



GLOBAL JOURNAL OF SCIENCE FRONTIER RESEARCH: H
ENVIRONMENT & EARTH SCIENCE

Volume 22 Issue 8 Version 1.0 Year 2022

Type: Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals

Online ISSN: 2249-4626 & Print ISSN: 0975-5896

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GJSFR-H Classification: FOR Code: 859899



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The Vanishing Curse: Crude Oil

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I. INTRODUCTION

Politicians, investors, lenders, and executives in oil, gas, coal, car-making, fossil fuel power plants, and oil exporting countries, have been standing in the way of sustainable energy. Using all the tactics previously mastered by the tobacco industry, they have been leading a fierce and effective crusade to discredit climate science and the 97 percent of actively-publishing climate scientists who attribute greenhouse gas emissions and global heating to human activity. [1] They have been lobbying politicians to delay, water down, and even repeal sensible environmental laws, while propagating an image of themselves as being green and committed to renewable energy.

The first US federal legislation involving air pollution was almost seven decades ago: The Air Pollution Control Act of 1955. "It provided funds for federal research in air pollution." It was followed by The Clean Air Act of 1963. This was the first federal legislation regarding air pollution *control*. "It established a federal program within the US Public Health Service and authorized research into techniques for monitoring and controlling air pollution." [2]

Alarm bells were sounded in 1965, when President Lyndon Johnson released for publication a 317-page report of the Environmental Pollution Panel of the President's Science Advisory Committee titled: "Restoring the Quality of Our Environment." [3] The Report warned that "large-scale fossil fuel burning is increasing CO₂ in the atmosphere well beyond normal levels. The result will likely be major changes to the earth's climate." [4]

In 1967, the Air Quality Act initiated enforcement proceedings "in areas subject to interstate air pollution transport." On December 2, 1970, the US Environmental

Protection Agency (EPA) was created. At approximately the same time, the enactment of the Clean Air Act of 1970 authorized "the development of comprehensive federal and state regulations to limit emissions from both stationary (industrial) sources and mobile sources." The 1970 Act was amended in 1977 and 1990. [5].

Exxon Mobil, the world's biggest oil company, knew of climate change long before it became a public issue. However, the company spent millions of dollars to promote climate denial. [6] In Europe, topping the list of firms obstructing climate action is British Petroleum, [7] Notwithstanding the green logo it designed in 2000 to propagate a positive environmental image of itself. [8] BP, Shell, ExxonMobil, Chevron, and Total spend US\$200 million a year lobbying to delay, control or block policies to address environmental damage. [9]

Mounting evidence of global heating, from melting glaciers to more intense heat waves, droughts, longer wildfire seasons, and bigger, stronger hurricanes are brushed aside as normal variations in weather pattern by climate change deniers among politicians and their benefactors in the banking, auto making, and fossil fuel industries. There are those who accept that global heating is real, but deny human responsibility, therefore efforts to forestall climate change will be futile. There are those who claim that global heating is beneficial because it will make parts of the earth more habitable, ignorant that many more parts would become uninhabitable and that annual losses due to, for example, heat-induced labour productivity alone may be estimated at over two trillion dollars, as will be discussed later.

Despite environmentalists' activism against the use of crude oil and the price-competitiveness of solar and wind electricity generation in recent years, global demand for oil between 1972 and 2021, increased by 84 percent, to 94 million barrels per day, [10] of which 42 million barrels per day were exported. In 1950, global oil demand was a mere 10 million bbl./day. [11] Significantly, the transport sector accounts for the lion's share of global oil consumption. In 2019, the International Energy Agency (IEA) estimated that the transport sector consumed 65.3 percent of global demand for crude oil, while other uses added up to 34.7 percent, as Table 1 shows: [12]

Table 1: Share of Crude Oil Final Consumption (2019)

Transport	%	Other	%
Road	49.2	Non-energy	16.7
Rail	0.8	Residential	5.3
Navigation	6.7	Industry	7.3
Aviation	8.6	Misc.	5.4
Total	65.3	Total	34.7

Source: IEA

Environmentalists' struggle over the past four decades suddenly benefited from a serious boost on February 24, 2022, from an unexpected quarter—Vladimir Putin's invasion of Ukraine. The war has finally awakened European public and politicians, and Germany in particular, to the national security risks of relying on Russia's oil and gas. It is disconcerting that protecting the environment had to wait for Russian realpolitik and Ukrainian blood to gain momentum. In Europe, Mr. Putin's war spurred a determined effort to transition from oil and gas to sustainable energy sources and from petrol cars to electric vehicles in order to protect European national security. In the United States, while Russian oil and gas are not needed, the shift to sustainable energy sources would weaken the Kremlin's spending on its war machine—36 percent of Russia's total budget for 2021 came from oil and gas. [13] President Biden's \$370 billion in clean energy investment serves US national security interest. It will hasten the day of making the internal combustion engine obsolete and help collapse the global demand for oil.

II. THE POLITICS OF HEGEMONY OVER GLOBAL OIL EXPORTS

Oil hegemony in a world addicted to crude oil means world hegemony. While the US might not need Saudi oil, [14] it may be argued that effective American control over the oil fields of the world's biggest oil exporter and swing producer, along with those of the five other Gulf Cooperation Council (GCC) members, has been important to US national security for two reasons. The first is to avert serious disruptions of oil shipments to US allies, like Japan, which could cripple global supply-chains and damage US industry and national security. The second reason is to enable Washington to control most of global oil exports and weaponize such control as a non-lethal weapon of mass destruction in the event of war against America's rivals, in particular, China.

The catastrophic consequences of the oil weapon on the national security of energy importing countries was made clear 40 years ago in a 24-page report prepared by the Central Intelligence Agency for former President Ronald Reagan titled "USSR-Western Europe: Implications of the Siberia-to-Europe Gas Pipeline." [15] It advised Mr. Reagan in 1981 of the

serious political and military risks involved in the construction of a giant gas pipeline from Russia to Germany. Describing the document, *The New York Times* wrote: "The language in the C.I.A. memo was unequivocal: The 3,500-mile gas pipeline from Siberia to Germany is a direct threat to the future of Western Europe, it said, creating 'serious repercussions' from a dangerous reliance on Russian fuel." [16] Former President Donald Trump, stressed during a visit to NATO Headquarters in Brussels on July 11, 2018, that a gas pipeline, supposedly the undersea Nord Stream 2 pipeline, from Russia to Germany has made Germany "totally controlled" by and "captive to Russia." [17]

Saudi and GCC oil fields are critical to the control of much of global oil exports and pricing. They contain around a third of the world's reserves and a quarter of annual oil production. [18] They are among the least costly to extract and relatively easy for US forces to protect. They are located on a rather small geographic area of some 800 miles along the Eastern Coast of the Arabian Peninsula. The size of the native population in the oil-rich areas is small, ruled by Sunni absolute emirs, kings, and sultans, troubled by a powerful neighbour like Shi'ite Iran and eager for US protection.

American interest in crude oil has protected Saudi and GCC rulers for decades despite their non-representative, non-participatory, and non-transparent governance. They stay in office for life until they die of natural causes, get assassinated, or are removed in a palace coup. The palace ulama (Islamic priests) teach that blind obedience to the Muslim ruler is obligatory: a form of piety, even if the ruler is corrupt and unjust. They invoke Qur'anic Verses and Prophetic Traditions to threaten hell's fire to those who might be tempted to disobey the king. It is far simpler for Washington to manage a few absolute leaders rather than deal with the scores of parliamentarians and political leaders of democratic settings. While the size of the families of the rulers of Bahrain, Kuwait, Oman, Qatar, and the seven emirates that make up the United Arab Emirates (UAE) are small, the Saudi ruling family is possibly the largest the world has ever known—more than 11,000 direct descendants of King Abdulaziz, the founder of the dynasty (2018 estimate). When the families of Abdulaziz's brother and the half-dozen half-brothers are added, the extended family might grow to 15,000, or more. [19] In such a huge family, only a small number of

trusted family elders counsel the king and run the important ministries, while the rest enjoy generous stipends and act as eyes and ears of the regime.

