www.dandebate.dk/eng-klima7.htm>

<https://link.springer.com/article/10.1007%2Fs10818-013-9156-6>

13:20: Since the 1800s we've been using stored fossil energy surplus 10 million times faster than it was sequestered

<https://www.pnas.org/content/112/31/9511>

13:52: Economics treats energy consumption like interest rather than principle

<https://read.realityblind.world/view/975731937/212/>

14:05 One barrel of oil is equivalent to 5 years of human work

<https://www.iier.ch/pub/files/Sun%2C%2007/31/2011%20-%2016%3A11/Green%20Growth%20DFID%20report.pdf>

Economics for the Future - Beyond the Superorganism - section: 4.3

15:10: There is no substitute for energy

<https://www.theguardian.com/news/2015/apr/08/can-world-economy-survive-without-fossil-fuels>

15:32: GDP cannot decouple from energy

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0164733>

16:25: The current financial system requires growth to continue
<https://www.theatlantic.com/business/archive/2016/11/economic-growth/506423/>

16:50: Central banks are blowing up their balance sheets keep the system going
<https://www.yardeni.com/pub/peacockfedecbassets.pdf>

17:20: We are a superorganism
<https://read.realityblind.world/view/975731937/126/>

Maximum Power Principle and the Human Superorganism

17:45: Technology is dependent on energy
<https://read.realityblind.world/view/975731937/222/>

19:30: Fourth Law of thermodynamics - Maximum Law Principle
<https://read.realityblind.world/view/388478403/170/>

20:22: Kleiber's Law
https://en.wikipedia.org/wiki/Kleiber%27s_law

<https://read.realityblind.world/view/975731937/198/>

<https://www.youtube.com/watch?v=hLGDJFGAmic>

23:08: Anthropocene
<https://www.nhm.ac.uk/discover/what-is-the-anthropocene.html>

23:45: Inequality of consumption correlates with surplus
<https://www.smithsonianmag.com/history/archaeology-wealth-inequality-180968072/>

24:16: Dunbar's number
<https://royalsocietypublishing.org/doi/10.1098/rsbl.2021.0158#:~:text='Dunbar's%20number'%20is%20the%20notion,other%20individuals%20in%20the%20group.>

24:54: Individual and cultural plasticity
<https://www.bibliovault.org/BV.landing.epl?ISBN=9780226712840>

25:20: Exosomatic energy - the average american consumes >200,000 Kcals per day
<http://www.ejolt.org/2012/12/human-energy-use-endosomatic-exosomatic/>

26:13: We use 100 billion barrel equivalents of oil, coal, and natural gas, equivalent to 500 billion human workers
<https://read.realityblind.world/view/975731937/190/>

Energy is Merely a Commodity 29:35 timestamp from Earth and Humanity

29:07: Stone age and overhunting
<https://www.npr.org/sections/thetwo-way/2018/04/19/604031141/new-study-says-ancient-humans-hunted-big-mammals-to-extinction>

31:00 Humans and livestock are 98% of mammalian biomass
<https://www.theguardian.com/environment/2018/may/21/human-race-just-001-of-all-life-but-has-destroyed-over-80-of-wild-mammals-study>

31:17 Total biomass is 700% of what it was 10,000 years ago
https://www.pnas.org/content/105/Supplement_1/11543

31:47 60% of nitrogen in our bodies today has a chemical signature from natural gas from synthetic fertilizer <https://cen.acs.org/articles/86/i33/Haber-Bosch-Reaction-Early-Chemical.html>

<http://vaclavsmil.com/wp-content/uploads/docs/smil-article-1999-nature7.pdf>

https://en.wikipedia.org/wiki/Haber_process (last 2 references)

32:32 For most of history our food system was a net energy producer, now it is a net energy sink
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2935130/>

33:15: our entire food system uses 10 times the energy that it produces
<https://blogs.scientificamerican.com/plugged-in/10-calories-in-1-calorie-out-the-energy-we-spend-on-food/>

<https://www.postcarbon.org/publications/the-future-is-rural/>

35:33: Over the last 50 years GDP has been growing 100% while energy is growing 99%

Figure 2: <https://synapse9.com/drafts/2021-NewSci-IndividSys-MS.pdf>

36:24: Energy intensity of GDP, some countries have been reducing their energy intensity due to exports and imports
<https://voxeu.org/article/myth-decoupling>

37:03: Global GDP is still very tightly coupled
<https://read.realityblind.world/view/975731937/195/>

38:00: Financial manipulation also create the illusion of decoupling
<https://link.springer.com/article/10.1007/s00191-017-0514-8>

39:58: Wide boundary thinking
<https://read.realityblind.world/view/975731937/20/>

40:56: Nate's Hagens ~ Economics for the future - Beyond the Superorganism
<https://www.sciencedirect.com/science/article/pii/S0921800919310067>

41:11: Jevons paradox
https://en.wikipedia.org/wiki/Jevons_paradox#:~:text=In%20economics%2C%20the%20Jevons%20paradox,rises%20due%20to%20increasing%20demand.

