

Energy is Power

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Abstract

Power is defined as the physical strength and force exerted by something or someone that provides the effective capacity or ability to direct, influence, or control the behavior of others or the course of events. Who has power? This article purports that politics, economic, military, technology, cultural, environmental, and resource power comes from oil, gas, coal, atom, wind, solar, water, and garbage. Those who have these items in quantity and use them to generate power domestically reduces the power of other countries and adds to their economy and the export of these commodities is a boost to our balance of trade.

Introduction

The United States is a great power. However, when you get to the bottom of the term power this article purports that power is based on the control and use of oil, gas, coal, and atom.

Today the Ukraine is being invaded by Russia and a boycott of oil being purchased from said country is an effective tool for blunting Russian “power.” But it is also hurting the European countries that have imposed the boycott. Domestic green policy in the United States has blunted power project and shifted power to countries such as Venezuela, Iran, and other Middle Eastern countries.

The world runs on oil, gas, and coal. While it is true 20% of the energy used in the world is “renewable/non-carbon” it is primarily to generate electricity. The other 80% use fossil fuel for power and even the 20% who are using the renewable sources of energy such Wind, solar, water and biomass s use oil, gas, and coal ingredients for products produced in their countries.

Domestic energy policy of the present administration is ineffective on US economic development, quality of life, and the projection of foreign policy. Declining GDP growth, reliance on outside energy sources, gasoline prices at \$5.00 a gallon are just a few signs of the understanding of the power of oil, gas, and coal domestically. The negotiations to spend US dollars in rogue states such as Iran, Venezuela is not good foreign policy. Also, if the US wants to curtail Russian influence why are we not supplying oil, gas, coal, to our allies. The production domestically reduces the power of other countries and adds to our economy and the export of these commodities is a boost to our balance of trade.

Power Defined

For this article power is defined as the physical strength and force exerted by something or someone that provides the effective capacity or ability to direct, influence, or control the behavior of others or the course of events (1, 2, 3).

This power can be exerted in any of one, multiple or all areas of politics, economic, military, technology, cultural, environmental, and resources (4).

This article purposes that “power” such as oil, gas, coal, atom, wind, solar, water, garbage are the projectors of “power.”

Nuclear Power

Let’s discuss nuclear power first to get it out the elephant in the room out of the way in the discussion that follows.

The top 15 countries for nuclear power account for 91% of global nuclear power production. The top five are the in order are the Us, China, France, Russia, and South Korea according to 2020 rankings (5). The use of the nuclear power is to generate electricity where 441 nuclear reactors generate approximately 10% of global electricity (6). In the world that is looking for renewable energy you would think nuclear would be at the top of the list due to the half life of nuclear material. However, domestic use is limited or curtailed because of the nuclear energy accident listed below which have been devastating in terms of human and economic cost.

Three Mile Island Pennsylvania, USA 1979 (INES Level 5)
Windscale Fire Nuclear Sellafield, UK 1957 (INES Level 5)
Kyshtym Nuclear Disaster Russia 1957 (INES Level 6)
Fukushima Nuclear Disaster Japan 2011 (INES Level 7)
Chernobyl Nuclear Disaster Ukraine 1986 (INES Level 7) (7 ,8).

An extensive list of accidents can be found #9. While the accidents have played a major role is the lack of development of nuclear power the residual fuel rods storage has also become an issue.

However, nuclear energy has been used as a weapon. The “nuke” is a deterrent and a threat. When it comes to power the “nuke” as a weapon rules supreme.

Renewable Supply (17)

Let’s look at the sources of natural power. First up are renewable power sources. Globally: About 11.2 percent of the energy consumed globally for heating, power, and transportation came from modern renewables in 2019 (i.e., biomass, geothermal, solar, hydro, wind, and biofuels with 29% global electricity lead by wind and solar power. (20, 21).

Excellent charts showing how much of our electricity comes from renewables can be found at #34.

