Lost Decade: How Shell Downplayed Early Warnings Over Climate Change

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Newly discovered documents from the 1970s and early '80s show that Shell knew more about the "greenhouse effect" than it let on in public.

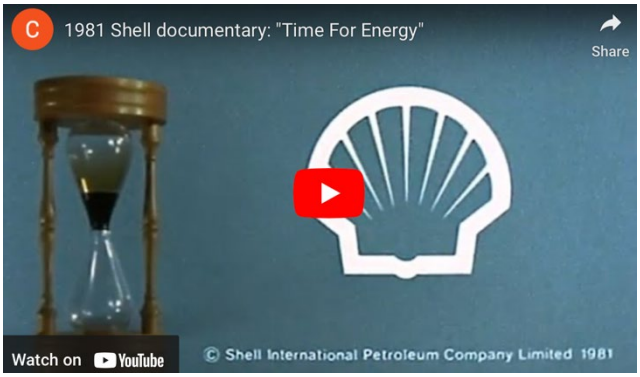
Andy Carter

Narrated in the upper-crust accent favoured by British documentary-makers of the era, Shell's 1981 film *Time for Energy* assesses the scope for solar, wind, nuclear, and other sources of power to end the world's dependence on finite reserves of oil.

By the closing credits, the viewer is left in little doubt that there is only one fuel plentiful and versatile enough to carry the world "safely" into the 21st century: coal.

The 30-minute film makes no mention of the coal assets the Anglo-Dutch oil major had acquired in an effort to diversify in the wake of the 1973 oil shock. Nor does it refer to a topic that was of unequivocal scientific concern at the time: The "greenhouse effect," or what is now known as climate change.

Time for Energy is part of a collection of 201 company documents, official correspondence, reports, academic studies, and other materials that cast new light on what Shell knew about climate change — and what it chose to tell the public.



Compiled by Dutch climate activist Vatan Hüzeir, and reviewed by DeSmog and Dutch investigative journalism platform Follow The Money, the documents show how Shell was actively supporting

research that clearly underscored the dangers posed by burning its fossil fuel products from the mid-1970s — years earlier than previously thought.

Even as the company's awareness of the potentially devastating consequences of climate change grew, the documents show how Shell shaped a series of influential industry-backed publications that downplayed or omitted key risks; emphasized scientific uncertainties; and pushed for more fossil fuels, particularly coal.

"This impressive history shows for just how long climate issues were known by Shell personnel," said Ben Franta, senior research fellow in climate litigation at the University of Oxford. "Despite internal awareness, the company systematically downplayed the problem to the public, instead promoting more and more fossil fuel use despite the dangers. Now, five decades later, Shell continues to dawdle and delay."

Shell announced record annual profits of $40 billion earlier this year on the back of surging prices for oil and gas in the wake of Russia's invasion of Ukraine. Wael Sawan, Shell's chief executive, told the *Wall Street Journal* this week: "I fundamentally believe in the role of oil and gas for a long, long time to come."

Hüzeir, a doctoral candidate at Erasmus University Rotterdam, assembled the dossier over a five-year period of trawling public and private archives; obtaining files from former Shell staff and individuals close to the company; and tracking down open source material. He dubbed his project "*Dirty Pearls: exposing Shell's hidden legacy of climate change accountability, 1970-1990*."

Documents from the collection can be viewed at Climate Files, a project of the U.S.-based Climate Investigations Center, and on this timeline produced by Follow The Money.

In response to questions based on Hüzeir's findings, Shell said that it had no unique knowledge about climate change, and that its position on the issue had been publicly documented for more than 30 years in its annual report and other publications.

"The issue of climate change and how to tackle it has long been part of public discussion and scientific research that has evolved over many decades," a Shell spokesperson said. "It has been widely discussed and debated, in public view, among scientists, media, governments, business and society as a whole."

Climate Lawsuits

Historical evidence of what oil majors knew about climate change is taking on new significance in the courtroom as lawyers seek to hold big polluters to account for the accelerating devastation caused by the climate crisis.

In the United States, states and cities have launched at least 20 lawsuits against oil companies including Shell, ExxonMobil, and BP over allegations that the industry waged a decades-long campaign to deceive the public regarding the risks posed by burning fossil fuels. In Canada, Vancouver's city council has voted to join a similar class action. And late last year a group of 16 municipalities in Puerto Rico sued Shell and other fossil fuel giants in the first climate liability case to target the industry with federal racketeering charges.

Shell has said it does not believe the courtroom is the right venue to tackle climate change. Nevertheless, lawyers are building cases on the oil industry's own documents, seeking to echo the success of a previous generation of lawsuits against tobacco companies for covering up the health risks of smoking. This fast-evolving legal strategy has placed a premium on new archival research.

Hüzeir's findings build on earlier Shell material obtained by Dutch journalist Jelmer Mommers of *De Correspondent* and published by Climate Files and DeSmog in 2018. Those files featured a confidential 1986 Shell memo titled "The Greenhouse Effect" that warned of climate impacts "larger

than any that have occurred over the last 12,000 years," and revealed an internal Shell climate science programme dating back to 1981.