42:42: Energy depletion
<https://www.thegreatsimplification.com/episode/03-arthurberman>

43:10: Two categories of technology
<https://read.realityblind.world/view/388478403/143/>

47:55: We are at diminishing returns on oil
<https://read.realityblind.world/view/975731937/265/>

48:25: The nature of interest requires financial growth
<https://www.sciencedirect.com/science/article/pii/S1057521915001477>

49:30: Potential vs Kinetic energy
<https://read.realityblind.world/view/975731937/289/>

51:24: Renewable are actually rebuildables
<https://read.realityblind.world/view/975731937/285/>

51:50: In 2019 we grew the electricity demand by more than all the solar voltaic capacity ever built
<https://www.iea.org/news/global-electricity-demand-is-growing-faster-than-renewables-driving-strong-increase-in-generation-from-fossil-fuels>

52:40: We are using more wood today than we were 100 years ago
<https://www.mdpi.com/1996-1073/7/12/7955/htm>

54:45: ER/OI - Energy return on Investments
https://en.wikipedia.org/wiki/Energy_return_on_investment

https://www.youtube.com/watch?v=mATjPdV3tcl&list=PLdHV4AV3ixB2J2PQrvbDnDg_93YAklTK&index=2

[Dynamic EROI of Global Energy System in Future Scenarios of Transition to Renewable Energy](#)

57:33: Intermittence and variability
<https://read.realityblind.world/view/975731937/291/>

58:21: Fossil carbons have a higher total system return on investment and is simple for our systems
<https://www.sciencedirect.com/science/article/pii/S0301421513003856>

59:37: 20% of total global energy is electricity and many things aren't replaceable by electricity
<https://www.un.org/en/chronicle/article/role-fossil-fuels-sustainable-energy-system>

1:00:37: We traded out human labor for mechanical labor, exponentially growing our system
<https://read.realityblind.world/view/975731937/192/>

1:04:06: We have underpaid for the core economic input and don't pay for the negative externalities
<https://www.nature.com/articles/d41586-017-07510-3>

1:05:15: Tim Garrett - GDP and CO2 chart
<https://twitter.com/nephologue/status/1455271331902099458>

1:06:35: Price difference when adding negative externalities of coal
<https://www.theatlantic.com/business/archive/2015/08/coins-externalities-medical-air-quality-financial-environmental/401075/>

[Full Cost accounting for life cycle of Coal](#)

1:08:50: 95% of taxes are on human labor
<https://www.untax.org/>

1:09:57: Relationship between material consumption and GDP is 1:1 over last 50 years
<https://www.nature.com/articles/s41467-020-16941-y>

1:10:02: 2lbs of non-renewable materials for every dollar of GDP

<https://unstats.un.org/sdgs/report/2019/goal-12/>

1:10:11: An American baby born today will use 3.1 million lbs of non-renewable materials in their lifetime

<https://www.manhattan-institute.org/mines-minerals-and-green-energy-reality-check>

<https://read.realityblind.world/view/975731937/202/>

<https://mineralseducationcoalition.org/mining-mineral-statistics>

1:10:45: Lithium and electric cars

<https://www.greentechmedia.com/articles/read/is-there-enough-lithium-to-maintain-the-growth-of-the-lithium-ion-battery-m>

1:11:10: Everything made from a barrel of oil

<https://www.energy.gov/articles/hows-and-whys-replacing-whole-barrel>

1:13:05: Waste that comes from mining

<https://www.sciencedirect.com/science/article/pii/B9780123814753100051>

<https://theconversation.com/mine-waste-dams-threaten-the-environment-even-when-they-dont-fail-130770>

1:14:55: What it takes to make a computer

<https://scmresearch.org/2018/09/28/the-supply-chain-of-a-computer/>

1:15:40: 2022 current events in Taiwan

<https://thehill.com/policy/defense/navy/591015-us-aircraft-carriers-enter-south-china-sea-amid-tensions-between-taiwan>

1:17:50: Dick gephardt and advanced policy

<https://www.thegreatsimplification.com/episode/01-dickgephardt>

1:18:14: Untax Project

<https://www.thegreatsimplification.com/episode/01-dickgephardt>

Herman Daly: "Toward an Ecological Economics"

Chuck Watson "From MAD to NUTS: Risk, Nukes, & Climate Change"

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Contact

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