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HEARING ON

CLIMATE CHANGE AND THE COSTS TO NATIONAL SECURITY

COMMITTEE ON THE BUDGET

U.S. SENATE

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Chairman Whitehouse, Ranking Member Grassley, and Members of the Committee, thank you for the opportunity to testify before you today regarding climate change and the costs to national security. Climate change is indeed an important topic. Having been in charge of the National Oceanic and Atmospheric Administration (NOAA), America's top climate science agency, and having led the U.S. Navy's Task Force on Climate Change, I have spent years researching and applying knowledge of the physical, biological, and chemical changes in the Earth system.

When it comes to national security, certain changes to the planet's climate are indeed concerning. Take the Arctic, where warming induced sea ice loss is opening new shipping lanes and access to natural resources, enticing both China<sup>1</sup> and Russia<sup>2</sup> to become more assertive in the region.

Another concern is sea level rise, which is combining with geological subsidence to make military bases in the Southeast and Mid-Atlantic areas of the U.S. more prone to inundation, which affects training and readiness<sup>3</sup>.

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<sup>1</sup> [https://breakingdefense.com/2024/03/amid-chinese-activity-new-northcom-chief-calls-for-more-exercises-near-arctic/?utm\\_campaign=dfn-ebb&utm\\_medium=email&utm\\_source=sailthru&SToverlay=2002c2d9-c344-4bbb-8610-e5794efcfa7d](https://breakingdefense.com/2024/03/amid-chinese-activity-new-northcom-chief-calls-for-more-exercises-near-arctic/?utm_campaign=dfn-ebb&utm_medium=email&utm_source=sailthru&SToverlay=2002c2d9-c344-4bbb-8610-e5794efcfa7d)

<sup>2</sup> <https://www.cbsnews.com/news/russia-arctic-military-presence-ukraine-war-nears-two-year-mark/>

<sup>3</sup> <https://crsreports.congress.gov/product/pdf/IF/IF11275>

However, I find it unfortunate that the approach to climate change by the DoD under the Biden Administration is deeply flawed. Consider the *2022 National Security Strategy* which calls climate change “the existential challenge of our time.”<sup>4</sup> This is an unfounded claim. It assumes that (a) we know with certainty that global scale, life threatening change will occur, and (b) our species will be unable to adapt to this change. Both points are problematic. For one, climate projections are rife with uncertainty<sup>5</sup>. Secondly, our species has proved to be quite resilient through significant climatic changes in the past<sup>6</sup>. Thirdly, a majority, if not all, of the scientific literature pointing to disastrous outcomes for humanity due to climate change employs implausible emissions scenarios<sup>7</sup>. Even the Administration’s EPA has adopted<sup>8</sup> more realistic scenarios<sup>9</sup> where global emissions begin to decrease mid-century.

Personally, I view Russia’s intention of developing an indiscriminate nuclear weapon in space as a potential existential threat<sup>10</sup>. Or perhaps an asteroid impact on the planet, which NASA is preparing for because we know an extinction event was caused by one in the past<sup>11</sup>.

The cost-imposing security threats we should be talking about here are obvious: Russia’s war on Ukraine, the war between Israel and Hamas supported by a nuclear-aspiring Iran, strikes by Iranian proxies on global shipping and U.S. assets in the Middle East, and China’s Navy eclipsing that of the U.S. to become the world’s largest with its sights set on taking Taiwan in the near future. None of these were generated by or are made significantly worse by climate change<sup>12</sup>.

Another failing in the DoD’s approach regards the *DoD Climate Risk Analysis*<sup>13</sup> released in 2021. Curiously, this was a month *after* the release of the *DoD Climate Adaptation Plan*<sup>14</sup>. Risk analyses are a standard part of the military planning process<sup>15</sup>, so the sequencing of these two documents is suspect.

A more disquieting aspect of this document is the complete absence of citations of peer-reviewed scientific research regarding the climatic trends it identifies. In fact, the *DoD Climate Risk Analysis* presents no actual analysis at all. Instead, it simply asserts a range of security implications resulting from climate change. The problem with these assertions is that they are too

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<sup>4</sup> <https://www.whitehouse.gov/wp-content/uploads/2022/11/8-November-Combined-PDF-for-Upload.pdf>

<sup>5</sup> <https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2022EF002963>

<sup>6</sup> <https://www.smithsonianmag.com/science-nature/how-did-climate-change-affect-ancient-humans-180979908/>

<sup>7</sup> <https://thebreakthrough.org/journal/no-20-spring-2024/the-social-feedback-loops-that-constrain-climate-science?>

<sup>8</sup> [https://www.epa.gov/system/files/documents/2022-11/epa\\_scghg\\_report\\_draft\\_0.pdf](https://www.epa.gov/system/files/documents/2022-11/epa_scghg_report_draft_0.pdf)