Hüzeir's dossier provides further — and earlier — insight into the company's knowledge. The documents show how Shell backed a series of reports by think tanks and academic initiatives in the mid- to late-'70s that spelled out the risks posed by burning fossil fuels in increasingly vivid terms, warning of "drastic economic consequences" for the US corn belt, or "severe stresses on human societies". These organisations included the Vienna-based International Institute for Applied Systems Analysis, and the Scientific Committee of Problems of the Environment, or SCOPE, then based in Paris.

A parallel world of Shell-backed publications brushed such warnings aside. These included Shell-produced content such as the *Time For Energy* film, and a book called *Energy* published the same year. Shell also financed and seconded staff to industry-backed energy research initiatives throughout the 1970s that emphasized uncertainties in climate science, or made unrealistic suggestions that technological solutions could be found to offset growing emissions from burning fossil fuels. Such studies included *Work For the Future* (1973); the findings of the Workshop on Alternative Energy Strategies (1977); and the *World Coal Study* (1980).

"This report winds back the clock even further on Shell's long history of climate knowledge and deception," said Geoffrey Supran, professor of environmental science and policy at the University of Miami, who co-authored a study in January that showed that ExxonMobil scientists had made accurate predictions of climate change as early as the late 1970s and early 1980s.

"It reveals that Shell was ahead of the curve both in terms of its growing understanding, in private and academic circles, of the threat of climate change and unburnable fossil fuels, yet also in terms of its public dismissal of those realities," Supran said. "These findings add fuel to the flames of efforts to hold oil and gas companies accountable for their decades of climate damages and denial."

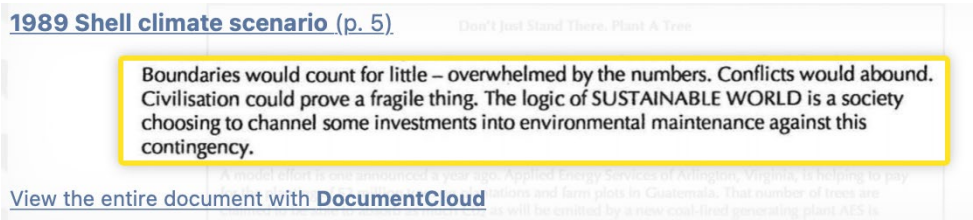
"A Fragile Thing"

Later documents obtained by Hüzeir shed new light on the ever-more granular understanding Shell was developing of the risks climate change posed to global stability. A confidential October 1989 Shell publication titled "SCENARIOS 1989 – 2010" outlines a high-emissions "global mercantilism" scenario in which average global temperatures rise by "considerably more" than 1.5 degrees Celsius.

The report warned that "many species of trees, plants, animals and insects would not be able to move and adapt."

But its starkest language was reserved for the implications for people.

"The changes would, however, most impact on humans [sic]. In earlier times, man was able to respond with his feet. Today, there is no place to go because people already stand there. Perhaps those in industrial countries could cope with a rise in sea level (the Dutch example) but for poor countries such defences are not possible. The potential refugee problem in GLOBAL MERCANTILISM could be unprecedented. Africans would push into Europe, Chinese into the Soviet Union, Latins into the United States, Indonesians into Australia. Boundaries would count for little – overwhelmed by the numbers. Conflicts would abound. Civilisation could prove a fragile thing."



Despite its knowledge of the looming risks, Shell went on to participate in confrontational lobby groups promoting climate denial and obstructionism in the 1990s and 2000s, such as the Global Climate Coalitionand American Petroleum Institute.

Hüzeir's research opens a window into a comparatively neglected, earlier period where the contours of Shell's later stance were starting to take shape. The following account by DeSmog and Follow The Money of what Shell knew in the 1970s and early '80s, and what it said in public, is based on a review of this latest set of documents, supplemented where appropriate by previous studies of Shell's engagement with climate science.

"Harmful Wastes"

Shell's knowledge of the risks posed by the build-up of atmospheric carbon dioxide (CO2) from burning fossil fuels can be traced to at least the early 1960s.

In 1962, Shell's chief geologist, Houston-based Marion King Hubbert, produced a book-length report on energy for the U.S. National Academy of Sciences that explicitly warned of the risks human-induced global warming could pose to earth's weather and "ecological balances," the U.S.-based Center for International Environmental Law has reported.

Meanwhile, Shell would commission British scientist James Lovelock — later a renowned proponent of the "Gaia Theory" of earth as a self-regulating organism — to investigate the possible global consequences of pollution from fossil fuels.

As documented by science historian Leah Aronowsky, Lovelock's report, dated June 1966, concluded that it was an "almost certain fact" that the climate was deteriorating, and that burning fossil fuels was probably responsible. Lovelock's main concern was not warming caused by the greenhouse effect, however, but the prospect of a precipitous drop in temperatures caused by the localised cooling influence of atmospheric pollution. In a separate essay for Shell, Lovelock warned that there was a good chance of a "brush with an ice age" within the next decade or so.

