**Rechtbank Den Haag**

Zaaknummer: C/09/571932 2019/379

Datum: 11 december 2020

**AKTE OVERLEGGEN AANVULLENDE PRODUCTIE**

inzake:

1. **Vereniging Milieudefensie**
   zowel voor zichzelf, als in haar hoedanigheid van procesgevolmachtigde en vertegenwoordiger van de mede-eisers die zijn vermeld op **bijlage A**, welke bijlage aan de dagvaarding is gehecht en daar deel van uitmaakt,
   gevestigd te Amsterdam;
2. **Stichting Greenpeace Nederland**,
   gevestigd te Amsterdam;
3. **Landelijke Vereniging tot Behoud van de Waddenzee**, gevestigd te Harlingen;
4. **Stichting ter bevordering van de Fossielvrij-beweging**, gevestigd te Amsterdam;
5. **Stichting Both ENDS**, gevestigd te Amsterdam;
6. **Jongeren Milieu Actief**, gevestigd te Amsterdam;
7. **Stichting ActionAid**, gevestigd te Amsterdam

Eisers

Hierna ook te noemen: "Milieudefensie c.s."

Advocaten: mr. R.H.J. Cox, mr. D.M.J. Dexters, mr. A.J.M. van Diem en mr. S.J. Keuls

Contra

**Royal Dutch Shell plc**

Gevestigd te 's Gravenhage

Gedaagde

Advocaten: mr. J. de Bie Leuveling Tjeenk, mr. N.H. van den Biggelaar en mr. D. Horeman

PAULUSSEN ADVOCATEN

1. Ter onderbouwing van haar stellingen brengt Milieudefensie c.s. alsnog de navolgende aanvullende productie in het geding, als aangehecht in de bijlage bij deze akte:

   **Productie 337:** Review of Mulder et al. 2020, by Peter Erickson, Senior Scientist, Stockholm Environment Institute (U.S. Center), December 10, 2020 (inclusief CV van Peter Erickson)

2. Op 30 oktober 2020 heeft Royal Dutch Shell plc (hierna ook: RDS) als nadere productie RK-35 het "Mulder-rapport" ingebracht. Het betreft een Policy Paper van 99 pagina's dat op verzoek van De Brauw Blackstone Westbroek N.V. en met financiële ondersteuning van RDS tot stand is gebracht door Machiel Mulder et al (zie pagina 2 van het Mulder-rapport).

3. Naar aanleiding van het Mulder-rapport is door Peter Erickson als korte reactie een expert statement opgesteld, dat Milieudefensie c.s. hierbij als productie 337 in het geding brengt. Peter Erickson is onderzoeker bij het Stockholm Environment Institute, zijnde een van de instituten die samen met UNEP het Production Gap rapport heeft geschreven dat als productie 276 door Milieudefensie c.s. is ingebracht. Zie ook het curriculum vitae van Peter Erickson dat samen met productie 337 is overgelegd.

4. De expert statement is uitgebracht op 10 december 2020 (door Milieudefensie c.s. ontvangen op 10 december 2020 om 22u52), reden waarom het door Milieudefensie c.s. niet eerder in het geding gebracht kon worden.

5. Daarenboven kent de expert statement een beperkte omvang (slechts 4 pagina's) en sluiten de bevindingen van Erickson aan bij de stellingen en producties die al eerder door Milieudefensie c.s. zijn ingenomen en in het geding zijn gebracht. In zoverre gaat het dan ook niet om nieuwe informatie. Milieudefensie c.s. zal tijdens de zittingsdagen op 15 en/of 17 december 2020 citeren uit de expert statement van Erickson. Door het korte rapport reeds nu over te leggen, wordt RDS in staat gesteld om hier voldoende kennis van te nemen en zich hierop voor te bereiden, zodanig dat zij adequaat kan reageren tijdens de zittingen op 15 en/of 17 december 2020. Mitsdien is geen sprake is van schending van het beginsel van hoor en wederhoor.

