

# HONR 229L: Climate Change: Science, Economics, and Governance

## Discussion #15: Capitalism

Ross Salawitch

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Class Web Site: <http://www.atmos.umd.edu/~rjs/class/honr229L>

ELMS Page: <https://myelms.umd.edu/courses/1269254>



<https://popularresistance.org/save-the-climate-or-save-capitalism-floodwallstreet-dispatch>

**24 October 2019**

# HONR 229L: Climate Change: Science, Economics, and Governance

AT 15, Q1. According to the Olah et al. reading:

a) what type of nuclear reactor technology are "the preferred reactors in the Western World"?

b) for the answer to a), what are two advantages of this technology?

c) for the answer to a), what is one disadvantage of this technology?

a) Pressurized water reactors (PWRs) are the preferred reactors in the Western World because the pressurized water utilized in the process acts as a moderator and coolant for the fission of Uranium 235, and water is then boiled in a secondary loop to turn a turbine and generate electricity.

b) PWRs are the first type of nuclear power plant technology to be commercialized. This fact proves to be an advantage to PWR technology because many nuclear plants around the world use PWRs today and the most development over a longer period of time could be done for PWRs. In addition, PWRs are a safer technology than the other popular, commercial nuclear power plant technology: the boiling water reactor (BWR). BWRs do not require a second vessel of water to boil, like PWRs, as the same water that boils to create high pressure in the nuclear power plant core is reboiled to power turbines. Although BWRs have a simpler build, the structure appears to be less safe than that of PWRs.

c) A disadvantage of this technology is that it is a more complex system when compared to the other popular systems (such as BWRs), since the technology requires high pressure to be built up and then a secondary loop to be constructed for the actual generation of electricity.

# HONR 229L: Climate Change: Science, Economics, and Governance

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- b) provide an overview of the "general plan" to store nuclear waste in the deep ocean
- c) state and defend, with a few sentences, whether you:
  1. prefer the U.S. pursue storage of nuclear waste at Yucca Mountain
  2. prefer the U.S. pursue storage of nuclear waste in the deep ocean
  3. prefer the U.S. pursue nuclear energy, but use some other option to store nuclear waste
  4. prefer the U.S. pursue nuclear energy, but using a technology that does not produce waste that requires geologic storage
  5. prefer the U.S. abandon nuclear energy, due to intractable issues involving nuclear waste

a) Essentially, the plan is to store nuclear waste inside/on top of the Yucca Mountain in Nevada. Strenuous tests have been performed to ensure that the rock that the mountain is comprised of is not susceptible to volcanic activity as well as the fact that it won't allow water with radioactive residue to travel through the rock and towards human civilization. Intense precautions such as blocking tunnel entrances and engineered barriers will also be taken to protect future generations from radioactivity. Despite concerns over storage of such materials in a mountain rather than deep below ground, tests have shown that the amount of radioactivity people in the future will be exposed to with this method is negligible.

b) The deep ocean is also a potential site to store nuclear waste. Deep ocean sediments have low permeability and are stable and lasts much longer than the half-lives of almost all radionuclides in nuclear waste. Even if radiation were to escape from the canisters containing nuclear waste, it would bind to these sediments. A specific potential site is located 600 miles north of Hawaii and is considered a marine desert, thus it is argued that little to no organisms would be affected by the burial of nuclear waste here.

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**9 students**

I would prefer this over the waste in deep ocean because they still have to match their predictions with actual data, and although the models show it's safe, it is still necessary to go through the process.

I prefer that the U.S. pursue the nuclear waste storage at Yucca Mountain because of the political feasibility of that option over an ocean repository. The Yucca Mountain is extremely safe with a very low chance of the waste contents harming the environment around it and that would also take thousands of years to occur. So I think it would be too time consuming and unrealistic to convince Congress to pass a bill reversing the 1987 bill given the polarization in throughout the country over the issue of climate change.

While the idea of recycling nuclear waste will (hopefully) come into play in the coming decades, I believe that today, in the **status quo**, storing nuclear waste in one Yucca Mountain facility is much safer than what we have today, with **facilities scattered all over the country, any one of which could be raided by terrorists at any point**.

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**7 students**

One of the potential sites located near Hawaii is the perfect location to store waste. Over millions of years skeletons of sea life, volcanic ash, and grains have settled at the bottom to settle a bed of clay 325 feet deep. There is very little plant and fish life, the plain has been free from any volcanic or seismic activity for millions of years, and the mud is self healing and forms a seal around any object that plummets down. In this setting radionuclides could not escape.

I would actually prefer that the U.S. store their nuclear waste deep inside the ocean, with one small addition. Before getting to that additional clause, it should be noted that deep-sea storage is superior to storage in Yucca mountain due to the lack of threat entirely from corrosion, rather than 99.9% mitigation. Should deep sea nuclear waste burying become the norm, **I would imagine the U.S. government would make an effort to not explicitly mark where canisters are buried**, and instead show the zone in which a handful of canisters have been deposited. Much like a minefield, any hostile actors attempting to locate the nuclear waste would have great difficulty in not knowing exactly where the waste is.

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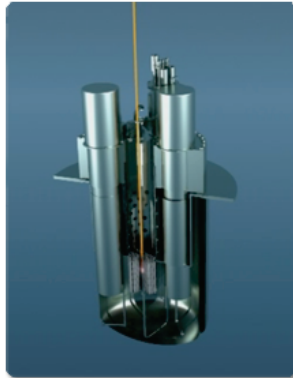
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**1 student**

**I prefer the U.S. pursue nuclear energy, but use some other option to store nuclear waste. I prefer this because of it's little to none greenhouse gas emission. The waste can be transmuted where we convert the nuclear waste into some other useful material**

## The well-thought out disposal of radioactive waste

### Reducing radioactive waste and making it less radiotoxic: transmutation



Transmutation can offer another solution, in addition to deep disposal, for high-level radioactive waste. Transmutation is a process in which the long-lived radioactive elements in waste are converted by fission to shorter-lived particles that produce radiation for a much shorter period and are less radiotoxic. Transmutation can therefore greatly reduce the amount and radiotoxicity of high-level radioactive waste. This **decreases the necessary storage time from several hundred thousand years to less than 1000 years.** Following the development of [MYRRHA](#), SCK•CEN has become a front runner in the **development of this promising technique**, i.e. transmutation using an [accelerator driven nuclear system](#). Such an installation permits as much as half the reactor core to be loaded with high-level radioactive waste, which makes it possible to process the waste efficiently. MYRRHA itself will not process nuclear waste on an industrial scale, but provides opportunities to continue testing and refining the technology.

[Discover all about MYRRHA.](#)

[https://www.sckcen.be/en/Technology\\_future/Radioactive\\_waste/Transmutation](https://www.sckcen.be/en/Technology_future/Radioactive_waste/Transmutation)

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**2 students**

I prefer the U.S. pursue nuclear energy that does not produce any waste that requires geologic storage. This is done using thorium-based reactors. These breeder reactors do not produce long-term nuclear waste. Nuclear energy's greatest downfall is the fact that it produces radioactive waste, and so by eliminating and dwindling that issue, it makes nuclear energy a much more viable and preferable technology. One of the problems with thorium-based reactors is that the start-up costs are high, but this is the price that must be paid for truly clean energy. We need to pay a price to take energy without ruining the environment, and it is time that we really start paying that price instead of greedily taking energy from earth while also destroying the environment that is providing all of these resources for us.

[https://en.wikipedia.org/wiki/Thorium-based\\_nuclear\\_power](https://en.wikipedia.org/wiki/Thorium-based_nuclear_power)

<https://www.world-nuclear.org/information-library/nuclear-fuel-cycle/fuel-recycling/processing-of-used-nuclear-fuel.aspx>

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## 2 students

I prefer the US abandon nuclear waste. No matter where the waste is stored, it will take transport to get it there. The transport required still added to carbon emissions, thus doing little to stop the rate of climate change. The US should be investing time and resources into pursuing renewable energy sources. In fact, carbon emissions from nuclear energy are 5 times that of hydropower and 3 times that of wind energy.