Canada is the leader in the use of renewable power sources with its large landmass and diversified geography, has substantial renewable resources that can be used to produce energy; these resources include moving water, wind, biomass, solar, geothermal, and ocean energy. Canada is a world leader in the production and use of energy from renewable resources. Renewable energy sources currently provide about 18.9 per cent of Canada’s total primary energy supply (22).

U.S. utility-scale electricity generation by fossil fuel and renewables by source, amount, and share of total in 2021 with preliminary data as of February 2022 can be found at #23.

Speaking of power. Who has it in renewable energy? China is the major exporter of wind turbine nacelles during 2011–20. Both China-headquartered and Western original equipment manufacturers (OEMs) increased nacelle exports from China (David, 2021, March). China commissioned 98% of the newly installed capacity from wind turbine manufacturers. This increased demand has allowed domestic wind turbine manufacturers to fully utilize their capacity and has achieved great footage in the world rankings (David, 2021; 32).

Can you guess the leader in manufacturing of solar panels? China. Of the world's top 10 solar panel manufacturers, seven are based in China, while only First Solar is based in the United States. The two remaining manufacturers on the list are from South Korea and Canada, though the latter is often considered Chinese as well (Kuchta, 2021).

OIL

As mentioned in the beginning of the article oil boycott is being used as an economic power. Let's take a look at oil and who has the power. Chart 1 has the Top 10 Countries with the Largest Oil Reserves (in thousand million barrels):

Rank	Country	Reserves	% of <u>World</u> Total
1	<u>Venezuela*</u>	303.8	17.5%
2	<u>Saudi Arabia</u>	297.5	17.2%
3	<u>Canada</u>	168.1	9.7%
4	<u>Iran</u>	157.8	9.1%
5	<u>Iraq</u>	145.0	8.4%
6	<u>Russia</u>	107.8	6.2%
7	<u>Kuwait</u>	101.5	5.9%
8	<u>United Arab Emirates</u>	97.8	5.6%
9	United States	68.8	4.0%
10	<u>Libya</u>	48.4	2.8%

Chart 1: Largest oil reserves (13)

Chart 1 is representative of the top 10. It provides the top 10 but other charts have the 5-10 in various positions. It should be noted that *Venezuela has the most oil reserves in the world, most of its oil is offshore or far underground and is considered to be dense. However, the United States now holds the world's largest recoverable oil reserve base—more than Saudi Arabia or Russia—thanks to the development of unconventional resource plays.

Ranking nations by the most likely estimate for existing fields, discoveries, and as-of-yet undiscovered fields (proved, probable, possible and undiscovered), the United States is at the top of the list with 264 billion barrels of recoverable oil reserves, followed by Russia with 256 billion, Saudi Arabia with 212 billion, Canada with 167 billion, Iran with 143 billion, and Brazil with 120 billion (13).

Natural Gas

Another source of power is natural gas. The top natural gas reserves by country are shown in chart 2.

#	Country	World Share
1	Russia	24.3%
2	Iran	17.3%
3	Qatar	12.5%
4	United States	5.3%

Chart 2: Natural gas reserves (14, 16)

Chart 3 shows Top 10 Countries that Produce the Most Natural Gas (Cubic Meters, 2020):

1. United States — 914.6 billion
2. Russia — 638.5 billion
3. Iran — 250.8 billion
4. China — 194 billion
5. Qatar — 171.3 billion
6. Canada — 165.2 billion
7. Australia — 142.5 billion
8. Saudi Arabia — 112.1 billion
9. Norway — 111.5 billion
10. Algeria — 81.5 billion

Chart 3: Produce the most natural gas (16)

A handful of countries dominate the world's largest reserves of natural gas, a key ingredient in the global energy mix used mainly for heat and electricity generation. Natural gas is a key fuel in the global energy mix – meaning those countries that hold large reserves have an opportunity to generate national revenues from exports, while boosting their own energy security.