6. Om bovengenoemde redenen is het gerechtvaardigd deze aanvullende productie alsnog in te brengen en is geen sprake van strijdigheid met de goede procesorde.

7. Milieudefensie c.s. menen hun stellingen met alle in het geding gebrachte (bewijs)stukken genoegzaam te hebben bewezen en voldoende te hebben onderbouwd maar bieden hierbij nogmaals uitdrukkelijk aan om hun stellingen – voor zover zij op grond van artikel 150 Rv daartoe zijn gehouden – nader te bewijzen door het aanbieden van aanvullende stukken, waaronder doch niet daartoe beperkt het in het geding brengen van nader wetenschappelijk bewijs aangaande de oorzaken en gevolgen van klimaatverandering voor (de doelstellingen van) Milieudefensie c.s., alsook bewijs aangaande de noodzaak van de vereiste reductiemaatregelen en de te eisen reductievorderingen, evenals door dienaangaande getuige-deskundigen te doen horen. Daartoe behoort in ieder geval bewijs in de vorm van stukken en/of getuige-deskundigen afkomstig van het Stockholm Environment Institute, meer in het bijzonder ook ten aanzien van het vraagstuk van de causaliteit.

8. In aanvulling op bovenstaande biedt Milieudefensie c.s. aan op verzoek van de rechtbank de literatuur en jurisprudentie waarnaar door haar wordt verwezen in deze procedure (digitaal) over te leggen.

Waarvan akte!

Advocaat,

PAULUSSEN
ADVOCATEN

# Review of Mulder *et al.* 2020

Peter Erickson, Senior Scientist, Stockholm Environment Institute (U.S. Center)
December 10, 2020

In November 2020, three researchers at the University of Groningen's Centre for Energy Economics Research (CEER) published a report exploring whether a reduction in oil and gas extraction by Royal Dutch Shell (Shell) would reduce global oil and gas consumption. Their report, "Bedrijfsspecifieke beperking in exploratie en productie en het effect op het wereldwijde verbruik van fossiele energie: Een analyse toegespitst op de positie van Shell", was carried out at Shell's request, as part of legal proceedings initiated by Milieudefensie (Friends of the Earth Netherlands), and with Shell's financial support. The report was published on the University of Groningen's web site[1].

The report contains findings that are important for understanding the relationship between global oil and gas production and consumption, as well as some assertions that are misleading and not supported by their evidence. This memo describes my observations about these findings and issues.

My qualifications and experience are detailed in my C.V., attached here as an appendix. In particular, I have published scientific articles on the relationship between oil and gas extraction and global climate change in several peer-reviewed scientific journals, including *Nature*[2], *Nature Energy*[3], *Nature Climate Change*[4], and *Climatic Change*[5]. In addition, I have been a co-author of the *Production Gap Report*, which describes how oil and gas must phase down to meet climate goals[6]. I received no financial support from Milieudefensie, or from other parties associated with the legal proceedings, to write this review.

Throughout this critique, I will refer to the CEER paper according to normal scientific convention, as Mulder *et al.*

## 1 Mulder *et al.* acknowledge that restrictions to oil and gas supply can affect price and, in turn, consumption

In section 4.4 (page 69) of their report, the authors describe the dynamics of how a decrease in oil or gas supply (a "supply disruption") can increase prices and, in turn, decrease consumption. As described in their report, a decrease in supply leads to a decrease in consumption whenever other producers are not able to compensate for all the avoided supply. This "partial compensation" occurs "when other producers can only produce more at higher costs, while consumers are price-sensitive." "In such a situation," the authors write, "the new market balance will be characterised by lower volumes and higher prices."