Moreover, to prevent the slightest whiff of democratic wind that might blow in the direction of the Arabian Peninsula, the US has tolerated the illegitimate, brutal, and corrupt military dictatorships in the Arab Levant, Egypt, and Yemen since the early 1950s. Like their royal counterparts, the presidents rule for life, until they die of natural causes, get assassinated, or are removed in a military putsch. Also, the army's ulama demand blind obedience to the president regardless of his bad deeds. In Cairo, Baghdad, and Damascus, the generals distinguish themselves, however, by conducting uncontested referendum theatrics, with near 100 percent farcical "yes" results.

Washington protected the al-Sauds after two major events during the past fifty years that injured the United States. The first was in October 1973, when Riyadh led the oil boycott by the Organization of Arab Petroleum Exporting Countries (OAPEC) of countries that supported Israel during the Arab-Israeli War, and as a result oil prices were quadrupled to \$11.65 a barrel the following January 1974. [20] The second event was September 11, 2001, when fifteen of the nineteen Wahhabi terrorists who flew passenger airplanes into buildings in New York City and Washington D.C. turned out to be Saudis, the G.W. Bush administration would not retaliate against the hotbed of Wahhabism. [21] Instead, it demolished much of Iraq in 2003, perhaps because Iraq's relatively small oil exports were less disruptive to global oil flows than Saudi Arabia's. Or, perhaps Iraq could have become a launching pad to overthrow the Ayatollah's regime in Tehran, impose a pax Americana on the Middle East, and break up OPEC. In the event, however, wittingly or unwittingly, by crippling Iraq, Mr. Bush handed Iraq to Iran, giving rise to the Shi'ite Crescent from Iran to Iraq, Syria, and Lebanon, and Yemen.

The empowerment of Iran has made Qom (the religious capital of the Supreme Ayatollah), act as if it were the Vatican of world's Shi'ites and the defender of their causes. Iran, a large; powerful country of 86 million people causes unease in Saudi Arabia, a smaller country of 33 million people, ten million of whom are expatriate workers, comprising 75 percent of the Saudi work force. [22] The empowerment of Iran opened the gates of hell between Islam's two intractable enemies: Persian-speaking Shi'ite Iran and Arab-Sunni Wahhabi Saudi Arabia. Shi'ites regard Sunnis as usurpers of the caliphate from Prophet Muhammad's cousin and son-in-law, Ali bin Abi Talib, after the death of the Prophet in 632, whereas Wahhabism regard the Shi'ites as heretics. [23] Indeed, Riyadh treats its own Shi'ite minority as second-class citizens. They live in the oil producing areas in the Eastern Province, across the Gulf from Iran. Their mistreatment goes beyond religious

discrimination due to a fear that Saudi Shi'ites are more loyal to Iran than the al-Sauds. Iran's newly found power exploded Saudi/Iranian proxy wars that have devastated Iraq, Syria, and Yemen and resulted in the sale of tons of American weapons to Saudi Arabia and the five other GCC states. Lebanon has practically become a colony of Iran, thanks to Hezbollah. It is likely that the Sunni/Shi'ite wars will burn for generations to come.

Over the decades, Washington has protected the al-Saud regime quietly and with discretion. Likewise, Saudi officials have kept to their non-transparency in government business. Former President Donald Trump, however, broke with diplomatic discretion. At a rally in Southaven, Mississippi on October 2, 2018, the former president disclosed that he told King Salman: "King — we're protecting you — you might not be there for two weeks without us." [24] Even South Carolina Republican Senator Lindsey Graham said in December 2018 that, Saudi Arabia's military "can't fight out of a paper bag" and, "if it weren't for the United States," he continued, "they'd be speaking Farsi in about a week in Saudi Arabia." [25]

III. GUARDING THE OIL FIELDS, SHIPPING LANES, AND ROYAL PALACES

The United States Stations some 40,000 troops around the Gulf region. They ensure the un-interrupted flow of some 17 million bbl./day (including oil exports from Iran and Iraq), through the choke-point of the Strait of Hormuz. They protect the oil fields and GCC rulers.

Bahrain is home to the US Fifth Fleet, hosting approximately 7,000 personnel. Its Khalifa bin Salman deep-water port can accommodate aircraft carriers. Out of Sheikh Isa Air Base, the US Air Force operates fighter and surveillance aircrafts. [26] In Kuwait, approximately 13,500 US forces are mainly at Camp Arifjan and Ali al-Salem Air Base. Only Germany, Japan, and South Korea host more US forces than Kuwait does. Since 2004, Kuwait has been designated as a Major Non-NATO ally. [27] In Saudi Arabia, until 2003, the US maintained a large air force presence at the Prince Sultan air base outside Riyadh. In a cosmetic move, it relocated to the nearby al-Udeid Air Base in Qatar. The move was intended to "purify" the land of the two holy mosques of Mecca and Medina from the military presence of "infidels" to calm bin Laden's followers. Currently, US troops in Saudi Arabia number around 2,700. [28] In Qatar, Al-Udeid Air Base is a few minutes flying time from Saudi Arabia's Eastern Province where all Saudi oil fields are located. With around 10,000 US troops and 120 aircrafts, al-Udeid is the largest US base in the Middle East. [29] It is indispensable to supporting US military operations throughout the region, and according to the State Department, Qatar has contributed since 2003, more than \$8 billion in developing al-Udeid. [30] The UAE hosts the Gulf Air Warfare Centre at Al Dhafra

Air Base, where approximately 3,500 US personnel are based. UAE ports also provide critical logistical support for the US Navy. [31]

Out of a global oil production in 2021 of 94 million bbl./day, 42 million bbl./day is exported (see the Introduction). Saudi Arabia's share is 18 percent. The share reaches around 30 percent when the oil exports from Kuwait, Oman, Qatar, and UAE are added. [32] In the event of a war between the US and its oil importing rival(s), especially China, the rich oilfields of Southwest Iran and Southern Iraq could come under the control of the American armada, raising the proportion of global oil exports under American control to around 50 percent. [33] In such an event, the US is also in a position to control another eight million bbl./day from Canada, Columbia, Mexico, Venezuela, Norway and the United Kingdom. [34] In all, the US may count on two thirds of global oil exports. The corner stone of its oil weapon, however, is the Middle East.

What will be the case when the sale of new petrol cars is banned? Since the transport sector burns some 65 percent of the global demand for oil (see Table 1), Russia would lose considerable oil income; Saudi Arabia and the other five GCC states would ultimately become impoverished, and the US would lose the oil weapon from its arsenal.

IV. MANIFESTING US PROTECTION OF SAUDI ARABIA

In addition to its military presence, US defence of Saudi Arabia is manifested in two ways. First, American weapons and technicians keep the hundreds of billions of dollars-worth of sophisticated US weapon systems sold to the Saudi Ministry of Defence and Aviation and the National Guard over the past half a century in good operational order. Weapon purchases may be described as a form of protection money. According to the Saudi Central Bank, between 1981 and 2017, Saudi defence and national security received the highest allocation of annual budgets: \$1.1 trillion out of \$3.36 trillion in total revenues from crude oil exports. [35] It may be guesstimated that spending on US weapons might have been in the region of 50% of the defence budget. The Obama administration, for example, sold Riyadh in a single deal in 2012, \$112 billion in weapons over eight years. It also had another \$110 billion package under negotiation before the Trump administration took office. [36] But, to Mr. Trump these billions were insufficient. He told a rally in Wisconsin on April 29, 2019, "We are losing our ass defending you, Saudi Arabia." [37]

Secondly, US protection of the al-Sauds is also aided by former senior Washington administration officials, captains of industry, media moguls, and professional lobbyists who act for the Saudi

government, ruling family members, and Saudi private sector in return for hefty fees. Politico reported that the Centre for International Policy "found that registered foreign agents working on behalf of Saudi interests contacted Congress, the White House, the press and think tank analysts more than 2,500 times in 2017." [38] The New York Times reported that six months after leaving the White House, Jared Kushner, Donald Trump's son-in-law and former senior adviser in the White House, secured a \$2 billion investment from the Saudi Public Investment Fund despite objections from the fund's technical advisers about the merits of the deal, such as, its excessive investment risk, high fees, and the inexperience of the Kushner management team. [39] The objections were overruled by the Fund's full board, led by Crown Prince Mohammad bin Salman (MBS). Also, former Treasury Secretary Steven Mnuchin was given an investment from the Saudi Fund, though not as large, or on terms as favourable, as Mr. Kushner's. [40]