In the context of the low-carbon energy transition, natural gas is often discussed as a “transitional fuel” that can bridge the gap between more carbon-intensive fossil fuels – coal and oil – and renewable technologies that are gathering momentum but not yet deployed at a scale that can meet overall energy demand (15).

COAL

The last of the fossil fuels is coal. The top five countries with the largest proven coal reserves are shown in chart 4.

1. United States – 249 billion tonnes
2. Russia – 162 billion tonnes
3. Australia – 149 billion tonnes
4. China – 142 billion tonnes
5. India – 106 billion tonnes

Chart 4: Proven coal reserves (18, 19)

To put the numbers into perspective, the world has about 139 years of coal left at current consumption levels and excluding unproven reserves (19).

Military Power

We have looked at power in the realm of fuel. Let's look at power as a tool.

Chart 5 shows the ranked 9 strongest militaries considering: weapon numbers, weapon diversity, manpower, financial stability, natural resources, and available industries.

Chart 5: Strongest militaries

- United States
 - Russia
 - China
 - India
 - Japan
 - South Korea
 - France
 - UK
 - Pakistan (24)
- **1. United States**
 - **2. Russia**
 - **3. China**
 - **4. India**
 - **5. Japan**
 - **6. South Korea**
 - **7. France**
 - **8. The United Kingdom**
 - **9. Pakistan (25)**

A list of the 20 Most Powerful Military Forces in the World can be found at #26.

Most Powerful and Influential countries

Who are the most powerful countries in the world when viewed through politics, economic, military, technology, cultural, environmental, and resources? Chart 6 ranks the most powerful.

United States
China
Russia
Germany
United Kingdom
Japan
France
South Korea
Saudi Arabia
United Arab Emirates

Chart 6: Most Powerful (29, 30)

When we look at the most powerful from a different source and see how they place in n the list of the world's most influential countries (Chart 7, 2021) there is not much change in the first seven.

Rank	Country	Region	Score
1	United States	North America	98.53
2	China	Asia & Pacific	98.39
3	Russia	Europe	98.28
4	Germany	Europe	95.71
5	France	Europe	95.26
6	United Kingdom	Europe	94.87
7	Japan	Asia & Pacific	89.67
8	India	Asia & Pacific	89.11
9	Italy	Europe	86.6
10	Israel	Europe	86.38
11	Canada	North America	86.02
12	Saudi Arabia	Middle east	85.08
13	Spain	Europe	78.72
14	South Korea	Asia & Pacific	78.49
15	United Arab Emirates	Middle east	77.95
16	Switzerland	Europe	77.94
17	Australia	Asia & Pacific	77.75
18	Netherlands	Europe	73.16
19	Brazil	South/Latin America	73.08
20	Sweden	Europe	73.05
21	Egypt	Middle east	72.95
22	Austria	Europe	72.74
23	Norway	Europe	72.57
24	Greece	Europe	72.33
25	Mexico	South/Latin America	72.03

Chart 7: Most Influential Countries (31)

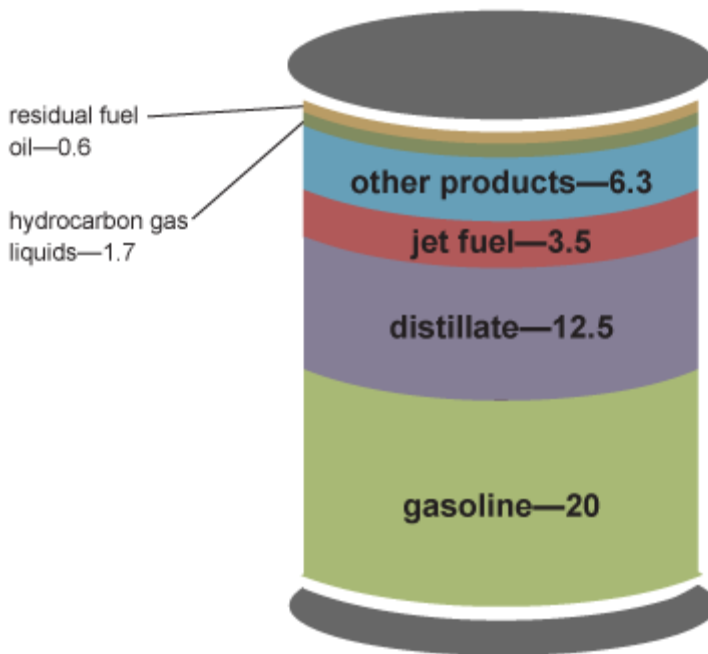
The Russia economy is based on a large part on natural resources. One of them is oil. The boycott of Russian oil has had a major impact on their economy. Why is the United States not producing oil for Europe? European dependency on Russian oil can be decreased or eliminated, US economy can be improved, and Russian projection of power may decrease. The author of this article sees one commonality in power rankings above ... the reliance on oil to project power.