<https://www.nirs.org/wp-content/uploads/factsheets/yucca.pdf>

<https://www.tampabay.com/news/military/effects-of-dumping-radioactive-waste-in-ocean-need-more-study-scientists/2157923>

<http://theconversation.com/is-nuclear-power-zero-emission-no-but-it-isnt-high-emission-either-41615>

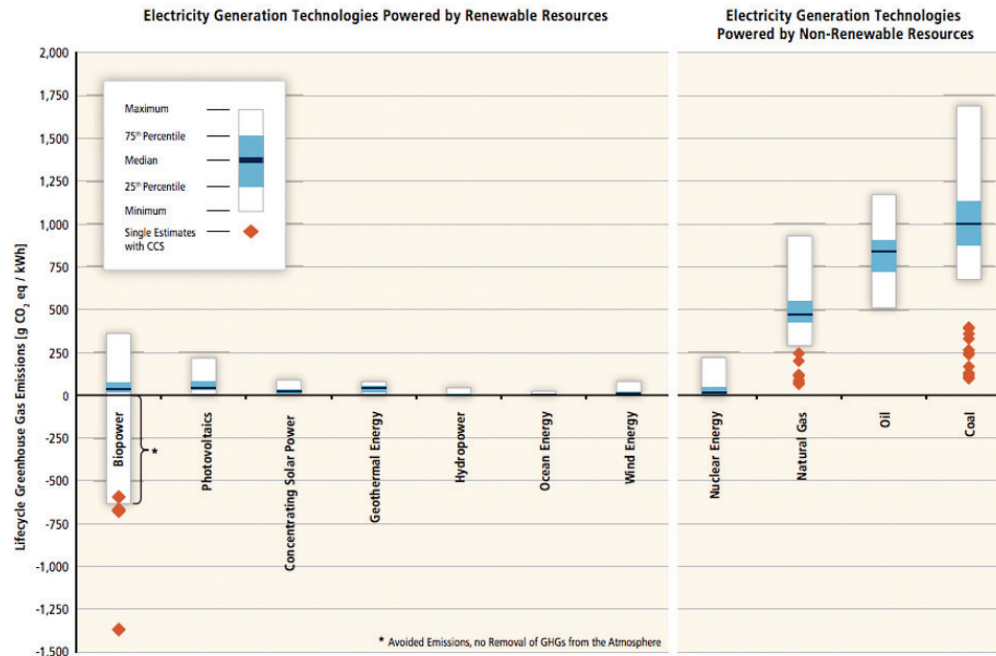


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<http://theconversation.com/is-nuclear-power-zero-emission-no-but-it-isnt-high-emission-either-41615>

# HONR 229L: Climate Change: Science, Economics, and Governance

AT 15, Q3. The assigned reading includes an Op-Ed piece in the NY Times signed by leading climate scientists arguing for the need to have a more prominent, future role for nuclear energy in order to reduce society's dependence on fossil fuels, as well as another article entitled "Preventing Nuclear Terrorism".

Given the competing forces of trying to slow the rate of climate change due to society's reliance on fossil fuels, versus fears of nuclear terrorism, write a brief essay (4 to 5 sentences) stating **whether or not you think nuclear energy should play a much more prominent role in the near-future generation of electricity throughout the world.**

**More prominent: 16 students**

- 1. The environmental effects of reliance on fossil fuels which might result in disasters regarding climate change.**
- 2. Other renewables are not able to scale up fast enough for energy supply.**
- 3. Although today's technology is far from perfect but it is sophisticated enough to ensure safety.**
- 4. Expanded use of nuclear energy even has smaller risks than fossil fuels.**

<https://www.world-nuclear.org/information-library/economic-aspects/economics-of-nuclear-power.aspx>

<https://www.forbes.com/sites/jamesconca/2012/06/10/energys-deathprint-a-price-always-paid/#140742a2709b>

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| Energy Source                            | Mortality Rate (deaths/trillionkWhr)      |
|--|---|
| Coal – global average                    | 100,000 (41% global electricity)          |
| Coal – China                             | 170,000 (75% China's electricity)         |
| Coal – U.S.                              | 10,000 (32% U.S. electricity)             |
| Oil                                      | 36,000 (33% of energy, 8% of electricity) |
| Natural Gas                              | 4,000 (22% global electricity)            |
| Biofuel/Biomass                          | 24,000 (21% global energy)                |
| Solar (rooftop)                          | 440 (< 1% global electricity)             |
| Wind                                     | 150 (2% global electricity)               |
| Hydro – global average                   | 1,400 (16% global electricity)            |
| Hydro – U.S.                             | 5 (6% U.S. electricity)                   |
| Nuclear – global average w/Chern&Fukush) | 90 (11% global electricity)               |
| Nuclear – U.S.                           | 0.1 (19% U.S. electricity)                |

<https://www.forbes.com/sites/jamesconca/2012/06/10/energys-deathprint-a-price-always-paid/#140742a2709b>

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**Less prominent: 5 students**

**In my opinion, nuclear energy should not play a prominent role in near-future electricity generation throughout the world. While "the risks associated with the expanded use of nuclear energy are orders of magnitude smaller than the risks associated with fossil fuels," as the article states, and the authors of the article believe that no other renewable energy option has scaled up as much as nuclear is capable of, nuclear energy is still too dangerous for our current technology to handle. In 2011 - just over two years before the Times article was published - the Fukushima disaster occurred in Japan, when the namesake nuclear plant had a meltdown and poured large amounts of radioactive material into the ocean. The technology may have advanced since then in terms of safety, but such serendipitous events as an accident or sabotage by a hostile power could cause nuclear-related catastrophes of devastating scale should the technology play a larger role in energy generation. As such, society should focus on improving safer renewable options (solar, wind, etc) so that we won't have to worry about such implications.**

# HONR 229L: CLIMATE CHANGE: SCIENCE, ECONOMICS, AND GOVERNANCE

## Capitalism

Sam Robinson

24 October 2019

[https://www.timeshereducation.com/sites/default/files/styles/the\\_breaking\\_news\\_image\\_style/public/stock-500752623.jpg?itok=WA3yALGo](https://www.timeshereducation.com/sites/default/files/styles/the_breaking_news_image_style/public/stock-500752623.jpg?itok=WA3yALGo)

# WHAT IS THE KEY FACTOR TO THE MODERN ECONOMY ACCORDING TO HARARI?

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[https://www.insidehighered.com/sites/default/server\\_files/styles/image/public/media/barber%20handshake.jpg?itok=KNWntI29](https://www.insidehighered.com/sites/default/server_files/styles/image/public/media/barber%20handshake.jpg?itok=KNWntI29)







# THE ISLAND OF YAP

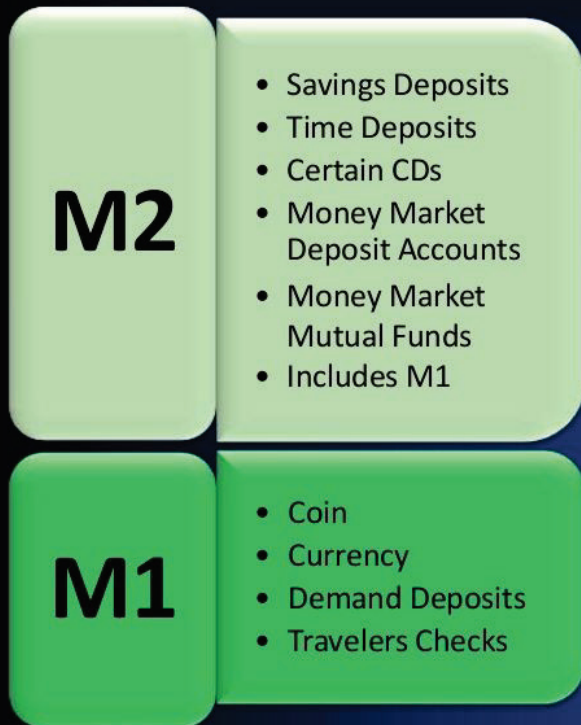


<https://www.npr.org/sections/money/2011/02/15/131934618/the-island-of-stone-money>