Since 2004, Saudi Arabia has been designated by the US State Department as a "Country of Particular Concern" (CPC) under the International Religious Freedom Act of 1998 for having engaged in or tolerated particularly severe violations of religious freedom. On February 29, 2016, the Secretary of State re-designated Saudi Arabia as a CPC and announced a waiver of the sanctions that accompany this designation as required in the important national interest of the United States. [41]

As long as the demand for oil imports by China, Europe, India, Japan etc. is strong, the US will tolerate the al-Saud regime. As would be expected of a rich but militarily weak country surrounded by enemies, especially since Ayatollah Khomeini established the Islamic Republic of Iran in January 1979, Saudi Arabia became particularly accommodating in its dealings with Washington. Alongside the US, Riyadh actively supported the Iraq/Iran war (1980-1988). [42] During Iraq's occupation of Kuwait (1990-1991), Saudi Arabia hosted some 800,000 troops (more than 540,000 from the United States) to liberate Kuwait. [43] Also, during the USSR war in Afghanistan (1978-1992), Saudi and American support of the mujahideen defeated Moscow. [44]

With the history of US-Saudi cooperation, it is curious that the Saudi Crown Prince, Muhammad bin Salman (MBS), decided that OPEC should cut oil production by 2 million bbl./day, one month before the US mid-term congressional elections on November 8, 2022. [45] The act was described by White House officials as "hostile." [46] It was clearly intended to hurt Mr. Biden's Democratic candidates and help Mr. Trump's Republican candidates. Judging from MBS' past behaviour, it was his way to retaliate against Mr. Biden's release on February 26, 2021, of a report by American intelligence agencies dated February 11,

2021, that MBS approved the planned assassination of Jamal Khashoggi. [47] By contrast, Mr. Trump boasted that he saved Saudi Arabia's crown prince from Congress over the killing of the journalist. "I saved his ass" Mr. Trump told author Bob Woodward for his book "Rage." [48] Needless to say that the Crown Prince's behaviour will damage Saudi interests. Such conduct, however, is consistent with MBS' short sightedness, volatility, brutality, and recklessness ever since his father, King Salman, handed him high office in June 2017.

V. FORMER PRESIDENT TRUMP'S ASSAULT ON ENVIRONMENTAL REGULATIONS

We have seen in the Introduction that the United States government has led the way in environmental protection legislation: The Air Pollution Control Act of 1955; Clean Air Act of 1963; Air Quality Act of 1967; Clean Air Act of 1970 and its amendment in 1977 and 1990. And, in order to implement the various requirements included in these Acts, the National Environmental Policy Act established the Environmental Protection Agency in 1970. Notwithstanding American commitment, Mr. Trump, nonetheless, asserted on Twitter on November 6, 2012, four years before he became President of the United States, that: "The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive." [49]

In his first 100 days in office, Mr. Trump reversed 23 environmental rules. [50] The consequences of such actions are serious. For example, by revoking the rule that prevents coal mining companies from dumping debris into local streams (February 16, 2017) and ending the ban on a potentially harmful insecticide (March 29, 2017), he improved corporate profits and the stock values of the companies involved, while the burden of cleaning the polluted rivers and reclaiming the contaminated soil is shifted to future generations.

In the middle of 2017, the US Interior Secretary directed the Bureau of Land Management to ramp up sales of oil and gas leases on federal land in order to increase oil production on federal lands. [51] In a sign of what was to come, "Trump Digs Coal" placards became a common sight in Trump's rallies in America's coal states. On a visit to West Virginia on August 21, 2018, Mr. Trump declared: "We love clean beautiful, West Virginia coal ... That's indestructible stuff ... In times of war, in times of conflict, you can blow up those windmills, ... You can blow up those pipelines ... You can do a lot of things to those solar panels ... But you know what you can't hurt? Coal." [52] Speaking at a National Republican Congressional Committee dinner on April 2, 2019, Mr. Trump went as far as declaring that "wind farms cause cancer" [53] and in an interview on

October 15, 2018, with CBS's program *60 Minutes*, he accused climate change scientists of having a "political agenda." [54] He doubted whether humans were responsible for earth's rising temperatures, adding that temperatures "could very well go back," and that he does not want "to give trillions and trillions of dollars" and "lose millions and millions of jobs." [55]

On August 4, 2017, the Trump Administration notified its intent to withdraw from the 2015 Paris Climate Agreement [56] and the US became the only country in the world outside the landmark Paris Agreement. [57] Subsequently, at the UN Climate Change Conference in Katowice, Poland in December 2018, the United States joined Kuwait, Saudi Arabia, and Russia in objecting to the report by the Intergovernmental Panel on Climate Change on the impacts of a temperature rise of 1.5 centigrade. This unusual coalition and action by the United States was shocking to scientists and many delegates at the conference. [58]

VI. WHAT MIGHT BE LURKING BEHIND MR. TRUMP'S DENIAL OF CLIMATE CHANGE?

It might be Mr. Trump's wishful thinking to prolong the life of America's oil weapon against China, even though, Beijing is actively electrifying its transport fleet, which would stop the sale of new petrol cars and seriously reduce its oil imports in about two decades (see below: Which Country Will Lead the Drive Towards Electric Cars). It might be that the transition from fossil fuel to green economy will inevitably see setbacks, and Mr. Trump cannot tolerate setbacks. On the campaign trail, Mr. Trump often told his followers: "We're going to win so much, you're going to be so sick and tired of winning." [59] Further, it might be that the transition to green economy requires the writing off the value of expensive smoke-stack assets and making major investments in green replacements, which neither Mr. Trump nor his benefactors in the energy, auto, and banking industries would accept.

Just like the motor car and the light bulb, which replaced the horses and candles and kerosene lamps, so the internal combustion engine and coal-fired power plants will be superseded. Mr Trump's attitude toward global heating would keep the US stuck with old technologies and polluting industries. It would deny US industry the potential of trillions of dollars in export revenues and millions of well-paid jobs. Trumpian politics would "make US manufacturing non-competitive."

VII. TRANSITION FROM FOSSIL FUEL TO GREEN ENERGY

British Petroleum estimated in 2014 that "the Earth has enough oil left for about 53 more years at current production levels," but "significantly more than

53 years of oil remaining if drilling technologies can improve to the point that recovering the more difficult to reach oil becomes economically feasible.” [60] The electric vehicle (EV), however, has changed the arithmetic. It has made future availability of oil a function of demand, not supply or oil reserves. The rapidly growing green consciousness around the world will pressure politicians to accelerate the momentum towards zero greenhouse emissions. Combined with new green technologies, it will determine how much of the earth’s oil reserves will be left in the ground.

The green revolution will progress over two stages. The first would see the EV cutting global demand for crude oil between 2030 and 2040, possibly by up to two-thirds (see Table 1). The second stage would end the demand for natural gas and coal over a considerably longer duration of time, possibly a century, or maybe longer.

VIII. THE FIRST STAGE

National security concerns in China, Europe, India, and Japan, among others, will spur the

Table 2: Cost to Produce a Barrel of Oil or Gas Equivalent (\$/bbl. - 2016)

Iran	Saudi Arabia	Iraq	Russia	Indonesia	US (non-shale)	Nigeria	UK
9.1	10.00	10.6	19.2	19.7	21.00	29.00	44.3

Source: *knoema*

The impact would be particularly severe on Saudi Arabia. In its country report on Saudi Arabia, the IMF wrote: “Oil revenues averaged 75 percent of total budget revenues since 2010, with large variations, peaking at 93 percent in 2011 and falling to 53 percent in 2020 as the COVID-19 crises pushed global oil demand down.” [62]

Ultimately, the first stage will see Saudi oil exports diminishing to a trickle. When that happens, US protection will come to an end; Wahhabi indoctrination and proselytization will falter; terror groups will be weakened and democracy could finally be born in the countries of the Arab Levant and Egypt. The EV would have contributed to promoting democracy and fighting terror, possibly more than the bombing of terrorists’ hideouts.