Crude Oil Products

After crude oil is removed from the ground, it is sent to a refinery where different parts of the crude oil are separated into useable petroleum products. These petroleum products include gasoline, distillates such as diesel fuel and heating oil, jet fuel, petrochemical feedstocks, waxes, lubricating oils, and asphalt. Petroleum products can also be made from coal, natural gas, and biomass. Chart 8 shows products from a barrel of crude oil.

Petroleum products made from a barrel of crude oil, 2021

gallons



Source: U.S. Energy Information Administration, *Petroleum Supply Monthly*, March 2022, preliminary data

Note: A 42-gallon (U.S.) barrel of crude oil yields about 45 gallons of petroleum products because of refinery processing gain. The sum of the product amounts in the image may not equal 45 because of independent rounding.

Chart 8: Barrel of crude (28)

Although the major use of petroleum is for fuel, and petroleum and natural gas are often employed to generate electricity, there are many other uses as shown in figure 1.

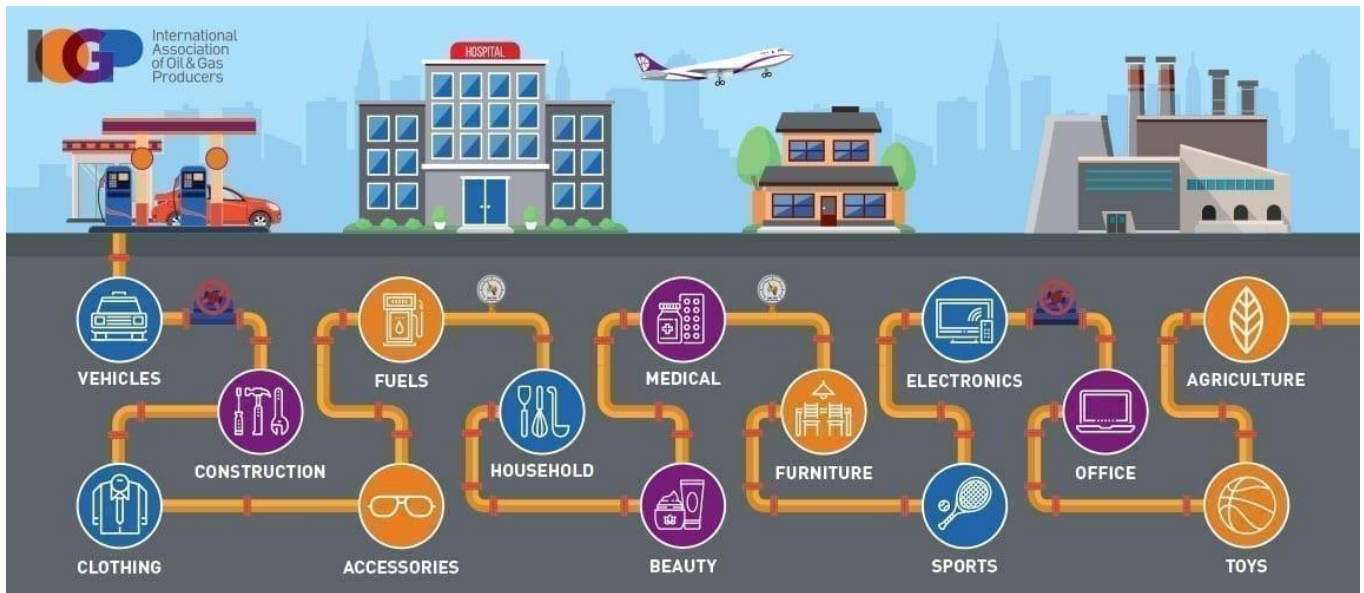


Figure 1: The many uses of oil and gas (27)

Vehicles

When thinking of oil, we immediately think of fuel to keep our cars running. However, oil is found in many car parts, including car seats, tires, and bumpers.

Construction

Oil and gas are essential for construction materials such as paint, caulking, roofing shingles, asphalt, and pipes. Moreover, using products derived from petroleum allows for a safer work environment for construction workers, providing them with hard hats, safety goggles, and other equipment. They also allow for more durable projects, with the use of protective coatings and waterproofing.

Clothing

The most commonly manufactured fibers are petroleum based, such as nylon, polyester, acrylic, and spandex. Fabrics and materials created from petroleum keep us dry and warm in cold weather and cool in hot weather.

Accessories

Many everyday accessories are derived from various plastics, such as handbags, sunglasses, phone cases, jewelry, and many others. All of these come from petroleum.

Fuels

Fuels are essential in our modern lives. They allow us to cook our foods, heat or cool our housing, and make high-speed land, sea, and air transportation possible.

Household

We might not realize it, but in our homes, we are surrounded by products containing oil and gas derivatives, including cooking tools, domestic appliances, and cleaning products.

Beauty

There are beauty products that are derived from petroleum, such as nail polish, perfumes, some make-up, and hair colorings. Some products which are used daily, such as soap, toothbrushes, and shampoo, are also made from oil.