# EXAMPLES OF NON-PHYSICAL CURRENCIES?

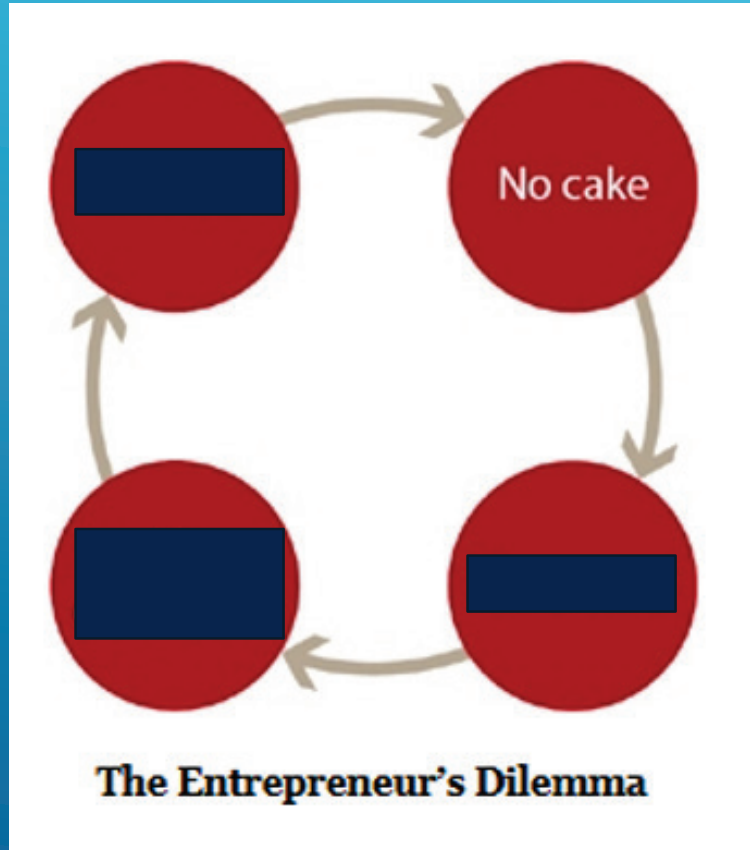
# EXAMPLES OF NON-PHYSICAL CURRENCIES?

## Money Supply – Components

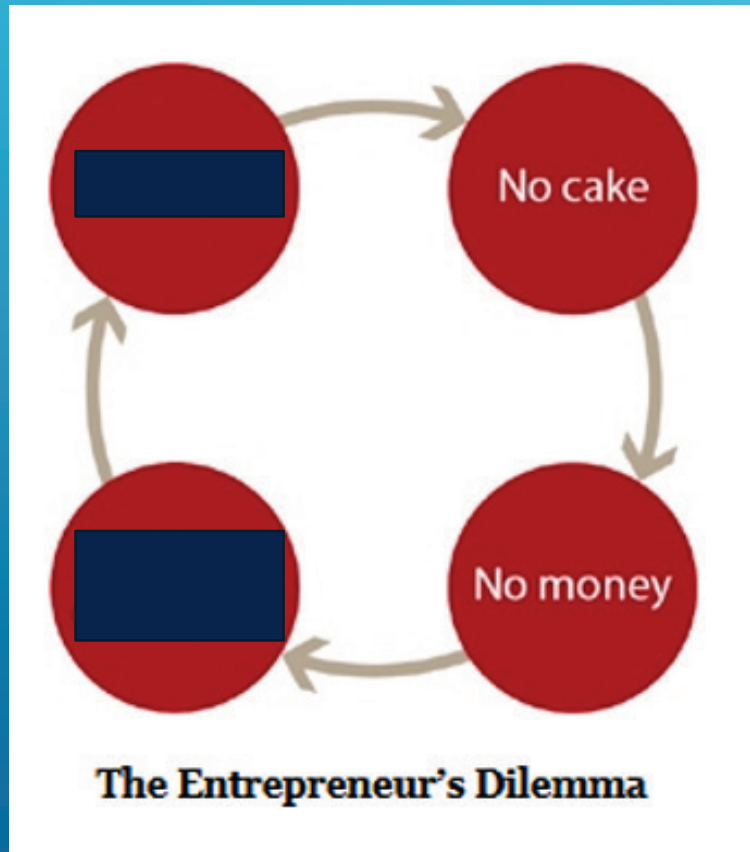


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# THE WEALTH OF NATIONS

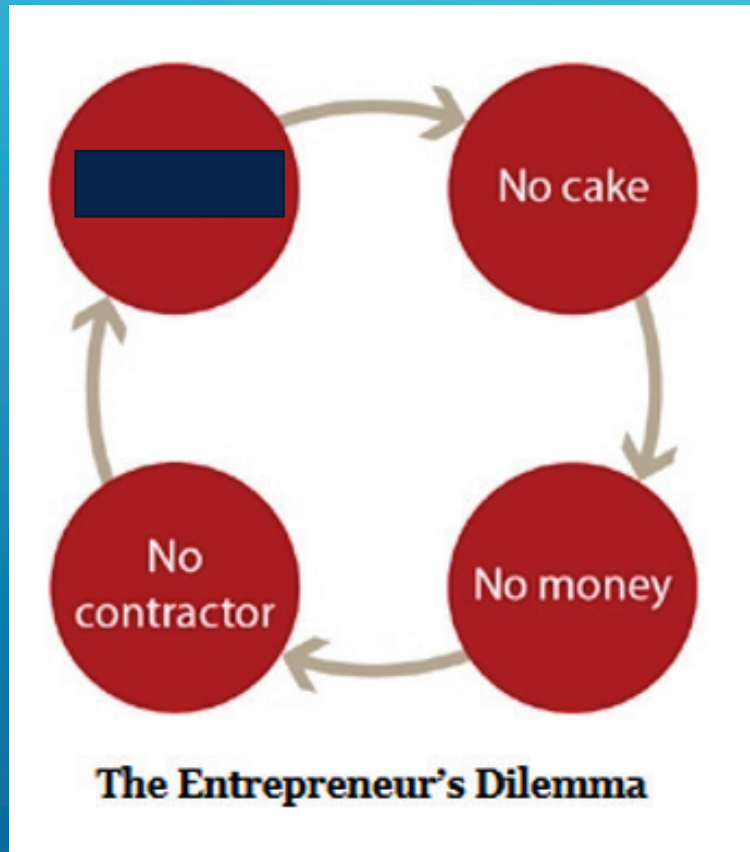


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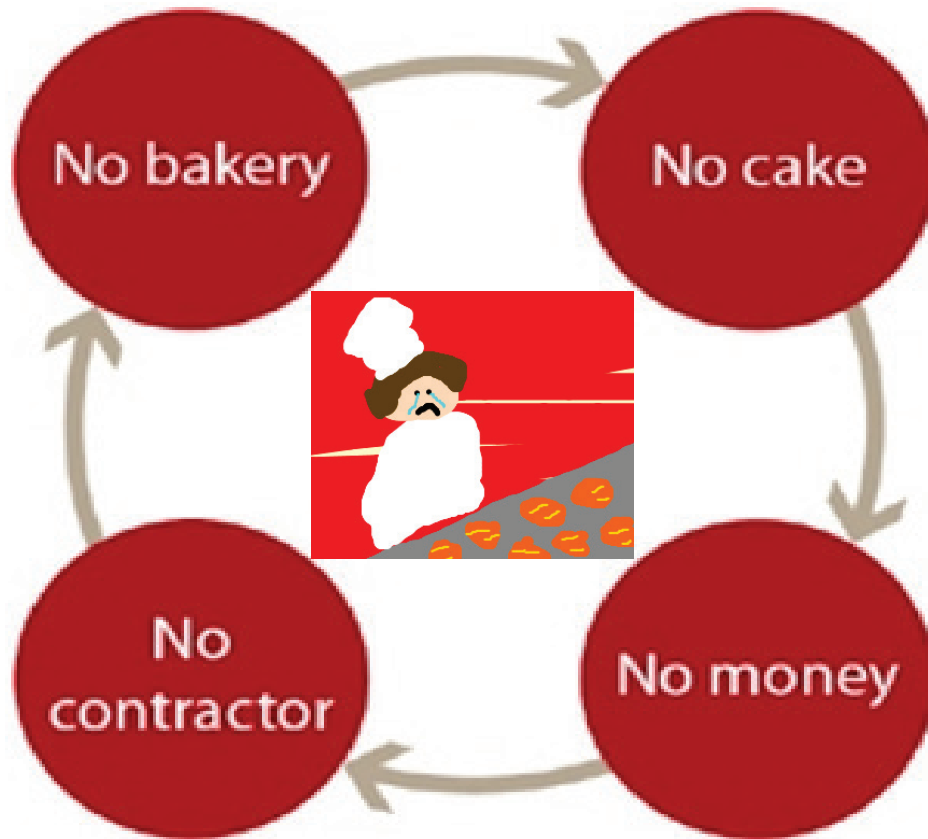