Shell asked Lovelock not to discuss his concerns that fossil fuel combustion could cause the weather to get colder with "non-Shell people," Aronowsky has written. At the same time, Shell was taking the potential commercial implications of possible natural or human-induced variations in the climate seriously. The company donated £10,000 (the equivalent of about £168,000 today) to help British climate scientist Hubert Lamb establish the Climatic Research Unit at the University of East Anglia in 1972. Shell explained at the time that it wanted to prepare itself to deal as "effectively as possible" with seasonal fluctuations in demand for oil.

Much later, the unit would be embroiled in the manufactured "ClimateGate" scandal, after an unknown hacker published a cache of emails from its scientists in November, 2009. Multiple enquiries would clear the researchers of any wrongdoing. But with their emails taken out of context and posted on climate denial blogs, the scientists suddenly found themselves under vicious attack — and public faith in climate science suffered a severe, albeit temporary, setback. There was no suggestion of a link with Shell.

In October 1970, the director of Shell's research into environmental protection acknowledged the potentially harmful impact of CO2 in an article he wrote in the Dutch trade publication *Chemisch Weekblad.* He described the gas as a "by-product" of the petrochemical industry that could be considered a "possible source" of pollution.

The act of allowing such by-products to blow into the "open air" was no longer seen as "unproblematic," he wrote. Society had acknowledged that it had "over-estimated" the carrying capacity of soil, water, and air so "current wisdom" would lead us to "unequivocally condemn such past practice."

This apparent early acknowledgement of the company's responsibility for its emissions was soon followed by attempts to downplay the scale of global environmental risks.

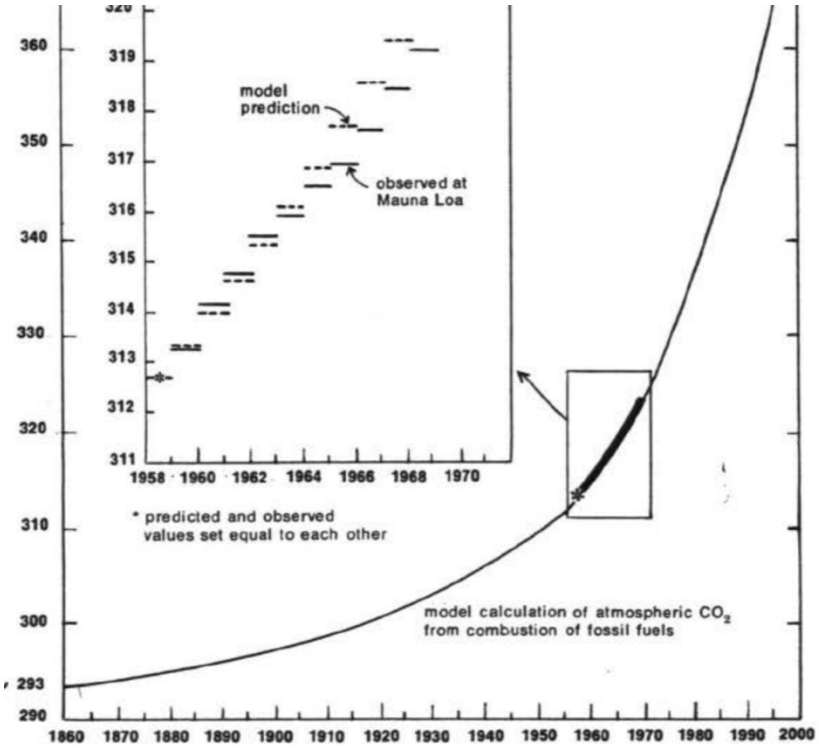
"Irreversible Changes"

In 1972, the Club of Rome think tank crystallized concerns over human pressures on finite natural resources in its landmark report *The Limits To Growth*, based on a computer modeling exercise at the Massachusetts Institute of Technology (MIT). The report's bleak prognosis — that unabated economic and population growth would lead to the collapse of industrial output within the next century — galvanised debate around the world.

The report had a particularly profound impact on Shell's then home base in the Netherlands. A series of television programmes explored its main arguments, and thousands of photocopied bootlegs circulated before the launch of the official Dutch translation, which topped the bestseller chart for several months.

Now regarded by climate scientists as a prescient early warning of the dangers posed by burning fossil fuels, *The Limits To Growth* noted the "exponential" build-up of atmospheric CO2. "It is not known how much CO2 or thermal pollution can be released without causing irreversible changes in the earth's climate," the report warned. "This ignorance about the limits of the earth's ability to absorb pollutants should be reason enough for caution in the release of polluting substances."

A graph projecting that the concentration of CO2 would reach 380 parts per million (ppm) by 2000 proved to be broadly accurate — the actual value that would be recorded at the turn of the century was close to 370 ppm.



Partial screenshot of page 72: The Limits to Exponential Growth, Fig 15: Carbon Dioxide concentration in the Atmosphere

"Given all of the uncertainties involved, that's a pretty remarkable and indeed sadly prescient prediction," Michael Mann, presidential distinguished professor in the Department of Earth and Environmental Science at the University of Pennsylvania, told DeSmog.

Shell lost little time in suggesting the report's projections of looming overshoot and collapse were too bleak.