I agree with this statement, and it is supported by historical reviews of oil and gas prices[7,8]. The connections between supply restrictions, prices, and consumption levels is important, because if reducing supply leads to "lower volumes", then the carbon dioxide emissions from combusting those volumes of oil and gas must also be lower, since each barrel of oil or cubic meter of gas contains carbon that, once burned, is released to the atmosphere as carbon dioxide ($CO_2$)[9]. Numerous scientific articles have shown how restricting fossil fuel supply increases fossil fuel prices and, in turn, reduces global $CO_2$ emissions, relative to what would have occurred without the supply restriction[4,10–13]. This occurs because, as described above, an increase in price of a fossil fuel leads to lower consumption of that fuel, and lower consumption means less resulting $CO_2$ emissions from burning that fuel.

## 2 Despite acknowledging the connection between reduced oil and gas supply and prices, Mulder *et al.* use misleading evidence to downplay the effect of supply restrictions

Mulder *et al.* introduce figures that they use to downplay the connection between reduced oil and gas supply and prices. These examples are misleading, and upon closer examination, fail to demonstrate what the authors are seeking to show.

For example, the authors introduce Figure 4.3, which shows the gas price in the Netherlands over time (page 71). They assert that Figure 4.3 shows "that a temporary price increase occurred after the announced production limitation, which disappeared after some time." However, it is not possible to determine from the figure whether the price increase "disappeared after some time". Any effect on prices must be measured relative to a counter-factual scenario of what would have happened otherwise *without* the production limitation that occurred in 2012, not just looking at how the price changed from one year to the next after 2012. It is entirely possible that the price in later years (e.g., 2014 and 2015) would have been even *lower* if not for the production limitation back in 2012, and therefore that, contrary to the authors' assertions, that the production limitation did indeed have an enduring effect.

Furthermore, the authors make another error in comparing the size of the gas price increase in 2012 to the size of other price increases in later years. ("Measured over a period of a few years, this price effect is minimal compared to other effects on the gas price"). The size of "other effects on the gas price" due to factors (here, air temperature and corresponding demand for gas heating) *other* than production limitations does not invalidate the existence of the price increase in 2012 or its relationship to the production limitation. Whether other factors (beyond production limitations) *also* affect price is irrelevant. This is therefore a logical flaw in Mulder *et al.*'s argument: just because the effect of a production limitation is small compared to other effects does not mean it does not exist. What is important here is that, as the authors acknowledge, prices did increase, not the authors' subjective characterization of the effects as "no significant price effects", and of gas prices being "hardly influenced." Crucially, if the prices increase, then, because consumers are price-sensitive[14,15], it is also true that consumption decreases, as well as that the producers not affected by the restrictions were higher cost (see argument #1, above).

Mulder *et al.* make a similar mistake in their figure about oil, in Figure 4.5 (page 75). Here, they argue "that prolonged and significant interruptions in oil production do not seem to have hindered a steady increase in world oil consumption," since world oil consumption continued an upward trend. But, as for their gas analysis, here the authors confuse an increase *over time* for an increase *relative to the counterfactual scenario* of what oil consumption would have done absent the "prolonged and significant interruptions in oil production." It is entirely possible instead that the consumption of oil may have gone up even *more* had the production interruption not occurred. Oil market economists have statistical techniques to separate the price effects of oil production restrictions from the background "noise" of price effects due to other factors. Those analyses consistently show that reducing oil supply increases oil prices and reduces oil consumption[7,8,10]. Here, Mulder *et al.* are substituting their own anecdotal observations of a single figure for oil-market analysis and, as a result, drawing conclusions not supported by their evidence.

## 3 Instead of Mulder *et al.*'s approach, it is straight-forward to make simple, scientifically sound assumptions that allow for quantification of the net $CO_2$ emission benefits of restricting oil and gas supply

As I describe above, just because an effect on oil or gas consumption is small relative to other effects does not mean it is necessarily insignificant. A better approach would be to first quantify the effect of a supply restriction, and then debate the significance.

Such quantification can be done using simple economic principles and models. For example, parameters called economic elasticities can be used to estimate what fraction of a quantity of oil left undeveloped will not be compensated by other producers and will therefore result in a net reduction in oil consumption. (One study, which I co-authored, found that, for each barrel of oil left undeveloped due to a supply restriction, net global oil consumption will be reduced by 0.2 to 0.6 barrels over the long term[4].) Since each barrel of oil contains about 400 kg of $CO_2$,[4,9] the calculation can be very straightforward, and presented with a range of plausible results.