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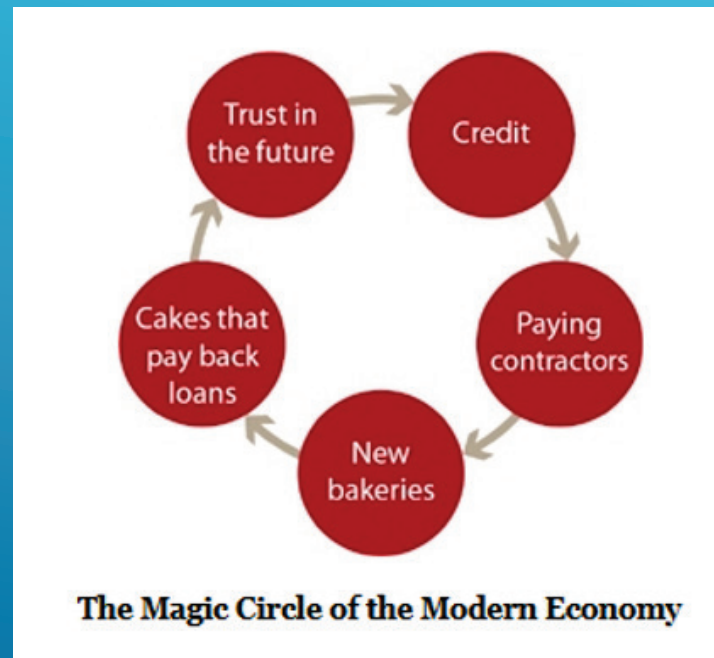
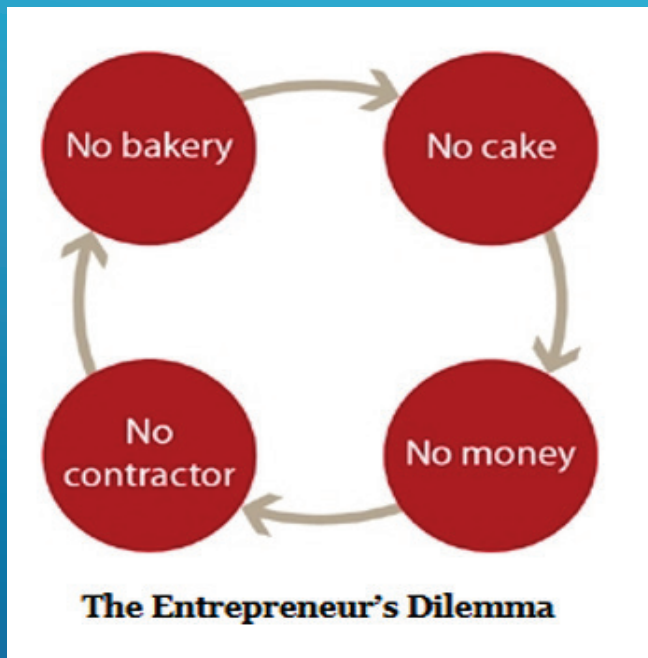
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**The Entrepreneur's Dilemma**

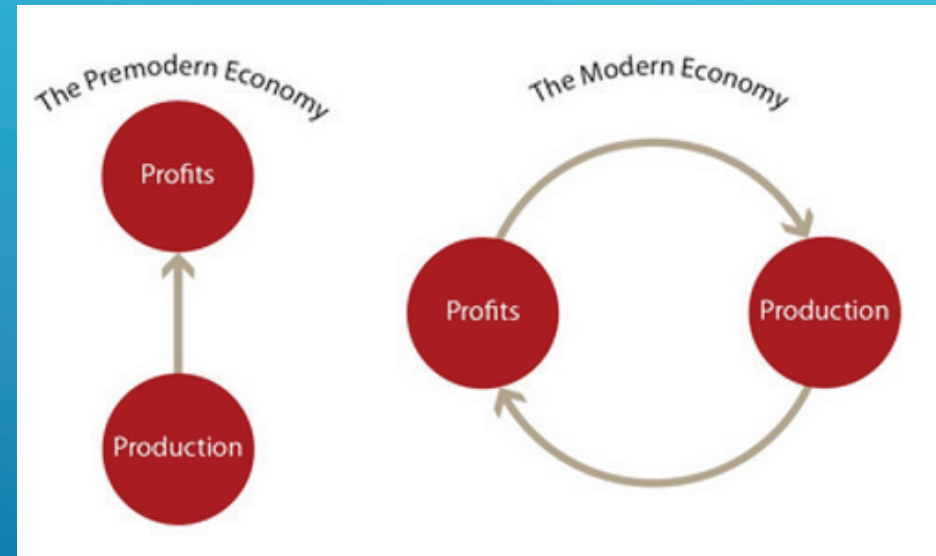
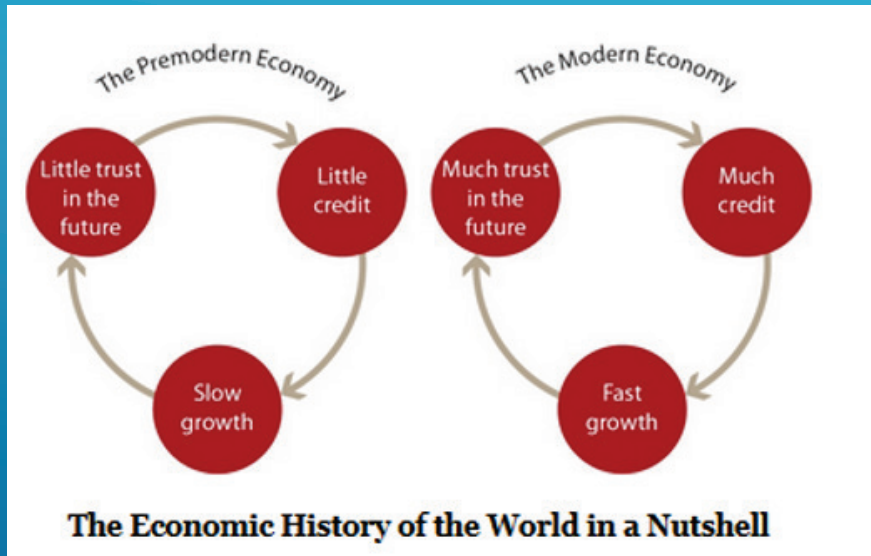
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# IS THIS A REASONABLE LINE OF THINKING?