Painting a different picture, Saudi Arabia’s Minister of Energy, said in October 2017, “Energy demand is expected to rise by about 45 percent by the year 2050... [renewables] will only account for about 10 percent of the primary energy demand... Petroleum, natural gas, and coal will continue to account for about 75 percent of the supply of energy by 2050. [63]

The International Energy Agency’s Electric Vehicles Report of September 2022 provide an optimistic account of the rapidly increasing momentum of the EV. [64] Compared with 2020, global electric car sales in 2021 nearly doubled, to 6.6 million, or about 9 percent of total car sales, bringing the total number of

electrification of their transport fleets and, within the next two decades, oil demand is expected to drop considerably. Ultimately, two-thirds of the current 42 million bbl./day in oil exports (see above: Guarding the Oil Fields) would disappear, leaving exports of 14 million bbl./day for non-energy uses, like industrial; pesticides; fertilizers; plastics; chemicals, etc. Clamouring for revenues out of a much smaller pie, the market price for oil would collapse. Countries with the lowest production costs will be in a position, theoretically, to drive higher cost producers out of the market. OPEC would be disabled. Wars among the oil exporters cannot be ruled out. Table 2 shows the overall costs in eight countries to produce a barrel of oil or gas equivalent (production + administrative/ transportation + capital spending + gross taxes). [61]

electric cars on the road to 16.5 million. The IEA estimates that in 2022, the global EV sales share will be around 13 percent. It also estimates that the numbers of EVs in 2030, would reach more than 300 million, accounting for 60 percent of new car sales. At the United Nations Conference of the Parties (COP26) in Glasgow, UK in late 2021, more than 100 stakeholders including governments, automakers, investors, financial institutions and fleet owners and operators committed to accelerate the transition to 100 percent zero-emission cars and vans globally by 2040, and by no later than 2035 in leading markets. [65]

In 2021 and 2022, major automakers announced plans to electrify their products: Toyota will have 3.5 million annual electric car sales by 2030; Volkswagen’s sales of all-electric vehicles by 2030, will exceed 70 percent in Europe and 50 percent in China and the US, and by 2040, nearly 100 percent will be zero emission vehicles. One third of Ford’s sales will be fully electric by 2026 and 50 percent by 2030, with all-electric sales in Europe by 2030; at BMW, 50 percent of vehicles sold will be fully electric by 2030 or earlier; Volvo will become a fully electric car company by 2030; at Mercedes, all newly launched vehicles will be fully electric from 2025. General Motors will have production capacity of 1 million units in North America of 30 EV models and battery electric vehicles (BEV) by 2025, plus carbon neutrality in 2040.

IX. WHICH COUNTRY WILL LEAD THE DRIVE TOWARDS ELECTRIC CARS?

The IEA Report noted that Chinese multinational holding company, Geely announced that 20 per cent of sales will be electric by 2025. Probably, China will lead the race towards electric cars. In 2021, EV sales were 3.3 million (tripling 2020 sales), representing 50 percent of global EV sales. Between January and October 2022, 4.63 million EVs were registered, with about 6 million units forecast by the China Passenger Car Association for the whole year. [66] The rapid growth in EV sales in China is driven by both consumer demand and policy

incentives: government investment in charging infrastructure, supply chain inducements, and parking and license plate privileges. [67]

Electrifying China's transportation sector will enhance China's national security by reducing the country's reliance on politically and militarily risky oil imports. It is notable that 1993 was the first year in which China's crude oil consumption exceeded its domestic production. [68] Table 3 shows that in 1993, a small volume of 90,000 bbl./day was imported. By 2016, however, what started as a trickle, has become a flood—7.89 million bbl./day.

Table 3: China's Crude oil Consumption and Production (1993 – 2016) –Thousands bbl./day

	1993	1995	2000	2005	2010	2014	2016
Consumption	2,993	3,394	4,689	6,970	9,339	11,637	12,792
Production	2,903	3,060	3,389	3,871	4,575	5,045	4,905
Imports	90	334	1,300	3,099	4,764	6,592	7,887

Source: *Worldometer*

In 2020, China imported a record 10.853 million bbl./day, or 25 percent of global crude oil exports (see above: *Guarding the Oilfield*). [69] In 2021, the volume dropped to 10.301 million bbl./day. [70] While Covid 19 could have contributed to the drop, tripling EV sales in China in 2021 certainly added to the drop in crude oil imports. In each of June and July 2022, 8.8 million bbl./day were imported, the least since July 2018, but increased to 9.5 million bbl./day in August. [71] For the first 11 months of 2022, imports stood at 10.06 million bbl./day. [72]

China's crude oil consumption in 2021 was 15.442 million bbl./day. [73] Assuming that it follows the IEA pattern in Table 1, (road transport 49.2 percent, rail 0.8 percent, navigation 6.7 percent; aviation 8.6 percent) and all internal combustion-engines are replaced by EVs, then China would be able to save 7.6 million bbl./day on road transport [74] and 2.48 million bbl./day on rail, navigation, and aviation [75] for a total saving of 10.08 million bbl./day, more or less equal to China's oil imports in 2021. It may be concluded from the data that China's oil imports are used to fuel the country's transport sector, and its domestic oil production is used to meet its non-transport needs. Said differently, for China to free itself from crude oil imports, it must abandon the internal combustion engine.

Europe is following China in shifting to electric vehicles with 2.3 million units sold in 2021, an increase from 1.4 million in 2020. During the first ten months of 2022, 1.9 million EVs were registered in Europe, about 21% of the total volume. [76] In Norway, electric cars were almost 80 percent of the cars sold in 2022. [77] The shift in Europe is expected to accelerate in reaction to Russia's war against Ukraine.

In the United States, electric car sales doubled their market share to 4.5 percent in 2021, reaching 630 000 units sold. On August 5, 2022, President Biden outlined an ambitious target of "50 percent EV sales share in 2030, to unleash the full economic benefits of his Build Back Better agenda and advance smart fuel efficiency and emission standards... Positioning America to drive the electric vehicle future forward, out compete China, and tackle the climate crisis." [78]

X. THE SECOND STAGE

The second stage would end the demand for natural gas and coal and will benefit the environment. However, it will take a long time. In 2021, fossil fuel provided 63.3 percent of the energy needed globally for electricity generation, with the remainder generated from renewable sources as Table 4 shows: [79]

Table 4: Electricity Generation Mix (% - 2021)

Oil	Gas	Coal	Solar	Wind	Nuclear	Hydro	Other renewables
3.1	23.5	36.7	2.7	5.3	10.4	15.8	2.5

Source: *Our World in Data*

De-commissioning coal and gas-fired electricity plants will be very slow. Power plants are typically depreciated over fifty years. Globally, there are more than 2,400 coal-fired power plants operating in 79

countries. [80] Since 2000, coal-fired capacity has doubled, thanks to explosive growth in China and India. In 2019, China produced almost one half of coal-generated electricity in the world. [81] In 2019, there

were 1,600 coal-fired power plants under construction. [82] In 2021, China's share of coal power stations under construction around the world was 52 percent. [83].

Science is leading a rapid transformational revolution towards cheap renewable sources of energy to replace fossil fuel in power plants. Solar Photovoltaics (PV) and onshore wind are now "the cheapest sources of new-build generation for at least two-thirds of the global population, according to BloombergNEF. Those two-thirds live in locations that comprise 71% of gross domestic product and 85% of energy generation."

And "battery storage is now the cheapest new-build technology for peaking purposes." [84] At MIT, it was announced in December 2022, that engineers have developed ultra light solar cells, much thinner than a human hair, that can be glued to a fixed surface to quickly turn it into a power source. MIT News described the new solar cells as being "one-hundredth the weight of conventional solar panels, generate 18 times more power-per-kilogram, and are made from semi-conducting inks using printing processes that can be scaled in the future to large-area manufacturing." [85].