Medical

Much of the medical equipment used today, many of which are life-saving devices, is made from oil. Not only are heart valves and artificial limbs made from petroleum, but also much of the cleaning and safety products medical personnel use. Aspirins and other pharmaceuticals also contain petroleum.

Furniture

Most of our furniture has some components derived from oil. This is true for any synthetic furniture, as well as furniture containing an oil finish.

Petroleum

Petroleum can be found in many types of sporting equipment: surfboards, basketballs, and skate wheels, to name but a few. Many times, the materials derived from oil and gas used in sporting equipment also contribute to the safety of the players.

Electronics

Most electronics, from TVs to computers and cell phones, contain plastics. In some cases, these plastics prevent any safety hazards. Electronics are now indispensable to our daily lives, and oil and gas play a central role in making this possible.

Office

Our office spaces are filled with oil-derived materials which help us in our everyday work and enable us to deliver the best products: all electronics, most furniture, and even printer ink all contain petroleum.

Toys

Many of the toys' children play with are made from oil-based plastics. Lego, dolls, frisbees, crayons and markers, and balloons are all made from or with plastic components, as do many other childhood items such as car seats or buggies.

Agriculture

For the agriculture industry to run smoothly, it uses various fertilizers, herbicides, and insecticides to protect the products from invasive plants or insects. Many of these products contain petroleum in some fashion.

Looking at only economics as power today the economy of the United States is presently suffering from inflation and a lack of many item that make the United States the United States and the number one country in the world. When you look at the product listed above and the domestic policies regarding fossil fuels do you see a disconnect?

Conclusion

Where would the most powerful and influential countries be if not for oil, gas, and coal? The United States domestic policy purporting the saving of the environment and planet is a lofty goal, but it does not compute on the world stage. The world still relies on oil, gas, and coal products and its usage through economic, military, and technology power projection. The United States curtailment of its production is only shooting itself in the foot on the world stage. Power is power!

There is power and then there is power.

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