<sup>9</sup> [https://media.rff.org/documents/WP\\_21-28\\_V2.pdf](https://media.rff.org/documents/WP_21-28_V2.pdf)

<sup>10</sup> <https://spacenews.com/defense-space-policy-chief-calls-russias-space-nuke-threat-a-thing-apart/>

<sup>11</sup> <https://www.jpl.nasa.gov/edu/news/2022/9/22/the-science-behind-nasas-first-attempt-at-redirecting-an-asteroid/>

<sup>12</sup> [https://www.realcleardefense.com/articles/2023/04/19/the\\_pentagon\\_needs\\_to\\_put\\_climate\\_clarity\\_at\\_the\\_top\\_of\\_its\\_target\\_list\\_894526.html?mc\\_cid=03c1d9553a&mc\\_eid=a291dd073d](https://www.realcleardefense.com/articles/2023/04/19/the_pentagon_needs_to_put_climate_clarity_at_the_top_of_its_target_list_894526.html?mc_cid=03c1d9553a&mc_eid=a291dd073d)

<sup>13</sup> <https://media.defense.gov/2021/Oct/21/2002877353/-1/-1/0/DOD-CLIMATE-RISK-ANALYSIS-FINAL.PDF>

<sup>14</sup> <https://www.sustainability.gov/pdfs/dod-2021-cap.pdf>

<sup>15</sup> [https://www.rand.org/content/dam/rand/pubs/research\\_reports/RR2100/RR2173z2/RAND\\_RR2173z2.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/RR2100/RR2173z2/RAND_RR2173z2.pdf)

vague to make sound investment decisions; they lack the analytical rigor required by standard defense risk analyses<sup>16</sup>; and in some cases, they are flat out wrong. For example, in the foreword of the *DoD Climate Risk Analysis*, Secretary Austin states that typhoons are occurring at an “unprecedented scale.” Not a single scientific study supports that statement. In fact, the frequency of major hurricanes and typhoons has seen no upward or downward change over the past four decades<sup>17</sup>.

Another fault in the *DoD Climate Risk Analysis* is that it focuses narrowly on the negative impact of climate change rather than a holistic assessment of what is really happening across the planet. One would never know this after reading the Administration’s trove of directives regarding climate change, but many climate-sensitive aspects of human society have been trending in a positive direction over the past 50 years despite ~1.3°C of warming<sup>18</sup>: Crop yields<sup>19</sup> and calories available per person<sup>20</sup> have increased; death rates from malnutrition<sup>21</sup> and famines<sup>22</sup> have decreased; the share of the population<sup>23</sup> with access to safe drinking water has increased; the rates of climate-influenced diseases like malaria<sup>24</sup> have decreased; death rates from natural disasters<sup>25</sup> have decreased; death rates from non-optimal temperatures<sup>26</sup> (hot and cold) have decreased; and the fraction of people in extreme poverty<sup>27</sup> has plummeted.

Additionally, for some climate trends in the DoD analysis, climate change is only one of several causal factors. For example, land and forest management practices are key contributors to the occurrence of wildfires<sup>28</sup>, in addition to climate.

A final failing in the DoD’s approach is its emphasis on greenhouse gas emissions. The Department of the Navy has prioritized mitigating climate change by establishing targets for reducing emissions<sup>29</sup>. Reaching such targets will have a near zero impact on net global emissions, warming, and climate change. The DoD was responsible for only ~1%<sup>30</sup> of the ~5

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<sup>16</sup> <https://thehill.com/opinion/national-security/4380722-the-dod-must-ditch-its-delusional-approach-to-climate/>

<sup>17</sup> <https://www.climatedepot.com/2024/01/24/analysis-hurricanes-have-not-become-more-intense-since-1980-based-on-ace-or-accumulated-cyclone-energy-combining-frequency-intensity/>

<sup>18</sup> <https://thebreakthrough.org/journal/no-20-spring-2024/the-social-feedback-loops-that-constrain-climate-science?>

<sup>19</sup> <https://ourworldindata.org/grapher/key-crop-yields?stackMode=relative>

<sup>20</sup> <https://ourworldindata.org/food-supply>

<sup>21</sup> <https://ourworldindata.org/grapher/malnutrition-death-rates?tab=chart>

<sup>22</sup> <https://ourworldindata.org/famines#famine-across-the-world-since-1860>

<sup>23</sup> <https://ourworldindata.org/water-sanitation-2020-update>

<sup>24</sup> <https://ourworldindata.org/malaria>

<sup>25</sup> <https://ourworldindata.org/natural-disasters>

<sup>26</sup> <https://thebreakthrough.org/issues/energy/human-deaths-from-hot-and-cold-temperatures-and-implications-for-climate-change>