Another notable development is Green Hydrogen. For hydrogen to be green it must be produced from renewable energy sources. In order to separate the hydrogen from the oxygen, an electric current is passed through water electrolyzers. The hydrogen gas is captured for use in a fuel cell to produce electricity to power vehicles, planes, ships, long-haul freight. [86] Standing in the way of large-scale green hydrogen developments is its high cost of production, storage, transport, and building an industrial supply chain. However, with declining costs for solar PV and wind generation, the IEA concluded: "Building electrolyzers at locations with excellent renewable resource conditions could become a low-cost supply option for hydrogen, even after taking into account the transmission and distribution costs of transporting hydrogen from (often remote) renewables locations to the end-users." [87]

Nuclear fusion promises limitless clean energy to end dependence on fossil fuels. Scientists studying fusion energy at Lawrence Livermore National Laboratory in California announced on December 13, 2022, that they had crossed a major milestone in reproducing the power of the sun in a laboratory when they bombarded a fuel pellet of the heavier forms of hydrogen (deuterium and tritium), resulting in a net energy gain. [88]

XI. RESISTANCE TO WRITING-OFF TRILLIONS OF DOLLARS

Standing in the way of renewable energy is the opposition of shareholders, bank lenders, and bond holders to writing-off trillions of dollars in the value of privately owned companies in oil, gas and coal mining,

oilfield services, pipelines, tankers, barges, ships, railroad cars, delivery trucks, gasoline stations, fossil fuel power plants, auto makers, and the myriad of equipment manufacturers to these and supporting industries. Governments would also object to writing-off the drop in the values of operational publicly owned assets of these same industries.

In the UK alone, reducing greenhouse gas emissions to net zero could cost an estimated £1 trillion, according to former Chancellor of the Exchequer, Philip Hammond. [89] In the United States, estimates vary wildly. Former President Trump claimed in a speech at a rally in El Paso, Texas on February 13, 2019, that the Green New Deal to transition to 100 percent green energy in the US, proposed by Representative Alexandria Ocasio-Cortez and Senator Edward Markey on February 7, 2019, could cost \$100 trillion. A syndicated columnist for *The Washington Post* estimated a low of \$46 trillion and a high of \$81 trillion. [90] To put the price of saving the environment in perspective, however, the cost of saving bankrupt banks in the US alone, in the aftermath of the 2008 financial meltdown, exceeded \$22 trillion. [91] And, while funding the bankrupt banks had to be done quickly, the cost of saving the environment will be spread over decades.

XII. THE GARGANTUAN COST OF INACTION

Global heating causes illnesses from polluted air and oceans, higher death rates from more frequent harsher weather, damage to property and infrastructure, rising sea levels, drowning of coastal cities, loss of agricultural land, national security threats from mass migrations, and lower productivity and GDP growth. Annual losses due to heat-induced labour productivity alone were estimated at \$2.1 trillion in 2017, and in several countries, labour productivity losses are equivalent to more than 10 percent of gross domestic product. [92]

A study of the public costs of climate-induced financial instability found that climate change will increase the frequency of banking crises. "Rescuing insolvent banks will cause an additional fiscal burden of approximately 5–15% of gross domestic product per year and increase the ratio of public debt to gross domestic product by a factor of 2." The authors estimate that "around 20% of such effects are caused by the deterioration of banks' balance sheets induced by climate change." [93]

Even if the probability of a connection between global heating and human behaviour is infinitesimally small the apocalyptic horror awaiting those parts of the earth that might become uninhabitable and the parts that might become severally inhospitable, should awaken climate science deniers to the toxic inheritance awaiting their grandchildren.

XIII. PREPARING FOR THE LOOMING WRITE-OFFS

During the five years since the Paris Agreement in 2015, 60 of the world's largest commercial and investment banks have committed more than \$3.8 trillion to the fossil fuel industry. [94]

The Bank of England was the first central bank to set supervisory expectations for banks and insurance companies on the management of climate-related financial risks for an orderly market transition to a low-carbon world. On September 29, 2015, it published "The impact of climate change on the UK insurance sector," followed on September 26, 2018, by "Transition in thinking: The impact of climate change on the UK banking sector." From 2022, the Bank moved towards actively overseeing regulated firms against its supervisory expectations. [95]

The US Federal Reserve Board announced on September 29, 2022 that in early 2023, six of the nation's largest banks will participate in a pilot climate scenario analysis exercise designed to enhance the ability of supervisors and firms to measure and manage climate-related financial risks. Climate scenario analysis is distinct and separate from bank stress tests. It is exploratory in nature and does not have capital consequences. [96]

The European Central Bank has launched a new climate change centre and is planning a climate stress test over a 30-year horizon to assess the impact of climate change under various climate scenarios on the counterparties of the European banking sector. [97]

The Network of Central Banks and Supervisors for Greening the Financial System (NGFS) was formed at the Paris One Planet Summit in December 2017. The group currently comprises 89 members and 13 observers. Its mission statement explains that its purpose is to "help strengthen the global response required to meet the goals of the Paris Agreement and to enhance the role of the financial system to manage risks and to mobilize capital for green and low-carbon investments in the broader context of environmentally sustainable development." [98]

XIV. A POST-OIL MIDDLE EAST

a) *The Political Scene*

Washington would abandon an Arabian Peninsula without crude oil. And without US protection, Saudi and the other GCC rulers will be left on their own to face an uncertain future against a more powerful and hostile Iran. In a post-oil Middle East, a dangerous brew of religion and nationalism will polarize the Middle East more than ever before. There could be four different ethnic, religious, and sectarian powers vying for control: Sunni Turkey; a block of Sunni Arab states; a block of Shi'ites in Iran and certain Arab communities; and

Jewish Israel. There can be as many scenarios of the shifting political alliances among these fervour-filled powers as the mind can conjure.

Israel's security will determine the politics and shape of the post-oil map. Sunnis and Shi'ites will be in a constant state of confrontation and Sunni Turkey is most likely to join co-religionist Arab Sunni states against Shi'ite Iran. Alliances could be struck along ethnic lines, as well. Arabs and Persians fought bitterly over the long sweep of history, before and after Islam. Turks and Persians, too, fought each other when both were Sunnis, as well as after Persia was converted to Shi'ism by Shah Ismail (1501-1524). Even if the Ayatollahs were removed from power, ethnic conflicts would trigger confrontations among Arabs and Persians, possibly dragging the Turks into the fight. These wars would cost GCC states much of their dollar reserves and the investments of the golden oil century in US Treasury bonds, as well as investments in London's finest real estate properties and grandest hotels.

The political map of the region will most likely change. Iran's occupation since November 30, 1971 (on orders of the Shah) of the three strategically important UAE islands at the mouth of the Strait of Hormuz—Abu Musa, Greater Tunb, and Lesser Tunb foreshadows the shape of things to come. The UAE never accepted Iran's occupation of these islands and continues to demand their return to no avail. In Bahrain, while the majority of Bahrain's population are Shi'ites, the ruling al-Khalifa family is Sunni. For decades, Iran has been calling for the return of Bahrain to Tehran. In 2016, a revolutionary Guard commander close to Iran's Supreme Leader demanded that Iran annex Bahrain. [99] Bahrain's historical background is relevant to mention here. Except for eighty years under Portuguese rule seven centuries ago, Bahrain had been a Persian territory. In 1782, the al-Khalifa clan removed the Persian ruler of the island. Other historical tensions will continue to fester. In Iran, the Arab population of the oil rich Khuzestan province want independence from Tehran. Iraq regards Kuwait as its own 19th province. The Kurds in Iran, Iraq, Syria, and Turkey dream of their own state, and many border disputes engulf GCC member states—Bahrain/Qatar; Kuwait/Saudi Arabia; Oman/Saudi Arabia/UAE; Qatar/Saudi Arabia; and within the UAE; Dubai/Sharjahh.

b) *The Economic Scene*

The transformation from economies dependent on oil revenues to a non-oil based-existence will be painful, although perhaps less so in Dubai. The immediate effect will be felt in the labour markets. Most of the expatriate workers who built and maintain the super modern cities of the GCC, with their glitzy skyscrapers, ice skating rinks, and golf courses would repatriate. While expatriate workers in Saudi Arabia are a third of the population, they provide around three

quarters of the labour force (see footnote 22). In the rest of the GCC, expatriate workers are around 75 percent of their aggregate population and provide around 90 percent of the labour forces. They will leave behind ghost-towns with huge excess capacity airports, desalination plants, roads, schools, hospitals, and public utilities. Without sufficient skilled workers for proper maintenance, the infrastructure would deteriorate quickly in the blazing sun. Compounding the financial stress, real estate values would crash, with millions of empty dwellings and office space.