## 4 Mulder *et al.* also argue that if Shell did not produce oil and gas from their existing licenses, other companies would. These arguments are incomplete and unconvincing.

Mulder *et al.* argue that, "Should Shell receive an injunction forcing it to reduce its activities in oil and gas production, it is therefore obvious to expect that Shell will transfer its existing licences (or participations in them) to other companies or that Shell will return them to the government concerned" and, further, that the government would "allow other companies to take over the activities, for example through an auction" (page 6).

This argument is, essentially, that it makes no difference whether Shell produces from the existing license or not, because any other producer (or government) would do the exact same thing as Shell.

This argument is incomplete and unconvincing for three reasons.

First, it is not necessarily the case that, were Shell to give up its licenses, that the governments would re-issue them. For example, Shell has been active in Denmark for over a century[16]. In early December, however, Denmark announced it will cancel all future licensing auctions, joining France, Ireland, and New Zealand, who have made similar restrictions[17]. As nations pursue efforts to align their energy policies with Paris Agreement's temperature targets, therefore reaching net zero emissions by mid-century[6], further efforts to limit oil and gas licensing may emerge, increasing the likelihood that, should licenses not be used soon – especially if returned to the issuing governments – then they may not be used at all.

Second, other companies may not be able to bring new oil and gas projects online for the same cost (or on the same timeline) as Shell. If other companies were not as cost-efficient as Shell in developing new projects, then those projects may be more vulnerable to oil price swings or other risks that could delay project completion. Indeed, one major oil consultancy indicates that Shell has costs below the industry average[18], suggesting that, were Shell to transfer its existing licenses to another firm, the (average) result could be an increase in costs.

Third, were Shell to "receive an injunction forcing it to reduce its activities in oil and gas production", or instead choose to do so voluntarily, the action could have a broader effect on risk perceptions and the investment climate for oil and gas and, therefore, indirectly reduce oil and gas production. This increase in investment risk in the sector could be transmitted through one of several channels[19], including reputational risk, litigation risk, or shareholder action, but the end result would be that the credit risk and cost of capital for the sector could increase[20]. An increase in cost of capital for new oil and gas projects would, through increase in project costs, then translate into decreases in oil or gas production, and then, through effects in oil and gas markets, to decreases in consumption and $CO_2$ emissions[2].

## Summary

As I describe above, the Mulder *et al.* report makes some important observations about oil and gas markets. However, the authors also draw several questionable and misleading conclusions from the evidence they present.

A closer examination of Mulder *et al.*'s evidence suggests that restricting Shell's oil and gas production would indeed help reduce global $CO_2$ emissions. Rather than dismiss this possibility, analysts interested in the role of Shell in meeting global climate limits should instead make credible estimates of the effect of a company reducing its oil and gas production on global emissions, using simple, transparent assumptions.

**References**


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2. Erickson, P. *et al.* Why fossil fuel producer subsidies matter. *Nature* **578**, E1–E4 (2020).
3. Erickson, P., Down, A., Lazarus, M. & Koplow, D. Effect of subsidies to fossil fuel companies on United States crude oil production. *Nat. Energy* **2**, 891–898 (2017).
4. Erickson, P., Lazarus, M. & Piggot, G. Limiting fossil fuel production as the next big step in climate policy. *Nat. Clim. Change* **8**, 1037–1043 (2018).
5. Erickson, P. & Lazarus, M. Would constraining US fossil fuel production affect global CO2 emissions? A case study of US leasing policy. *Clim. Change* **150**, 29–42 (2018).
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# Peter A. Erickson