In a critique published in *Nature* in August 1972, three Shell employees argued that it was "too early" to draw policy conclusions from *The Limits To Growth.* Positive feedback loops — such as

growing investment in pollution control, or public pressure for environmental regulation — averted a "crisis" in their "augmented" model.

The head of Shell's models division followed up with an article the next year that also painted a more reassuring picture than *The Limits To Growth*. By factoring in the impact of technological and economic advances, he concluded that the world probably had "more critical and immediate crises ahead in the next 50 years than running out of energy." The risks to the climate posed by CO2 emissions were not discussed.

"A Few More Centuries"

Shell's response to *The Limits To Growth* did not end there.

With discussion of the report at fever-pitch, chemistry professor Frits Böttcher, the only Dutch member of the Club of Rome, who also served as a scientific adviser to Shell, convened an impromptu think tank to assess the findings. Shell Managing Director Gerrit Wagner, the Dutch minister of economic affairs, and the central bank president were among the 13 top officials, scientists, and industrialists who met in this group — nicknamed The Club of The Hague.

In the spring of 1973, the network held a series of meetings in the Royal Palace in Amsterdam with a carefully selected audience, including the Queen of the Netherlands, to craft a response to *The Limits To Growth.* Addressing the gathering, Shell's Wagner concluded: "Nothing in my speech suggests the need for a fundamental change in our society."

The deliberations informed a new Dutch-language report, titled *Werk voor de Toekomst, or Work For The Future,* published that August, and put on public sale with translations in English, French, and German. The report noted possible risks posed by the build-up of atmospheric CO2, which could have a "serious effect on the climate." But since the magnitude of the "greenhouse effect" remained "controversial," the report said, more research was urgently needed.

Although *Work For The Future* acknowledged that alternatives to fossil fuels would be needed in the long run, the report suggested that technical advances would enable the exploitation of large quantities of tar sands and shale oils in the meantime. Coal was seen playing a role for a few more centuries.

Shell's Wagner personally commissioned the English translation of *Work For The Future,* that would inform Shell's lobbying for increased coal production for years to come. Böttcher, who chaired the report, would go on to become a prominent climate science denier during the 1990s, while receiving more than a million guilders — the equivalent to more than 750,000 euros — from Shell and other Dutch multinationals, Follow The Money has previously reported. In 1996, Böttcher appeared before a Dutch parliamentary committee investigating climate change to argue that the UN's official advisor, the Intergovernmental Panel on Climate Change (IPCC), had it all wrong: CO2 had positive impacts on plants and the greenhouse effect was an unproven hypothesis. In one document in his archives, Böttcher described Shell as the "godfather" of his "CO2-project", as he labeled his climate work at the time. He died in 2008.

"Ecological Disaster"

In October 1973, the Arab-Israeli War sent shockwaves through global energy markets. Aiming to force Western countries to pressure Israel to withdraw from territory it had seized, Arab OPEC countries drove oil prices sharply higher — and then banned the sale of oil to the United States and the Netherlands.

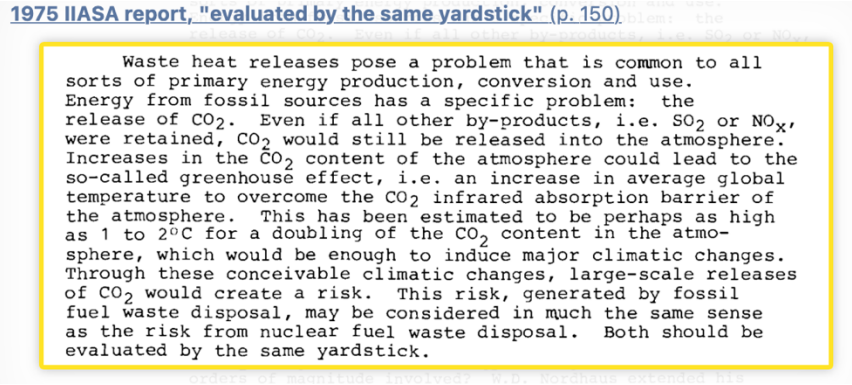
While the energy crisis meant car-free Sundays in the Netherlands or longer queues at the pump, it presented a serious threat to oil companies that were already contending with growing public unease over their environmental impact.

Climate change was starting to become a commonplace scientific concern, as evidenced by the January 1973 edition of the *UNESCO Courier,* a monthly magazine published by the Paris-based UN scientific and cultural organization UNESCO. The magazine featured CO2 at the top of a list of 10 major pollutants, drily noting that the accumulation of the gas could "significantly increase the earth's surface temperature" and cause "geochemical and ecological disaster." By the mid-70s, discussion of the risks from burning fossil fuels had become so current that the word "greenhouse effect" entered the Merriam-Webster's collegiate dictionary.

In 1975, Shell backed an "energy systems" project run by the Vienna-basedInternational Institute for Applied Systems Analysis (IIASA), a think tank set up to bridge Cold War divides by fostering collaboration between Western researchers and their Eastern Bloc counterparts. Shell was listed among the industry partners, and a Shell staffer would go on secondment to the organisation the following year.