Over the millennia, scant rainfall and absence of rivers prevented the development of any sizeable settled agricultural communities in the Arabian Peninsula and constrained its capacity to feed more than ten million inhabitants. Today, excluding Yemen, 55 million people live in the GCC alone. They are sustained mainly through food imports and desalinated sea water. After the departure of 25 million expatriates, there will still be tens of millions of local residents. How would they survive? The very rich could afford to move to London's snazzy Knightsbridge, and the less rich would migrate north, to the Levant, repeating what the Bedouin of Arabia have done to survive since the beginning of time. Ultimately, the oil century will give way to the desertification century, eventually restoring the desert to its former pristine condition.

The excesses of the Arabian Peninsula's rulers during the oil century may be described by the fate of one man: "Ozymandias" — the title of Percy Bysshe Shelley poem (1792-1822) about the King of Kings, the mighty pharaoh Ramesses II, whose huge statue and all of his other works are toppled by the sands of time.

ACKNOWLEDGEMENT

I am grateful to my friends Chris Perry and David Dent for reviewing the paper. I benefited from their comments, but I assume full responsibility for the contents.

REFERENCES RÉFÉRENCES REFERENCIAS

1. "Do scientists agree on climate change?", NASA Global Climate Change: <https://climate.nasa.gov/faq/17/do-scientists-agree-on-climate-change/>
2. "Evolution of the Clean Air Act", United States Environmental Protection Agency: <https://www.epa.gov/clean-air-act-overview/evolution-clean-air-act>
3. "Restoring the Quality of Our Environment", Report of the Environmental Pollution Panel of the President's Science Advisory Committee, The White House, (November 1965): <https://babel.hathitrust.org/cgi/pt?id=uc1.b4315678&view=1up&seq=5>
4. President's Science Advisory Committee, "Restoring the Quality of our Environment: Report of the Environmental Pollution Panel," (November 1965), <https://apeoplesepa.org/modules/president-s-science-advisory-committee-restoring-the-quality-of-our-environment-november-1965>
5. "Evolution of the Clean Air Act", United States Environmental Protection Agency: <https://www.epa.gov/clean-air-act-overview/evolution-clean-air-act>
6. "Exxon Knew about Climate Change almost 40 years ago", Scientific American, (October 26, 2015): <https://www.scientificamerican.com/article/exxon-knew-about-climate-change-almost-40-years-ago/>
7. "BP tops the list of firms obstructing climate action in Europe", The Guardian, (September 21, 2015): <https://www.theguardian.com/environment/2015/sep/21/bp-tops-the-list-of-firms-obstructing-climate-action-in-europe>
8. "BP goes green", BBC, (July 24, 2000): <http://news.bbc.co.uk/1/hi/business/849475.stm>
9. "Top oil firms spending millions lobbying to block climate change policies, says report", The Guardian, (March 22, 2019): <https://www.theguardian.com/business/2019/mar/22/top-oil-firms-spending-millions-lobbying-to-block-climate-change-policies-says-report>
10. "World Oil Consumption Historical Data", YCHARTS: https://ycharts.com/indicators/world_oil_consumption
11. Julian Geiger, "How Much Crude Oil Has The World Really Consumed?", World-energy, (August 21, 2019): <https://www.world-energy.org/article/1481.html>
12. "Share of oil final consumption by sector, 2019", International Energy Agency IEA, (October 26, 2022): <https://prod.iea.org/data-and-statistics/charts/share-of-oil-final-consumption-by-sector-2019>
13. "Factbox: Russia's oil and gas revenue windfall", Reuters, (January 21, 2022): <https://www.reuters.com/markets/europe/russias-oil-gas-revenue-windfall-2022-01-21/>
14. US oil imports from Saudi Arabia were 5.8% in 2021. "US Imports by Country of Origin, Petroleum and Other Liquids", US Energy Information Administration: https://www.eia.gov/dnav/pet/PET_MOVE_IMPCUS_A2_NUS_EPC0_IM0_MBBL_A.htm
15. "USSR-Western Europe: Implications of the Siberia-to-Europe gas Pipeline", The CIA, (March 1981): https://www.cia.gov/readingroom/docs/DOC_0000500594.pdf
16. Hiroko Tabuchi, "How Europe Got Hooked on Russian Gas Despite Reagan's Warnings", The New York Times, (March 23, 2022): <https://www.nytimes.com/2022/03/23/climate/europe-russia-gas-reagan.html>

17. Jonathan Lemire and Jill Colvin, "In Testy Exchange, Trump Hits Germany for Being 'Captive' to Russia", Real Clear Politics, (July 11, 2018): https://www.realclearpolitics.com/articles/2018/07/11/in_testy_exchange_trump_hits_germany_for_being_captive_to_russia_137488.html
18. "The Oil Resources of the GCC States", Middle East Monitor (MEMO), (June 23, 2014): <https://www.middleeastmonitor.com/20140623-the-oil-resources-of-the-gcc-states/>
19. Elhadj, Elie, "An Estimate of the Number of the Direct Descendants of King Abdulaziz al-Saud", Chapter Six, Appendix One, Oil and God – Sustainable Energy Will Defeat Wahhabi Terror, Universal Publishers, Irvine, 2018, PP. 167-168.
20. Michael Corbett, "Oil Shock of 1973–74", Federal Reserve History: <https://www.federalreservehistory.org/essays/oil-shock-of-1973-74>
21. In 1805, Mohammad Bin Saud allied himself with Mohammad Bin Abdulwahhab in a rebellion against the Ottoman Sultan. They accused Istanbul of corrupting the tenets of Islam and proclaimed their struggle to restore to the land of Mecca and Medina the true Islam. Wahhabism finds its roots in Hanbalism, the most extreme among Sunni Islam's four schools of jurisprudence, established by Ahmad bin Hanbal (d. 855). Due to its extremism, it never found much following. The al-Saud project was unsuccessful. In 1817, Mohammad Ali, Egypt's ruler, acting on behalf of the Ottoman Sultan, Mahmud II (July 1785-July 1839) crushed the rebellion. In 1902, a second rebellion was launched by Abdulaziz al-Saud and the Abdulwahhab clan. On the ashes of the Ottoman Empire's defeat in World War I and with active help from London, the second rebellion succeeded in establishing in 1932, the Wahhabi Kingdom that bears the al-Saud family name.
22. "Expats account for over 75% of the jobs in Saudi's labour market", Gulf Business, (June 17, 2019): <https://gulfbusiness.com/expats-account-75-jobs-saudis-labour-market-report/>
23. There are fundamental theological and law-making differences between Shi'ites and Sunnis. Shi'ites believe in the infallibility of the Twelve Imams descendants from Ali bin Abi Talib, the Prophet's cousin and son in law. They believe that in 874, when the Twelfth Imam was a child, he disappeared and that he is in a hidden state of occultation. They also believe that the Hidden Imam will one day return to the Earth and bring justice and prosperity. Until his return, however, the senior Shi'ite clerics (ulama) are his deputies, interpreting for their followers the Qur'an and Shi'ite version of the Hadith (reported words and actions of the Prophet) according to their own personal intellectual reasoning, but in the name of the Hidden Imam. To Sunnis, the Twelfth Imam's occultation and return to the earth are heresies, strikingly similar to the biblical messianic concept of the return of Christ to the Earth. Sunnis preach Qur'an's 33:40, that the Prophet Muhammad is the final and the last messenger of Allah.
On Islamic law-making (Shari'a), while Shi'ites observe three sources; Qur'an, Sunna (Shi'ite version), and Shi'ite ulama's intellectual reasoning, Sunni Shari'a sources are four; Qur'an, Sunna, analogical deduction, and consensus of the Sunnialama.
24. "Trump says he told Saudi's King Salman that the ruler wouldn't last without US support", CNBC, (October 2, 2018): <https://www.cnbc.com/2018/10/03/trump-i-told-saudi-king-salman-he-wouldnt-last-without-us-support.html>
25. Gregg Re, "Graham: Saudis would 'be 'speaking Farsi in about a week' without US support against Iran", Fox News, (December 9, 2018): <https://www.foxnews.com/politics/graham-saudi-arabia-would-be-speaking-farsi-in-about-a-week-without-us>
26. "Assessing the Global Operating Environment, Middle East", Heritage.org, (October 18, 2022): <https://www.heritage.org/military-strength/assessing-the-global-operating-environment/middle-east>
27. "U.S. Security Cooperation with Kuwait", US Department of State, Bureau of Political-Military Affairs, (July 22, 2021): <https://www.state.gov/u-s-security-cooperation-with-kuwait-2/>
28. "Assessing the Global Operating Environment, Middle East", Heritage.org, (October 18, 2022): <https://www.heritage.org/military-strength/assessing-the-global-operating-environment/middle-east>
29. "Al Udeid Air Base, Qatar", GlobalSecurity.Org.: <http://www.globalsecurity.org/military/facility/udeid.htm>
30. "U.S. Security Cooperation With Qatar", US Department of State, Bureau of Political-Military Affairs, (July 30, 2021): <https://www.state.gov/u-s-security-cooperation-with-qatar>
31. "U.S. Security Cooperation with the United Arab Emirates", US Department of State, Bureau of Political-Military Affairs, (June 25, 2021): <https://www.state.gov/u-s-security-cooperation-with-the-united-arab-emirates/>
32. Index Mundi, Country comparison – Energy: Oil exports (bbl./day): <https://www.indexmundi.com/g/r.aspx?t=50&v=95&l=en>
33. Ibid.
34. Ibid.