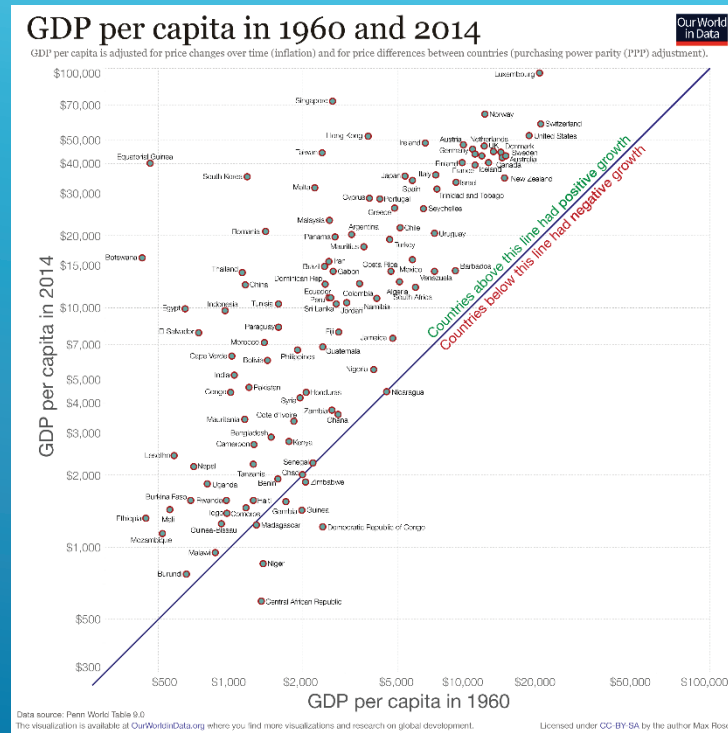
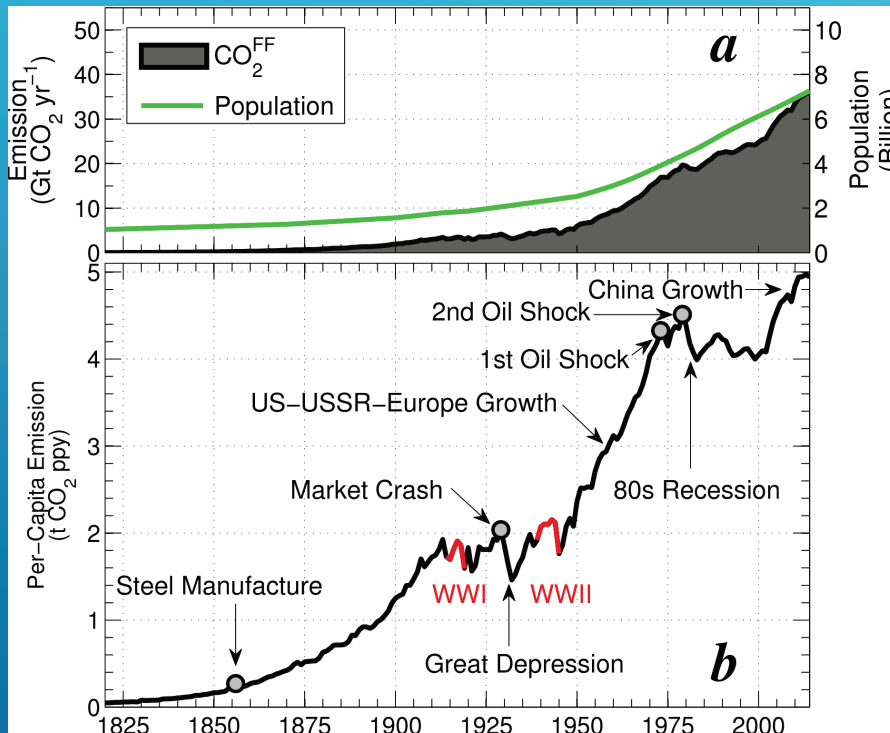




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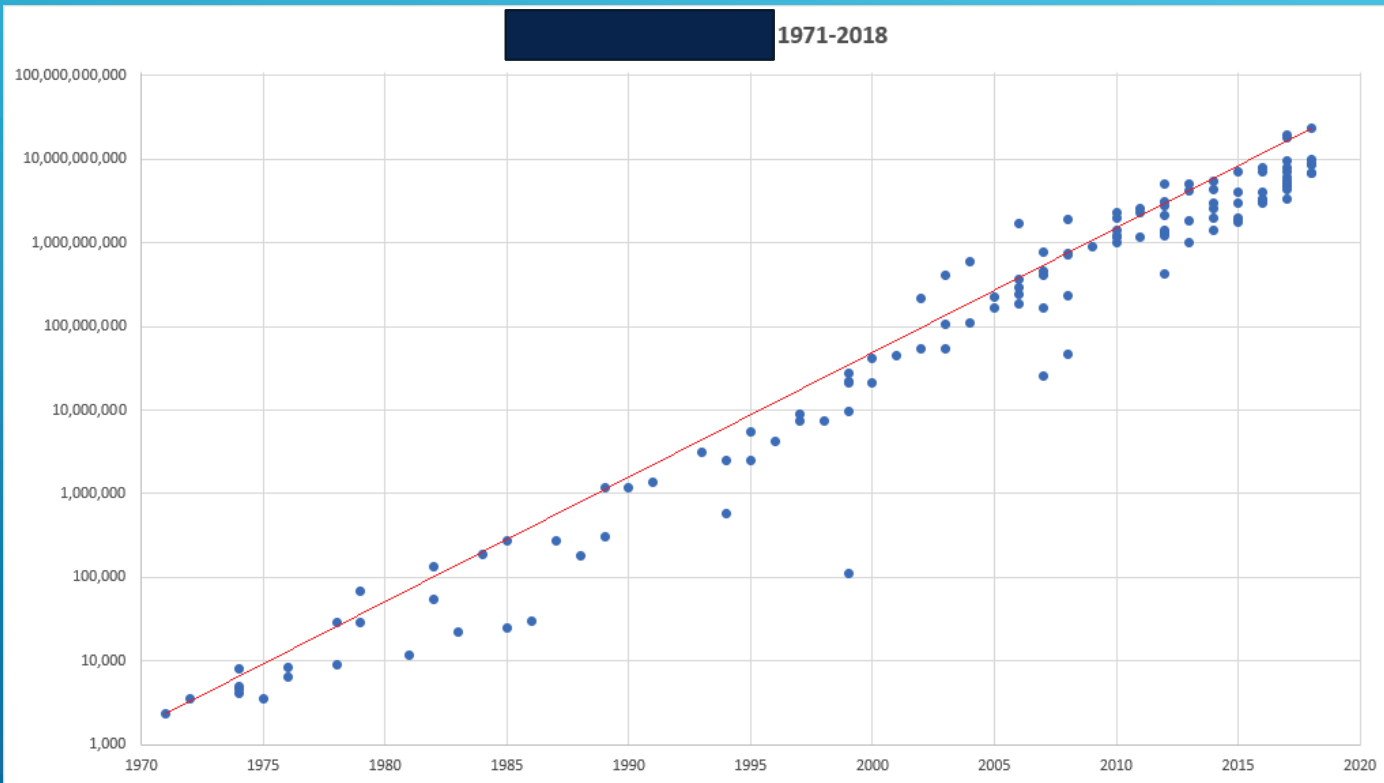


# SUSTAINABILITY OF GROWTH



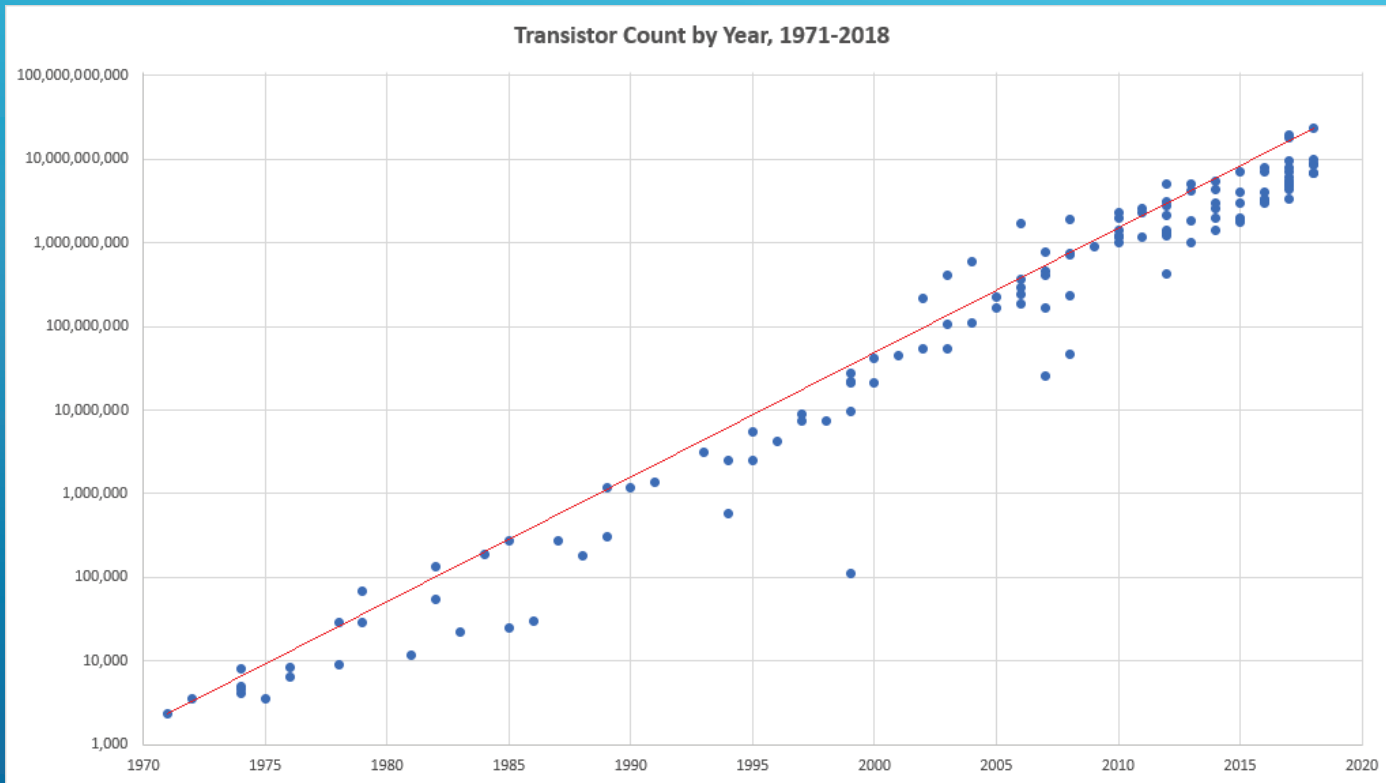
<https://ourworldindata.org/uploads/2013/05/Scatter-1960-vs-2014-GDP.png>