The resulting report, also published in 1975, and aimed largely at a specialist audience, left no illusions about the risks posed by climate change: A doubling of the concentration of atmospheric CO2 could cause temperatures to rise by 1-2 degrees Celsius, "enough to induce major climatic changes."

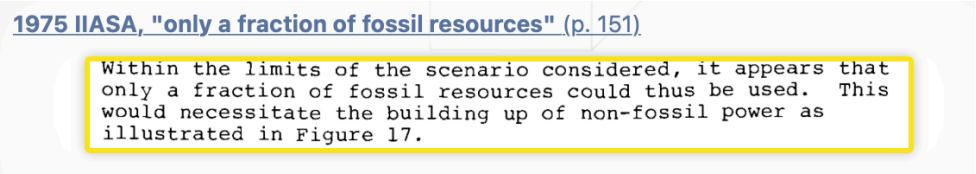
At a time of mounting public concern over nuclear safety, the authors drew a striking parallel between the dangers posed by CO2 and radioactive waste. "Both should be evaluated by the same yardstick," the report found.



1975 IIASA report, "evaluated by the same yardstick" (p. 150)

Waste heat releases pose a problem that is common to all sorts of primary energy production, conversion and use. Energy from fossil sources has a specific problem: the release of CO_2. Even if all other by-products, i.e. SO_2 or NO_x, were retained, CO_2 would still be released into the atmosphere. Increases in the CO_2 content of the atmosphere could lead to the so-called greenhouse effect, i.e. an increase in average global temperature to overcome the CO_2 infrared absorption barrier of the atmosphere. This has been estimated to be perhaps as high as 1 to 2°C for a doubling of the CO_2 content in the atmosphere, which would be enough to induce major climatic changes. Through these conceivable climatic changes, large-scale releases of CO_2 would create a risk. This risk, generated by fossil fuel waste disposal, may be considered in much the same sense as the risk from nuclear fuel waste disposal. Both should be evaluated by the same yardstick.

Anticipating today's warnings over the extent of "unburnable" fossil fuel reserves in a carbon-constrained world, the IIASA report also noted that stabilising the amount of CO2 in the atmosphere would mean using only a "fraction" of fossil fuel resources.



1975 IIASA, "only a fraction of fossil resources" (p. 151)

Within the limits of the scenario considered, it appears that only a fraction of fossil resources could thus be used. This would necessitate the building up of non-fossil power as illustrated in Figure 17.

Shell had other plans. With the Arab embargo underscoring the vulnerability of its oil business, and fears mounting that finite reserves of oil would soon run out, the company had established a new coal business, Shell Coal International. While concern over climate change was building, Shell saw the heavily-polluting fuel as the answer to the world's energy needs, and its coal business would eventually grow to span the United States, Canada, Australia and South Africa.

"Too Little Is Known"

With energy markets undergoing a period of acute uncertainty, Shell participated in a series of high-profile industry-backed research projects designed to set the terms of the debate among policymakers.

From 1974-1977, Shell was among the multinational companies that fundedand loaned staff to a study known as the Workshop on Alternative Energy Strategies — or WAES — coordinated by Carroll Wilson, a professor at MIT who had begun to champion coal after becoming disenchanted with nuclear power. Other corporate backers of the exercise included American carmaker General Motors, Italian oil major Eni, and French bank Société Générale. All shared Wilson's goal of producing an authoritative account for governments on how the world could power itself to the end of the century.

The WAES participants drew on *Work For The Future* — the report chaired by the Shell adviser Böttcher that had described the extent of the greenhouse effect as "controversial." Böttcher sent Wilson at least a hundred copies of the report, which were warmly received, and referenced in the annexes of the workshop proceedings, according to correspondence between the two men.

"I was delighted to find on my return…the supply of copies of Work for the Future. They're going like hot cakes," Wilson wrote to Böttcher.

1973 Peter from Carroll Wilson (MIT) to Frits Böttcher (p. 1)

Dr. C.J.F. Bottcher
P.O. Box 5859
The Hague, Netherlands

Dear Fritz:

I was delighted to find on my return on the 15th the supply of copies of Work for the Future. They're going like hot cakes and I am taking 25 copies to Detroit with me on Tuesday for my meeting with the Administrative Committee of General Motors.

Like *Work For The Future*, the industry-supported WAES report emphasized scientific uncertainties in its perfunctory discussion of climate risks. "Some experts fear that the effects on the climate of burning fuel may become irreversible," the WAES report acknowledged.

But the authors theorised that localised cooling caused by air pollution might counteract the greenhouse effect. "Too little is known about the complex interaction of these phenomena to say which is the true effect," the report said.

1977 WAES report, "too little is known" (p. 20)

from tanker operation).

One global effect of energy use that is of some concern is the accumulation of carbon dioxide in the atmosphere as the result of fossil fuel combustion—the so-called greenhouse effect. On the other hand, the presence of particulate matter in the atmosphere might affect climate in the opposite direction. Too little is known about the complex interaction of these phenomena to say which is the true effect. Much more systematic research, both at the regional and global levels, is required.

Other reports in the WAES authors' possession had much more explicitly spelled out the possible dangers of burning fossil fuels.