35. Elhadj, Elie, *Oil and God – Sustainable Energy Will Defeat Wahhabi Terror*, Universal Publishers, Irvine, 2018, P. 152.
36. Bruce Riedel, "The \$110 Billion Arms Deal to Saudi Arabia is Fake News." *Brookings*, (April 5, 2017): <https://www.brookings.edu/blog/markaz/2017/06/05/the-110-billion-arms-deal-to-saudi-arabia-is-fake-news/>
37. "Trump: We are losing our a** defending you, Saudi Arabia", *Middle East Monitor*, (April 29, 2019): <https://www.middleeastmonitor.com/20190429-trump-we-are-losing-our-a-defending-you-saudi-arabia/>
38. Theodoric Meyer, Lorraine Woellert, and Marianne Levine, "Diplomatic crisis spotlights Saudi Arabia's spending in Washington", *Politico*, (October 18, 2018): <https://www.politico.eu/article/jamal-khashoggi-diplomatic-crisis-spotlights-saudi-arabias-spending-in-washington/>
39. David D. Kirckpatrick and Kate Kelly, "Before Giving Billions to Jarid Kushner, Saudi Investment Fund had Big Doubts", *The New York Times*, (April 10, 2022): <https://www.nytimes.com/2022/04/10/us/jared-kushner-saudi-investment-fund.html>
40. Ibid.
41. US Department of State, "International Religious Freedom Report for 2015, Saudi Arabia": <https://2009-2017.state.gov/j/drl/rls/irf/religiousfreedom/index.htm#wrapper>
42. Seymour M. Hersh, "U.S. Secretly Gave Aid to Iraq Early in Its War Against Iran", *The New York Times*, (January, 26, 1993): <https://www.nytimes.com/1992/01/26/world/us-secretly-gave-aid-to-iraq-early-in-its-war-against-iran.html>
43. "The Persian Gulf War and its Aftermath", *Britannica*: <https://www.britannica.com/place/Saudi-Arabia/The-Persian-Gulf-War-and-its-aftermath>
44. "Afghan War, 1978-1993", *Britannica*: <https://www.britannica.com/event/Afghan-War>
45. Julianne Geiger, "OPEC+ To Cut Oil Production By 2 Million Barrels Per Day", *Oilprice.com*, (October 5, 2021): <https://oilprice.com/Energy/Crude-Oil/OPEC-To-Cut-Oil-Production-By-2-Million-Barrels-Per-Day.html>
46. Ken Klippenstein, "'Election Interference': Oil Price Hike Is Saudi Arabia's October Surprise Against Biden", *The Intercept*, (October 11, 2022): <https://theintercept.com/2022/10/11/mbs-saudi-oil-biden-october-surprise-election-interference/>
47. "The Report on Jamal Khashoggi's Killing", *The New York Times*, (February 26, 2021): <https://www.nytimes.com/interactive/2021/02/26/us/report-jamal-khashoggi-killing.html>
48. 'Saved his ass': Trump reportedly boasted he shielded MBS after Khashoggi murder", *The Times of Israel*, (September 11, 2020): <https://www.timesofisrael.com/saved-his-ass-trump-reportedly-boasted-he-shielded-mbs-after-khashoggi-murder/>
49. Donald J. Trump, @realDonaldTrump: <https://twitter.com/realdonaldtrump/status/265895292191248385?lang=en>
50. Nadja Popovich and Tatiana Schlossberg, "23 Environmental Rules Rolled Back in Trump's First 100 Days", *The New York Times*, (May 2, 2017): <https://www.nytimes.com/interactive/2017/05/02/climate/environmental-rules-reversed-trump-100-days.html>
51. Jim Lyons, "The Rush to Develop Oil and Gas We Don't Need", *The New York Times*, (August 28, 2017): <https://www.nytimes.com/2017/08/28/opinion/trump-oil-public-lands.html>
52. John Siciliano, "Trump uses dramatic vision of exploding windmills to tout coal's reliability", *Washington Examiner*, (August 22, 2018): <https://www.washingtonexaminer.com/policy/energy/trump-uses-dramatic-vision-of-exploding-windmills-to-tout-coals-reliability>
53. Ledyard King, "Do wind farms cause cancer? Some claims Trump made about the industry are just hot air", *USA Today*, (April 3, 2019): <https://eu.usatoday.com/story/news/politics/2019/04/03/cancer-causing-wind-turbines-president-donald-trump-claim-blown-away/3352175002/>
54. "Trump: Climate change scientists have 'political agenda'", *BBC*, (October 15, 2018): <https://www.bbc.co.uk/news/world-us-canada-45859325>
55. Ibid.
56. "US Notifies UN of Paris Climate Deal Pullout", *BBC*, (August 5, 2017): <http://www.bbc.co.uk/news/world-us-canada-40829987>
57. Fiona Harvey, "Syria Signs Paris Climate Agreement and Leaves US Isolated", *The Guardian*, (November 7, 2017): <https://www.theguardian.com/environment/2017/nov/07/syria-signs-paris-climate-agreement-and-leaves-us-isolated>
58. Matt McGrath, "Climate change: COP24 fails to adopt key scientific report", *BBC*: <https://www.bbc.co.uk/news/science-environment-46496967>
59. Geoff Earle, "We will never get tired of winning! Donald Trump boasts about his success as the stock market hits another all-time high fuelled by belief there will be China trade deal", *MailOnline*, (December 17, 2019): <https://www.dailymail.co.uk/news/article-7798377/We-never-tired-winning-Donald-Trump-boasts-stock-market-high.html>
60. Ryan McQueeney, "How Much Oil Is Left," *Zacks*, (December 27, 2017): <https://www.zacks.com/stock/news/287141/how-much-oil-is-left-in-the-earth>
61. "Cost of Crude Oil Production by Country and Crude Oil Prices", *knoema*, (December 25, 2020):