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## Professional Summary

- Broad expertise in greenhouse gas abatement and policy analysis. Published first-author research articles in prominent journals, including *Climatic Change, Climate Policy, Energy Policy, Environmental Research Letters, Environmental Science and Technology, Nature, Nature Climate Change,* and *Nature Energy.*
- Twenty years experience in environmental policy research and consulting, supported by funders such as UNFCCC, European Commission, World Bank, U.S. EPA, Bloomberg Philanthropies, Energy Foundation, KR Foundation, Schmidt Family Foundation, C40 Cities, World Resources Institute, NRDC, SIDA, U.S. states of Washington and Oregon, Western Climate Initiative, City of Seattle, City of Chicago
- Outstanding skills in economic and financial analysis, modeling, writing, public speaking, project management, communication

## Professional Experience

**2008-Present** **STOCKHOLM ENVIRONMENT INSTITUTE – U.S., SEATTLE, WA**
**Staff Scientist 2008-2011; Senior Scientist 2012-2020**

**Selected Projects and Research**

- **Oil market economics.** Leading long-term research into how supply and demand in oil markets interact, and with what $CO_2$ emissions implications. Major research publications in *Nature, Nature Climate Change, Nature Energy, Climatic Change*, and others. Popular commentary in the *New Yorker, Scientific American, Seattle Times, Salt Lake Tribune, Texas Tribune,* others.
- **Emissions implications of new fossil fuel supply infrastructure.** Researching the GHG implications and lock-in of investments in new infrastructure for supplying fossil fuels, such as oil pipelines, coal export facilities, and chemical facilities.
- **GHG emissions abatement potential of the world's cities.** Led a research effort, funded by Bloomberg Philanthropies, on the GHG emissions abatement potential of urban-scale policy levers worldwide.
- **Net emissions impact of the CDM.** Lead researcher for the UNFCCC's High Level Panel on the CDM Policy Dialogue focused on additionality and over- or under-crediting in the CDM. Contributed chapter to major research report.
- **Implications of international offsets on global climate mitigation.** Researched and modeled the supply and environmental efficacy of alternative sources and methods of crediting greenhouse gas offsets from developing countries.
- **Scenarios of domestic offset supply in a U.S. cap-and-trade system.** Lead researcher, with Michael Lazarus, on a partnership between SEI and the World Resources Institute on the economics and emissions implications of domestic greenhouse gas offsets.
- **Embodied emissions in international trade.** Led a research initiative on the embodied emissions in international trade and assessing opportunities to shift trade for both emissions and development benefits.
- **Emissions leakage and the CDM.** With Michael Lazarus, conducted an assessment of the potential for the CDM to induce activity or emissions leakage in the cement, steel, and aluminum sectors.

- **King County (WA) consumption-based GHG inventory and GHG measurement framework.** Led effort to conduct geographic and consumption-based greenhouse gas inventories and recommend a new measurement framework for King County.
- **Role of behavior and consumption in global climate mitigation.** Developed a method to estimate the GHG reductions for a nation or community due to shifts in consumption behaviors. Working paper published summer 2012.
- **City of Seattle (WA) carbon neutral scenario analysis.** Contributing to a technical scenario analysis of how the Seattle community could reduce greenhouse gas emissions to near zero in the next few decades, with a focus on the buildings and transportation sectors.
- **State of Oregon consumption-based GHG inventory.** Peter was the project manager on this effort to develop a consumption-based (rather than production- or geographic-based) GHG inventory for the State of Oregon. Published in *Environmental Science and Technology* in 2012.
- **Europe deep GHG emissions reduction scenario.** Peter developed a deep greenhouse gas reduction scenario for the EU-27's transportation, buildings, and agriculture sectors – the deepest reduction scenario proposed EU-wide at the time of its publication.
- **Greenhouse gas mitigation potential in developing countries (US EPA).** Peter was the lead researcher on a study of greenhouse gas mitigation potential and policies in six developing countries for the U.S. EPA. Published as working paper, June 2009.
- **Industry greenhouse gas benchmarking.** Peter led an assessment of benchmarking as a policy tool for reducing industrial GHGs. Funded by the Washington Department of Ecology and the Energy Foundation.
- **GHG and green energy planning in Mongolia.** Researcher on alternative scenarios of Mongolia's energy development.