In 1974, America's Ford Foundation had published *A Time To Choose: America's Energy Future*. The study warned that the greenhouse effect could become a major problem if improved pollution control measures reduced the countervailing cooling effect of small particles in the atmosphere. Some scientists believed the build-up of atmospheric CO2 could trigger enough heating to result in a "complete melting of Arctic sea ice," "widespread disruption of agriculture," and sea level rise of "more than twenty feet." The United States and other countries might therefore need to seriously consider "zero energy growth policies," the authors found, posing a direct challenge to the fossil fuel industry's expansion plans.

1974 Ford Foundation, "complete melting of Arctic sea ice" (p. 213)

Some scientists fear the opposite effect: that the increased surface heating from CO_2 would prove more important than the cooling from particles. In that case, a sequence of events leading to a complete melting of Arctic sea ice could develop. The complete melting of Arctic sea ice could bring about climatic changes that would result in widespread disruption of agriculture. On a longer time scale it could cause a complete melting of the Greenland ice

Wilson's correspondence shows that WAES participants received 50 copies of the Ford Foundation report ahead of their first workshop in Cape Cod in October 1974. However, the Ford Foundation's most alarming warnings — such as the references to melting ice and disruption to agriculture — were not reflected in the final WAES draft.

Instead, with oil production at that time expected to peak and decline, the WAES report emphasized the scope for significant investments to expand the global coal industry, saying the fossil fuel could be a "major energy gap-filler for many countries."

The two co-authors of the coal chapter — one of whom worked for Shell — acknowledged the fuel's "severe environmental and climatic impacts." But they argued that technological solutions could be found to allow for the clean burning of coal — anticipating Shell's later promotion of carbon capture and storage technology to enable continued burning of fossil fuels.

1977 WAES report, "new and improved techniques for the clean burning of coal are necessary" (p. 28)

Widespread burning of coal will pollute the air, which could have severe environmental and climatic impacts. These issues must be faced, and ultimately resolved. If large increases in coal use are to occur, new and improved techniques for the clean burning of coal are necessary. Government policies should support research, develop-

The significance of WAES to Shell became apparent in October 1977, when the Shell Briefing Service based an edition of its world energy outlook on the rpt's findings. The publication — aimed at an internal audience across Shell's global operations — lacked any reference to climate change.

"Severe Stresses"

Meanwhile, Shell was receiving ever more precise warnings of the dangers posed by burning its products.

In 1977, Shell co-funded and helped organise a week-long academic workshop on the carbon cycle in the West German town of Ratzeburg, staged by the Scientific Committee of Problems of the Environment, or SCOPE, an international research collaboration initiative. Bert Bolin, the Swedish meteorologist who would later become the first chairman of the IPCC, took part in the session. The workshop's 491-page report, aimed at an academic audience, projected a build-up of atmospheric CO2 that "certainly warrants serious consideration with regard to possible climatic changes."

In 1978, the Shell-supported IIASA think tank issued a new report titled *Carbon Dioxide, Climate and Society* that said rising temperatures "may already be adversely influencing food production in some regions." The authors also modeled the "drastic economic consequences" that climate change could have on the breadbasket region of the U.S. corn belt.

"Lowered crop yields that in some places would result from inadvertent climate modifications would most likely place severe stresses on human societies," the report found.

1978 IIASA report, "severe stresses on human societies" (p. 234)

Lowered crop yields that in some places would result from inadvertent climate modifications would most likely place severe stresses on human societies. While other areas might benefit from climate changes, it is not yet possible to say definitively where this would occur. What impact climatic changes might have on the quality of life may be the most significant problem of all, while perhaps the least quantifiable.

Such concerns were, however, absent when Dirk de Bruyne, then president-director of Shell, took the stage at the National Economists Day in Amsterdam in October that year to outline three scenarios for Dutch society and the "world energy situation" into the year 2000.

De Bruyne concluded that the kind of "energy gap" as envisaged in *The Limits To Growth* would be "physically impossible" and foresaw an important role for coal in addition to oil.

The Shell chief made no reference to the environment or climate change.

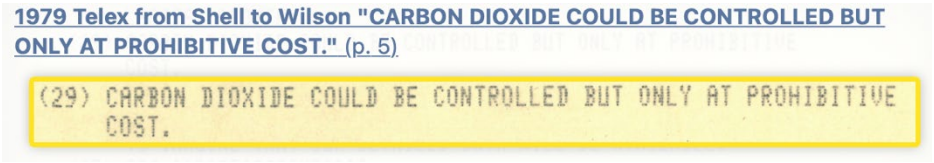
"More Positive Tone"

Shell was by then funding and providing detailed input into another industry-backed report aligned with its evolving business model — the World Coal Study, or WOCOL, also coordinated by MIT's Carroll Wilson.

Wilson saw WOCOL as a definitive study that would buoy support for coal among policymakers around the world. More than 80 people working for coal companies, industry associations, government ministries, and research institutes in coal-producing and coal-importing countries took part in the 18-month project. The final report, sold in book form, argued for a tripling of coal production to compensate for the unfounded but widespread fears at the time that oil would soon become scarce.