- <https://knoema.com/infographics/nolsgce/cost-of-crude-oil-production-by-country-and-crude-oil-prices>
62. IMF Country Report No. 22/275, Saudi Arabia, International Monetary Fund, (June 7, 2022): <file:///Users/eliie/Downloads/1SAUEA2022002-1.pdf>
 63. AnmarFrangoul, "Saudi Minister Says Global Energy Demand Expected to Jump 45% by 2050," CNBC, (October 25, 2017). <https://www.cnbc.com/2017/10/24/saudi-minister-says-global-energy-demand-expected-to-jump-45-percent-by-2050.html>
 64. Electric Vehicles Report, International Energy Agency (IEA), September 2022: <https://www.iea.org/reports/electric-vehicles>
 65. "COP26 declaration on accelerating the transition to 100% zero emission cars and vans", UK Department of Transport, (Updated November 17, 2022): <https://www.gov.uk/government/publications/cop26-declaration-zero-emission-cars-and-vans/cop26-declaration-on-accelerating-the-transition-to-100-zero-emission-cars-and-vans>
 66. Mark Kane, "China: Plug-In Car Sales Increased By 75% In October 2022", Inside evs (November 27, 2022): <https://insideevs.com/news/623665/china-plugin-car-sales-october2022/>
 67. Zhinan Chen, "Electric Vehicle Growth in China: What's Next?" Berkeley California-China Climate Institute, (February 2, 2022): <https://ccci.berkeley.edu/news/2022/01/electric-vehicle-growth-china-what-s-next>
 68. "History of Oil Consumption and Production", China Oil: <https://www.worldometers.info/oil/china-oil/>
 69. "China Crude Oil: Imports", CEIC Data: <https://www.ceicdata.com/en/indicator/china/crude-oil-imports>
 70. Ibid.
 71. "China processed the least crude oil since early 2020 in second-quarter 2022", US Energy Information Administration (eia), (October 2, 2022): <https://www.eia.gov/todayinenergy/detail.php?id=54139>
 72. "China Nov crude oil imports hit 10-mth high on stock build, new plants", Hellenic Shipping News (December 8, 2021): <https://www.hellenicshippingnews.com/china-nov-crude-oil-imports-hit-10-mth-high-on-stock-build-new-plants/>
 73. "China Oil Consumption", CEIC Data: <https://www.ceicdata.com/en/indicator/china/oil-consumption>
 74. (15.44 million bbl./day x 49.2% = 7.6 million bbl./day).
 75. (0.8% + 6.7% + 8.56% = 16.1%. 15.44 million bbl./day x 16.1% = 2.48 million bbl./day),
 76. Mark Kane, "Europe: Plug-In Electric Car Sales Increased 14% In October 2022", Insideevs, (December 6, 2022): <https://insideevs.com/news/624922/europe-plugin-electric-car-sales-october-2022/>
 77. "Norway: Electric car sales soar, setting new record", DW, (January 3, 2023): <https://www.dw.com/en/norway-electric-car-sales-soar-setting-new-record/a-64266831>
 78. "FACT SHEET: President Biden Announces Steps to Drive American Leadership Forward on Clean Cars and Trucks", The White House, (August 5, 2022): <https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/05/fact-sheet-president-biden-announces-steps-to-drive-american-leadership-forward-on-clean-cars-and-trucks/>
 79. Hannah Ritchie and Max Roser, "Electricity Mix", Our World in Data: <https://ourworldindata.org/electricity-mix>
 80. Fiona Harvey, "Too many new coal-fired plants planned for 1.5C climate goal, report concludes", (April 26, 2022): <https://www.theguardian.com/environment/2022/apr/26/too-many-new-coal-fired-plants-planned-for-15c-climate-goal-report-concludes>
 81. "Mapped: The world's coal power plants", CarbonBrief, (March 26, 2020): <https://www.carbonbrief.org/mapped-worlds-coal-power-plants/>
 82. Benny Peiser, "1600 New Coal Power Plants Being Built Around The World", Climate change dispatch, (July 2, 2017): <https://climatechangedispatch.com/1600-new-coal-power-plants-being-built-around-the-world/>
 83. Adam Vaughan, "China is building more than half of the world's new coal power plants", NewScientist, (April 26, 2022): <https://www.newscientist.com/article/2317274-china-is-building-more-than-half-of-the-worlds-new-coal-power-plants/>
 84. Mike Scott, "Solar And Wind Costs Continue To Fall As Power Becomes Cleaner", Forbes, (April 30, 2020): <https://www.forbes.com/sites/mikescott/2020/04/30/solar-and-wind-costs-continue-to-fall-as-power-becomes-cleaner/?sh=7a3a2e9785f9>
 85. Adam Zewe, "Paper-thin solar cell can turn any surface into a power source", MIT News, (December 9, 2022): <https://news.mit.edu/2022/ultrathin-solar-cells-1209>
 86. Francis Willick, "What is green hydrogen, and how green is it, anyway?", CBC News, (Dec 11, 2022): <https://www.cbc.ca/news/canada/nova-scotia/green-hydrogen-what-is-it-how-green-is-it-1.6587-802>
 87. "The Future of Hydrogen", IEA, (June 2019): <https://www.iea.org/reports/the-future-of-hydrogen>
 88. Kenneth Chang, "Scientists Achieve Nuclear Fusion Breakthrough With Blast of 192 Lasers", The New York Times, (December 13, 2021): <https://www.nytimes.com/2021/12/13/science/nuclear-fusion-breakthrough.html>

- nytimes.com/2022/12/13/science/nuclear-fusion-energy-breakthrough.html
89. Seth Jacobson, "Cutting UK emissions to net zero would cost £1tn, says Hammond," *The Guardian*, (June 6, 2019): <https://www.theguardian.com/environment/2019/jun/06/cutting-uk-emissions-net-zero-cost-1tn-philip-hammond>
 90. Dave Anderson, "Who's Behind Trump's Claim the Green New Deal Will Cost \$100 Trillion?", *Truthout*, (March 20, 2019): <https://truthout.org/articles/whos-behind-trumps-claim-the-green-new-deal-will-cost-100-trillion/>
 91. The GAO study states: "cumulative output losses could exceed \$13 trillion" (P. 17). Further, "Households collectively lost about \$9.1 trillion ... in part because of the decline in home prices" (P. 21). *Financial Regulatory Reform: Financial Crisis Losses and Potential Impacts of the Dodd-Frank Act* US Government Accountability Office, (Released: February 14, 2013). <https://www.gao.gov/products/GAO-13-180>
 92. "Global labor loss due to humid heat exposure underestimated for outdoor workers", *IOP Science* (January 13, 2022): <https://iopscience.iop.org/article/10.1088/1748-9326/ac3dae?ftag=MSF09-51a18>
 93. Francesco Lamperti, Valentina Bosetti, Andrea Roventini, and Massimo Tavoni, "The public costs of climate-induced financial instability", *Nature Climate Change*, (October 29, 2019): <https://www.nature.com/articles/s41558-019-0607-5>
 94. "How central banks are tackling climate change risks", *World Economic Forum*, (May 4, 2021): <https://www.weforum.org/agenda/2021/05/central-banks-tackling-climate-change-risks/>
 95. "Climate change. UK financial regulations and supervision", *Bank of England*: <https://www.bankofengland.co.uk/climate-change>
 96. Press release, Board of Governors of the Federal Reserve System, (September 29, 2022): <https://www.federalreserve.gov/newsevents/pressreleases/other20220929a.htm>
 97. Luis de Guindos, "Shining a light on climate risks: the ECB's economy-wide climate stress test", *European Central Bank*, (March 18, 2021): <https://www.ecb.europa.eu/press/blog/date/2021/html/ecb.blog210318~3bbc68ffc5.en.html>
 98. Origin and purpose of the Network for Greening the Financial System (NGFS): <https://www.ngfs.net/en/about-us/governance/origin-and-purpose>
 99. Maayan Grossman, "Revolutionary Guards commander demands that Iran annex Bahrain", *The Jerusalem Post*, (March 21, 2016) <https://www.jpost.com/Middle-East/Iran-News/Revolutionary-Guards-commander-demands-that-Iran-annex-Bahrain-448643>