# SCIENTIFIC ADVANCEMENTS



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# MOORE'S LAW



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**(1827).**

© *National Maritime Museum, Greenwich, London.*



**40. The Battle of Navarino (1827).**

© *National Maritime Museum, Greenwich, London.*



# HOW DOES IMPERIALISM TIE INTO TRUST IN MARKETS?



<https://i.ytimg.com/vi/vReChHhgPGg/maxresdefault.jpg>

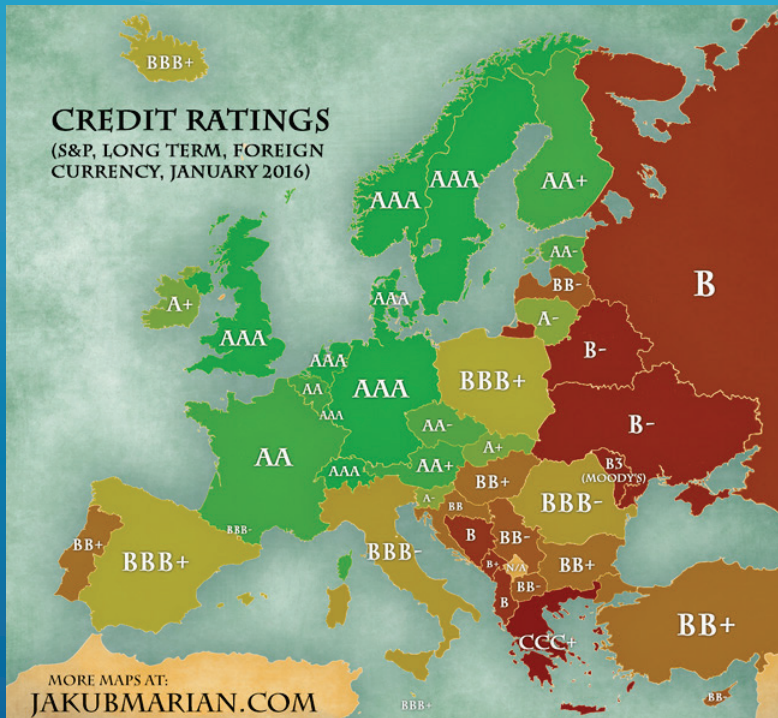
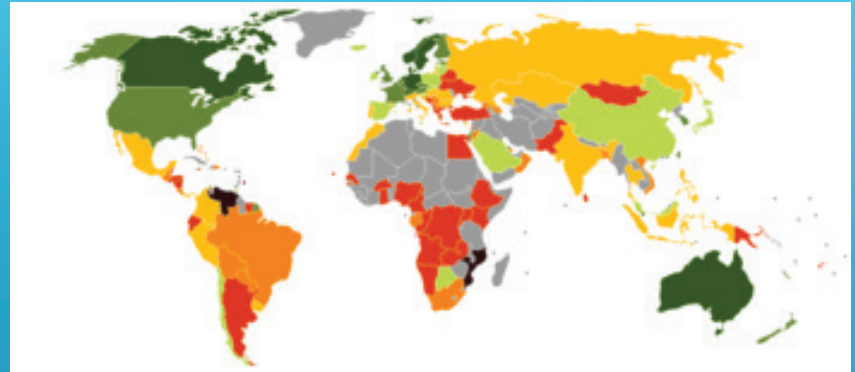
<https://cdn.britannica.com/81/130981-050-AA21E922/map-Belgian-Congo.jpg>

[https://www.facinghistory.org/sites/default/files/styles/265x150/public/3.1\\_imperial\\_pie.jpg?itok=-dfEujHA&timestamp=1405908688](https://www.facinghistory.org/sites/default/files/styles/265x150/public/3.1_imperial_pie.jpg?itok=-dfEujHA&timestamp=1405908688)

<https://lbb.in/pune/visit-a-sugarcane-farm-326583/>



# MODERN IMPLICATIONS



<https://jakubmarian.com/wp-content/uploads/2016/01/credit-rating-europe.jpg>

[https://upload.wikimedia.org/wikipedia/commons/thumb/0/00/Countries\\_by\\_Standard\\_Poor's\\_Foreign\\_Rating.png/350px-Countries\\_by\\_Standard\\_Poor's\\_Foreign\\_Rating.png](https://upload.wikimedia.org/wikipedia/commons/thumb/0/00/Countries_by_Standard_Poor's_Foreign_Rating.png/350px-Countries_by_Standard_Poor's_Foreign_Rating.png)



# WILL CAPITALISM BE ABLE TO SOLVE THE CLIMATE PROBLEM?

# HONR 229L: Climate Change: Science, Economics, and Governance

## Capitalism

Sam Robinson

**24 October 2019**

# HONR 229L: Climate Change: Science, Economics, and Governance

## Capitalism: Last Word

Ross Salawitch

## Page 7 of the Harari reading:

And your brother's travails are not over. The king of Spain desperately needs more money to pay his army. He's sure that your father has cash to spare. So he brings trumped-up treason charges against your brother. If he doesn't come up with 20,000 gold coins forthwith, he'll get cast into a dungeon and rot there until he dies.

Your father has had enough. He pays the ransom for his beloved son, but swears never to do business in Spain again. He closes his Madrid branch and relocates your brother to Rotterdam.

**Good that this types of action does not occur today, correct?**

The New York Times

## *Saudis Said to Use Coercion and Abuse to Seize Billions*

By Ben Hubbard, David D. Kirkpatrick, Kate Kelly and Mark Mazzetti

March 11, 2018



RIYADH, Saudi Arabia — Businessmen once considered giants of the Saudi economy now wear ankle bracelets that track their movements. Princes who led military forces and appeared in glossy magazines are monitored by guards they do not command. Families who flew on private jets cannot gain access to their bank accounts. Even wives and children have been forbidden to travel.