In 1979, a Shell executive would make detailed comments on the draft — apparently to ensure the report cast coal in a rosier light, Wilson's correspondence shows.

Frank Pecchioli, the managing director of Shell Coal International, sent Carroll extensive suggested edits by telex. The comments included: "ENITRE [Sic] SECTION ON COAL CHAINS RATHER NEGATIVE…WOULD LIKE SEE MORE POSITIVE TONE" and "RISKS ABOUND IN ALL ENERGY DEVELOPMENTS. WHY SINGLE OUT COAL?"


1979 Telex from Shell to Wilson "CARBON DIOXIDE COULD BE CONTROLLED BUT ONLY AT PROHIBITIVE COST." (p. 5)

(29) CARBON DIOXIDE COULD BE CONTROLLED BUT ONLY AT PROHIBITIVE COST.

When CO2 was mentioned at the beginning of the report, Pecchioli wrote: "CARBON DIOXIDE SO EARLY?" Another addition from Pecchioli stated: "CARBON DIOXIDE COULD BE CONTROLLED BUT ONLY AT PROHIBITIVE COST."

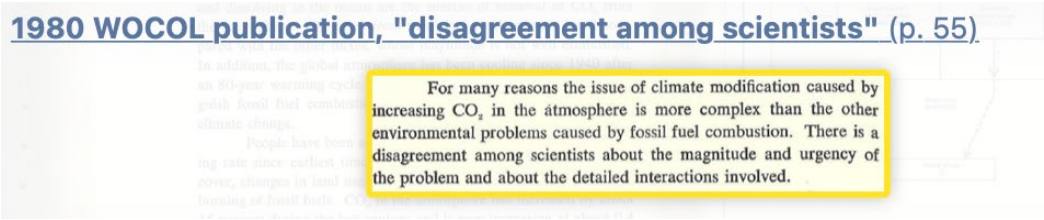
The final version of WOCOL — published in 1980 — downplayed the dangers posed by CO2 emissions from increased coal production by following the pattern established in earlier reports: Emphasizing uncertainties in climate science.

Though WOCOL acknowledged that the "greenhouse effect" might bring "disaster" to some areas, the report said it was "uncertain" whether large increases in coal combustion would be significant in comparison with "other mechanisms at work in the earth's carbon cycle."

To bolster their case, the WOCOL authors quoted from the findings of the 1979 World Climate Conference in Geneva — the world's first major climate conference. Even as the conference had warned that human-induced climate change could cause "significant" effects by 2050, it had acknowledged "uncertainty" about many of the causes of climatic variations.

WOCOL noted "disagreement among scientists about the magnitude and urgency" of the greenhouse effect and argued that "the present state of knowledge about CO2 effects on climate does not justify action to…delay the expansion of coal use."

1980 WOCOL publication, "disagreement among scientists" (p. 55)

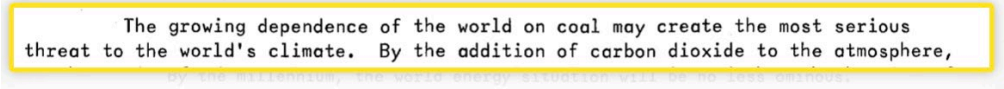


For many reasons the issue of climate modification caused by increasing CO_2 in the atmosphere is more complex than the other environmental problems caused by fossil fuel combustion. There is a disagreement among scientists about the magnitude and urgency of the problem and about the detailed interactions involved.

Such reassurances were echoed by A.A.T. van Rhijn, the deputy director general for energy affairs at the Dutch economy ministry, who had helped draft WOCOL. He told Dutch newspaper *De Volkskrant*: "There are no reasons to be found at present in the study not to proceed to a large expansion of the use of coal."

In fact, the chairman of the World Climate Conference had reached the opposite conclusion. Page five of the published proceedings stated that the world's "growing dependence" on coal may represent "the most serious threat to the world's climate."

1979 WMO World Climate Conference, "the most serious threat to the world's climate" (p. 17)



The growing dependence of the world on coal may create the most serious threat to the world's climate. By the addition of carbon dioxide to the atmosphere,

Cementing the emerging consensus over the risks posed by burning fossil fuels, an ad hoc group of climate scientists had gathered at the Woods Hole Oceanographic Institution in Massachusetts in July 1979 — five months after the World Climate Conference. Their deliberations were compiled into the report, *Carbon Dioxide and Climate: A Scientific Assessment*, known colloquially as the Charney Report. The study is still regarded as a milestone in climate science for its accuracy in projecting the rate at which human-induced increases in the concentration of atmospheric CO2 would cause global temperatures to rise.

Nevertheless, the WOCOL study — with its emphasis on scientific uncertainty — would soon play an important role in energy diplomacy. In 1980, Wilson used it to lobby U.S. President Jimmy Carter to triple coal production by the G7 countries until the year 2000. Though Wilson did not get his wish, the G7 did call for production to double.

"Safely Into The Next Century"

In 1981, Shell published *Energie*, a lavishly illustrated book aimed at a general audience with a print run of 120,000 copies. Like earlier Shell-backed publications, *Energie* emphasised uncertainties in climate science: "To what extent carbon dioxide (carbonic acid) can pose a threat to the environment is not certain; that is still a subject of in-depth international research."