**2000-2008 CASCADIA CONSULTING GROUP, SEATTLE, WA**
Senior Associate (2006-2008); Associate (2002-'05); Project Assistant ('00-'01)

**Selected Projects - 2008**

- **Climate Change Policy Initiatives (Seattle City Council).** Peter led the development of a legislative agenda to address climate change
- **Energy Efficiency Policy Study (Seattle Office of Sustainability and Environment).** Led a study of energy efficiency policies for existing buildings in Seattle to support Mayor Greg Nickels' Green Building Task Force.
- **Carbon Footprint Calculator (Seattle Office of Sustainability and Environment)** Updated the City of Seattle's greenhouse gas footprint tool for businesses to include a greater focus on business supply chain (included upstream, embedded emissions) and year-to-year tracking.
- **Greenhouse Gas Inventory (Pierce County, Washington).** Oversaw Pierce County's greenhouse gas inventory process.

**Selected Projects – Pre-2008**

- **Carbon Footprint Calculator (Seattle Office of Sustainability and Environment)** Peter created the City of Seattle's greenhouse gas footprint tool for businesses
- **Other Carbon Footprint Calculators (Various clients).** Peter adapted the Seattle carbon footprint calculator for use by several other state and local jurisdictions
- **Oregon Waste Prevention Strategy (Oregon Department of Environmental Quality).** Peter contributed to research in support of DEQ's Waste Prevention Strategy.
- **Zero Waste Plan (City of Chicago).** Led several tasks of the development of a Zero Waste Plan for the City of Chicago.

## Committees

| | |
|---|---|
| **2015** | Compact of Mayors, City Mitigation Goals – Member of aggregation technical advisory group. |
| **2012-2014** | WRI GHG Protocol Mitigation Accounting Initiative. Member of the mitigation goals accounting technical working group. |
| **2010-2012** | ICLEI-US Community Greenhouse Gas Protocol. Member of the lifecycle technical advisory committee |

## Education

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|---|---|
| **1994-1998** | Carleton College, Northfield, Minnesota, USA<br>B.A with major in geology and extensive studies in mathematics, studio art<br>*Magna Cum Laude, Phi Beta Kappa*, with distinction in major; GPA: 3.83 |

## Selected Recent (2009-2020) Publications


SEI, IISD, ODI, E3G and UNEP (2020). The Production Gap: Special Report 2020. http://productiongap.org/ [I was a lead author of Chapter 2 and contributing author to other chapters.]

**Erickson, P.** and Lazarus, M. (2020). Examining Risks of New Oil and Gas Production in Canada. SEI report. Stockholm Environment Institute, US Center, Seattle. https://www.sei.org/publications/examining-risks-of-new-oil-and-gas-production-in-canada/

**Erickson, P.** et al. (2020). Why fossil fuel producer subsidies matter. *Nature* 578, E1–E4.

SEI, IISD, ODI, Climate Analytics, CICERO, & UNEP. (2019). The Production Gap Report 2019. Retrieved from http://productiongap.org/ [I was the lead author of Chapter 2 and contributing author to other chapters.]

Koski, J., Kartha, S., & **Erickson, P.** (2019). Principles for aligning US fossil fuel extraction with climate goals. https://www.sei.org/publications/principles-for-aligning-fossil-fuel-extraction-with-climate-limits/

Broekhoff, D., Piggot, G., & **Erickson, P.** (2019). Estimating consumption-based greenhouse gas emissions at the city scale [SEI Report]. https://www.sei.org/publications/consumption-based-greenhouse-gas-emissions-city-scale/

**Erickson, P.**, Lazarus, M., & Piggot, G. (2018). Limiting fossil fuel production as the next big step in climate policy. *Nature Climate Change,* 8, 1037–1043. https://doi.org/10.1038/s41558-018-0337-0

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