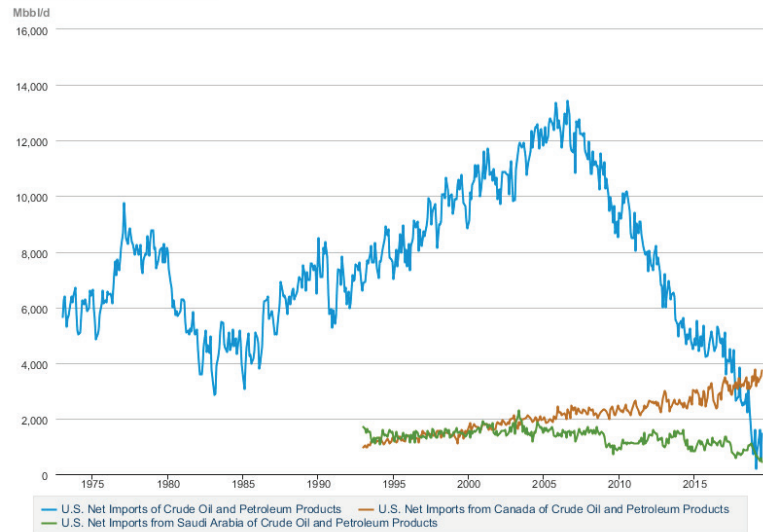
In November, the Saudi government locked up hundreds of influential businessmen — many of them members of the royal family — in the Riyadh Ritz-Carlton in what it called an anti-corruption campaign.

To leave the Ritz, many of the detainees not only surrendered huge sums of money, but also signed over to the government control of precious real estate and shares of their companies — all outside any clear legal process.

<https://www.nytimes.com/2018/03/11/world/middleeast/saudi-arabia-corruption-mohammed-bin-salman.html>

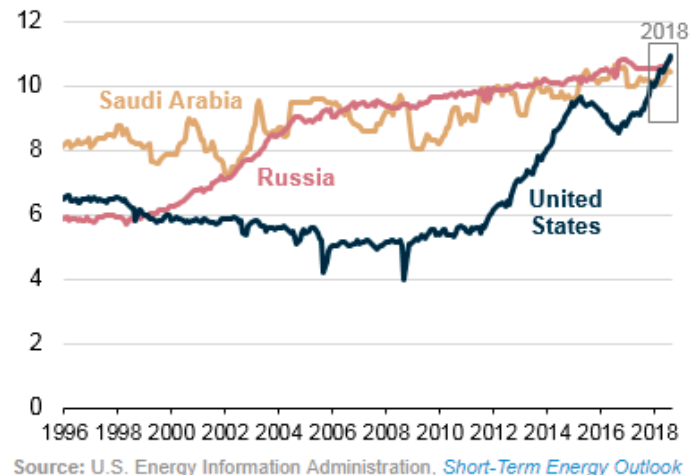
# HONR 229L: Climate Change: Science, Economics, and Governance

U.S. Net Imports by Country



[https://www.eia.gov/dnav/pet/pet\\_move\\_net\\_i\\_a\\_EP00\\_IMN\\_mbb/ldpd\\_m.htm](https://www.eia.gov/dnav/pet/pet_move_net_i_a_EP00_IMN_mbb/ldpd_m.htm)

Monthly crude oil production (Jan 1994-Aug 2018)  
million barrels per day



<https://www.eia.gov/todayinenergy/detail.php?id=37053>

## Top 15 crude oil exporting nations, **2017**:

1. Saudi Arabia: \$133.6 billion (15.9% of total crude oil exports)
2. Russia: \$93.3 billion (11.1%)
3. Iraq: \$61.5 billion (7.3%)
4. Canada: \$54 billion (6.4%)
5. United Arab Emirates: \$49.3 billion (5.9%)
6. Iran: \$40.1 billion (4.8%)
7. Kuwait: \$38.2 billion (4.5%)
8. Nigeria: \$33 billion (3.9%)
9. Angola: \$30.5 billion (3.6%)
10. Kazakhstan: \$26.6 billion (3.2%)
11. Norway: \$25.9 billion (3.1%)
12. Venezuela: \$23.1 billion (2.7%)
- 13. United States: \$21.8 billion (2.6%)**
14. Mexico: \$19.9 billion (2.4%)
15. United Kingdom: \$19 billion (2.3%)

These nations account for 80% of global total

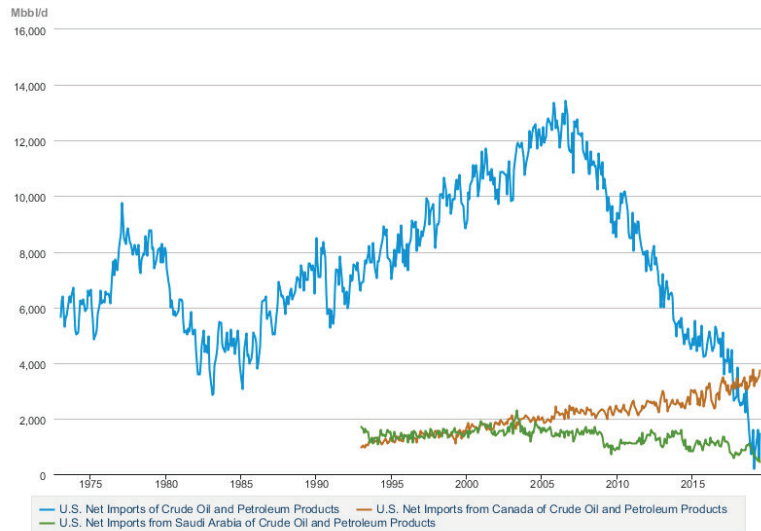
In 2017, crude oil was the world's number two export product, outpaced only by cars. This is due in part to oil prices continuing to be relatively low and a strong international market for automobiles.

Middle Eastern countries accounted for 42.4% of globally exported crude oil. At the continent level, almost half comes from countries in Asia (49.4%). Europe supplies 18% of the overall total, followed by Africa at 13.4%, and North America at 11.4%.

<http://www.worldstopexports.com/worlds-top-oil-exports-country/>

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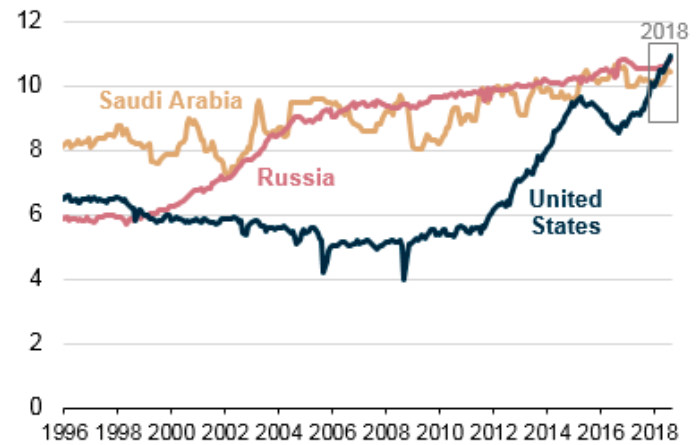
U.S. Net Imports by Country



Source: U.S. Energy Information Administration

[https://www.eia.gov/dnav/pet/pet\\_move\\_net\\_i\\_a\\_EP00\\_IMN\\_mbbldpd\\_m.htm](https://www.eia.gov/dnav/pet/pet_move_net_i_a_EP00_IMN_mbbldpd_m.htm)

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million barrels per day



Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*

<https://www.eia.gov/todayinenergy/detail.php?id=37053>

## Top 15 crude oil exporting nations, **2018**:

1. Saudi Arabia: \$182.5 billion (16.1% of total crude oil exports)
2. Russia: \$129 billion (11.4%)
3. Iraq: \$91.7 billion (8.1%)
4. Canada: \$66.9 billion (5.9%)
5. United Arab Emirates: \$58.4 billion (5.2%)
6. Kuwait: \$51.7 billion (4.6%)
7. Iran: \$50.8 billion (4.5%)
8. **United States: \$48.3 billion (4.3%)**
9. Nigeria: \$43.6 billion (3.8%)
10. Kazakhstan: \$37.8 billion (3.3%)
11. Angola: \$36.5 billion (3.2%)
12. Norway: \$33.3 billion (3.1%)
13. Libya: \$26.7 billion (2.4%)
14. Mexico: \$26.5 billion (2.3%)
15. Venezuela: \$26.4 billion (2.3%)

These nations account for 80% of global total

In 2018, crude oil became the world's number one export product, outpacing even cars.

Middle Eastern countries accounted for 42.9% of globally exported crude oil. At the continent level, almost half comes from countries in Asia (49.5%). Europe supplies 16.9% of the overall total, followed by Africa at 13.7%, and North America at 12.5%.