Shell also released the *Time for Energy* film, which echoed the conclusions of the WOCOL report by arguing that a huge build-out of coal infrastructure was urgently required to meet future energy demand.

"New ports, new handling facilities, more ships, and rolling stock — a massive investment that will have to start now if coal is to help see us safely into the next century," the narrator intoned, over footage of coal miners operating machinery, and conveyor belts ferrying heaps of the black fuel.

Although the film noted public unease over the radioactive waste associated with nuclear power, it made no reference to climate change caused by burning fossil fuels.

Shell's interest in climate research continued, nevertheless. The company took part in a symposium staged in September 1981 by the Uranium Institute in London, where Tom Wigley, director of the Climatic Research Unit at the University of East Anglia, gave a detailed presentation on the greenhouse effect. Wigley warned that a doubling of the concentration of CO2 in the atmosphere

would produce global warming of 2-3 degrees Celsius, and that burning fossil fuels "may produce changes in climate that exceed any which have occurred naturally in the past 10,000 years."

Wigley would go on to receive a £10,000 research grant from Shell. Wigley and his colleagues published their findings in 1983, concluding that climate change could increase fluctuations in energy demand as more severe winters in Europe offset the impact of longer summers.

Shell's internal interest in climate change continued to grow, leading to the drafting in 1986 of the internal "Greenhouse Effect" memo unearthed by Mommers, the Dutch journalist, which spelled out dire risks. Three years later, in 1989, Shell joined the Global Climate Coalition (GCC), a U.S.-based fossil fuel lobby group that pushed outright denial of climate science. As public concern over climate change intensified, Shell joined other prominent companies that quit the GCC in 1998 — but not before the lobby group had made extensive efforts to manipulate and undermine the work of the IPCC, the UN scientific body. Shell remained a member of the American Petroleum Institute, which ramped up its own climate misinformation campaign in the early 2000s.

Despite Shell's initially high expectations for coal, by 1999, the company had decided to abandon the business, and put its mines up for sale. Shell's then chairman Cor Herkströter said the decision reflected the company's desire to embrace "decarbonisation."

Though coal fell by the wayside, other fossil fuels did not, and Shell's dependence on oil and gas has increasingly been the subject of legal action. In May 2021, a Dutch court ruled that the company must slash its emissions by 45 percent by 2030, compared to 2019 figures after a case brought by environmental organisation Milieudefensie. Shell has appealed the verdict, arguing that it effectively holds Shell accountable for a wider global issue — reducing consumer demand for fossil fuels — something the company says it cannot do alone.

Meanwhile, environmental law organization ClientEarth launched legal proceedings in London last month to sue Shell's directors for failing to properly prepare the company to achieve its goal of reaching net zero emissions by 2050. Shell said in response that it was delivering on the commitment, including by adopting an industry-leading target to halve emissions from its global operations by 2030, and transforming its business to provide more low-carbon energy for customers.

Fifty years after Shell staff had publicly pushed back against the warnings of mounting environmental pressures in *The Limits To Growth,* the company is still prospecting for new reserves of oil and gas.

Shell's Response in Full

- We produced the Climate of Concern documentary in 1991, which was widely disseminated.
- Shell has been advocating for a CO2 trading system for 30 years.
- In 1997 Shell publicly supported the Kyoto Protocol.
- Shell companies participate in industry associations for many reasons. Our membership is part of how we learn from others and share our knowledge; for example, industry associations play an important role in developing and implementing technical, safety and environmental standards and regulations, such as those relating to methane emissions and water management. By nature they are consensus-based organisations, and their positions don't necessarily reflect the same views as individual members.
- The Shell Group is committed to transparency on the topic of industry associations, which is why we publish industry associations reviews,which share our positions in detail.

On the Dutch court ruling:

- Shell's goal is to become a net-zero emissions energy company by 2050; appealing the Dutch court's ruling from May 2021 does not change this.
- In summary, we are appealing because there are aspects of the ruling that are just not feasible — or even reasonable — to expect Shell, or any single company, to achieve. It effectively holds Shell accountable for a wider global issue — reducing consumer demand for fossil fuels — something we cannot do alone and that requires action from business, governments and society. You can read more about our appeal here: Waarom Shell in hoger beroep gaat | Shell Nederland.
- The court ruling gives Shell broad discretion to determine how the emissions reduction should be achieved. Importantly, the court did not impose a prohibition on new oil and gas investments; it recognised that Shell may need to consider, among other ways of complying with the ruling, forgoing new investments in the extraction of fossil fuels and / or limiting its production of fossil resources. It also stated that Shell is entitled to take its contractual obligations into account. You can read more here: In beroep gaan is niet negeren | Shell Nederland.
- As we wait for the outcome of the appeal, we are taking active steps to comply with the ruling. We believe the actions we are taking to deliver our energy transition strategy are consistent with the court ruling and its end of 2030 timeline. This includes the investments we are making in low-carbon fuels, renewable power, and hydrogen; in addition to making changes to our upstream and refinery portfolios.