<http://www.worldstopexports.com/worlds-top-oil-exports-country/>

# HONR 229L: Climate Change: Science, Economics, and Governance

## Exxon is lobbying for a carbon tax. There is, obviously, a catch.

The oil giant wants

By Umair Irfan | Oct 18, 2018, 8:10am EDT

ExxonMobil, the largest investor-owned oil company in the world, announced last week that it will spend **\$1 million** over two years to lobby for a US **carbon tax**.

The announcement came just after the **Intergovernmental Panel on Climate Change** reported that the world may have as little as 12 years to act to limit global warming to 1.5 degrees Celsius, and Exxon's news got somewhat buried.

But it's a significant move from a company with a decades-long history of **studying climate change**, misleading the public about it, and funding organizations that **deny climate change** even exists.

Exxon's proposal is the model outlined by the **Climate Leadership Council**, led by former Republican Secretaries of State James A. Baker III and George P. Shultz. The price would start at \$40 per ton of carbon dioxide emissions and then rise. The money would then be sent back to citizens in the form of rebates, starting at \$2,000 per year for a family of four.

### **Pricing carbon dioxide at \$40 per ton is nowhere near enough to fight climate change**

Researchers calculated last month that the environmental damages of greenhouse gas emissions for the United States, the country's **social cost of carbon**, is about \$48 per ton. The global median social cost of carbon is \$417 per ton. A meaningful carbon tax has to be **high enough** to compensate for this harm as well as drive further reductions in greenhouse gases if the goal is to actually curb warming.



# HONR 229L: Climate Change: Science, Economics, and Governance

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The oil giant wants immunity from lawsuits that would make it pay for the damages of climate change.

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<https://www.vox.com/2018/10/18/17983866/climate-change-exxon-carbon-tax-lawsuit>

## *Fossil Fuels on Trial: New York's Lawsuit Against Exxon Begins*



By John Schwartz

Oct. 22, 2019



After four years of legal sparring and finger-pointing, oil-industry giant Exxon Mobil went to court on Tuesday to face charges that the company lied to shareholders and to the public about the costs and consequences of climate change.

The case turns on the claim that Exxon kept a secret set of financial books that seriously underestimated the costs of potential climate change regulation while claiming publicly that it was taking such factors into account. It follows a sprawling investigation that included millions of pages of documents and allegations of [a chief executive's secret email account](#).

In his opening statement, Kevin Wallace, a lawyer with the New York Attorney General's office, argued that "the gap between what Exxon said it was doing and was actually doing was significant, and had an impact on the bottom line."

While "we are not telling Exxon how to run its business," Mr. Wallace said in closing, the company, he said, "has to be honest with investors."



Protesters gathered outside Manhattan Supreme Court before a lawsuit against Exxon Mobil began on Tuesday.  
Jefferson Siegel for The New York Times

<https://www.nytimes.com/2019/10/22/climate/new-york-lawsuit-exxon.html>

ENERGY

## Renewable capacity additions exceed new coal in India

Drastic reduction in new coal power station capacity construction in India

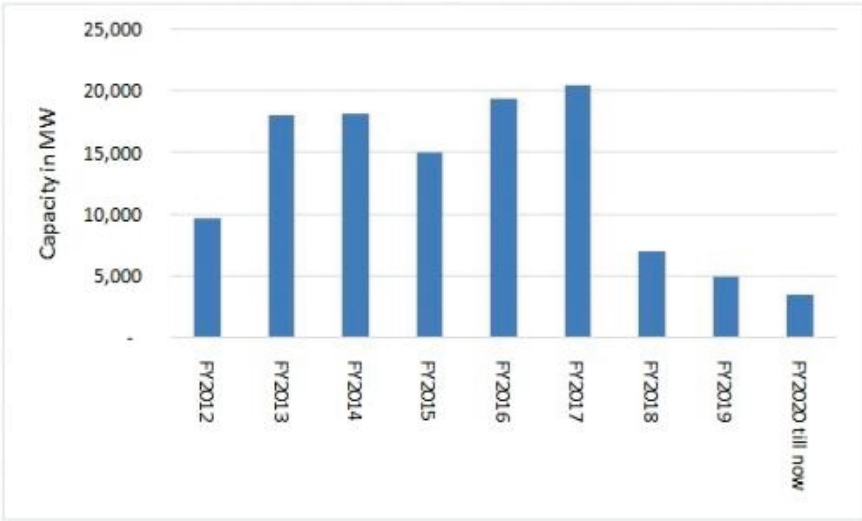


NEXT BLOG >

By Soundaram Ramanathan  
Last Updated: Friday 18 October 2019

Coal power station capacity addition is seeing a declining trend in India. Between financial years 2012 and 2016, 10-20 gigawatt (GW) new coal-power station capacity was added every year to the grid. But, in the last three years, this dropped to 5 GW and is further declining.

**New coal power addition declines in India**



<https://www.downtoearth.org.in/blog/energy/renewable-capacity-additions-exceed-new-coal-in-india-67269>

ENERGY

## Renewable capacity additions exceed new coal in India

Drastic reduction in new coal power station capacity construction in India

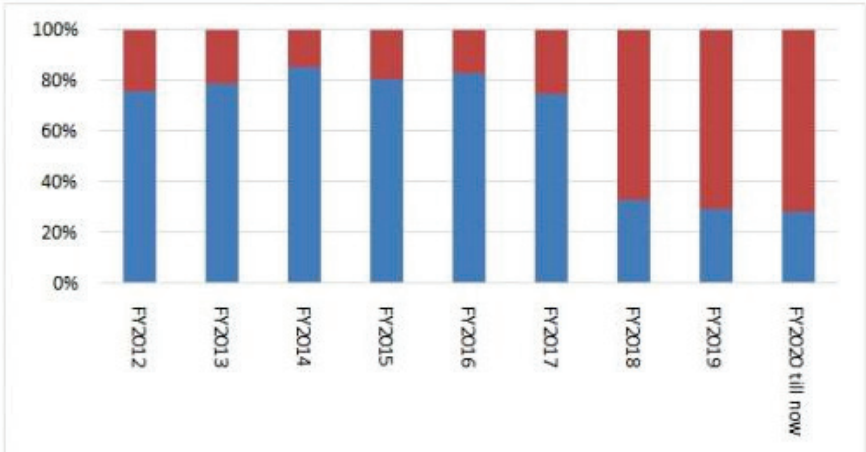


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Many other companies are shifting their ambitions away from installing new coal power stations with falling renewable energy costs. These companies include including Tata Power, Chhattisgarh State Power Generation Company, Punjab State Power Generation Company, and Bihar State Power Generation Company.

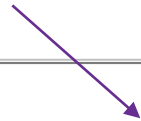
Share of new renewable power capacity rises



<https://www.downtoearth.org.in/blog/energy/renewable-capacity-additions-exceed-new-coal-in-india-67269>

# Readings for Next Week: Web-based Learning Modules from Tufts University

Have assigned less fewer pages than entire PDF file



|       |                                   |  |                       |  |                        |   |
|-------|-----------------------------------|--|-----------------------|--|------------------------|---|
| 10/29 | The Economics of Renewable Energy | <a href="#">Tufts GDAE Doc 1</a><br>(pages 17 to 42)   | <a href="#">AT 17</a> | Nyah S.<br><a href="#">Template</a><br><a href="#">PPT with figs</a>   | Discussion 17<br>Video | <a href="#">Short Rotat. Woody Crops A</a><br><a href="#">Short Rotat. Woody Crops B</a><br><a href="#">Northfield Energy Storage</a>   |
| 10/31 | The Economics of Climate Change   | <a href="#">Tufts GDAE Doc 2</a><br>( <b>assigned</b> : pages 15 to 45)<br>(optional: pages 1 to 14) | <a href="#">AT 18</a> | Amanda O.<br><a href="#">Template</a><br><a href="#">PPT with figs</a> | Discussion 18<br>Video | <a href="#">Stern Review 4 pg summary</a><br><a href="#">Stern Review 27 pg summary</a><br><a href="#">Nat'I Geo</a><br><a href="#">RGGI</a><br><a href="#">Pacala and Socolow, 2004</a><br><a href="#">US EPA Social Cost Carbon</a> |

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