<sup>27</sup> <https://ourworldindata.org/extreme-poverty-in-brief>

<sup>28</sup> <https://pubs.usgs.gov/fs/2019/3025/fs20193025.pdf>

<sup>29</sup> [https://www.navy.mil/Portals/1/Documents/Department%20of%20the%20Navy%20Climate%20Action%202030%2020531.pdf?ver=3Q7ynB4Z0qUzIFg\\_2uKnYw%3d%3d&timestamp=1654016322287](https://www.navy.mil/Portals/1/Documents/Department%20of%20the%20Navy%20Climate%20Action%202030%2020531.pdf?ver=3Q7ynB4Z0qUzIFg_2uKnYw%3d%3d&timestamp=1654016322287)

<sup>30</sup> <https://media.defense.gov/2023/Jun/16/2003243454/-1/-1/1/2023-DOD-PLAN-TO-REDUCE-GREENHOUSE-GAS-EMISSIONS.PDF>

billion<sup>31</sup> metric tons of U.S. CO2 emissions in 2021, which pales in comparison to coal hungry<sup>32</sup> China's 10 billion metric tons<sup>33</sup>. The Navy's objective to reduce emissions is a dangerous distraction from its need to deter the security threats mentioned previously<sup>34</sup>.

I do not mean to dismiss the good work the Department is doing to adapt to climate change. When I led the Navy's Task Force Climate Change, I called for climate risk assessments for all military installations<sup>35</sup>. The DoD is following through with these which are essential to adapt to situations like the frequent flooding on and around Naval Station Norfolk<sup>36</sup>.

I also strongly support the first Line of Effort in the *DoD Climate Adaptation Plan: Climate-Informed Decision Making*. I will even say that the DoD needs to invest more in this area. The most effective way to prepare for climate change is to improve short-term, sub-seasonal, and seasonal forecasts for weather, water, and ice. This can be accomplished by expanding the network of environmental observation systems, including satellites<sup>37</sup>, buoys<sup>38</sup>, ships<sup>39</sup>, and drones<sup>40</sup>, as well as improving the numerical models used to predict<sup>41</sup> the state of the physical environment.

Such improvements do not require significant growth in the Pentagon's budget. As NASA has done with SpaceX, the DoD can accelerate its climate readiness by partnering with the private sector<sup>42</sup>, where a variety of innovative startups are providing the tools that can help the U.S. military avoid hazards<sup>43</sup> and prevail in any operational environment. A few examples include:

- The Boston-based company Tomorrow.io<sup>44</sup> is working with the U.S. Air Force to deploy the first-ever constellation of Low Earth Orbit satellites equipped with Ka-band radars

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<sup>31</sup> <https://www.eia.gov/todayinenergy/detail.php?id=52380>

<sup>32</sup> <https://thehill.com/opinion/energy-environment/4308889-bidens-environmental-agenda-is-meaningless-if-he-doesnt-push-china-to-change-too/>

<sup>33</sup> <https://ourworldindata.org/co2/country/china>

<sup>34</sup> <https://thehill.com/opinion/3778861-for-the-navy-and-marines-weather-readiness-is-climate-readiness/>

<sup>35</sup> <https://www.eesi.org/briefings/view/052214southeast>

<sup>36</sup> <https://www.defense.gov/News/News-Stories/Article/Article/2703096/dod-navy-confront-climate-change-challenges-in-southern-virginia/>

<sup>37</sup> <https://thehill.com/opinion/national-security/3661897-the-department-of-defense-needs-more-commercial-data-to-weather-future-storms/>

<sup>38</sup> <https://thehill.com/opinion/technology/598504-the-us-needs-open-ocean-data-to-avoid-an-innovation-wipeout/>

<sup>39</sup> [https://www.realcleardefense.com/articles/2023/02/22/all\\_us\\_navy\\_ships\\_should\\_be\\_motherships\\_for\\_unmanned\\_systems\\_883159.html?mc\\_cid=ac0a87d881&mc\\_eid=a291dd073d](https://www.realcleardefense.com/articles/2023/02/22/all_us_navy_ships_should_be_motherships_for_unmanned_systems_883159.html?mc_cid=ac0a87d881&mc_eid=a291dd073d)

<sup>40</sup> <https://www.usni.org/magazines/proceedings/2024/march/ocean-drones-revolution-marine-robotics>

<sup>41</sup> <https://thehill.com/opinion/national-security/3667162-hurricanes-like-ian-are-a-growing-national-security-threat-we-need-better-prediction/>

<sup>42</sup> <https://www.washingtonpost.com/weather/2021/07/09/extreme-weather-government-commercial-partnership/>

<sup>43</sup> <https://thehill.com/opinion/national-security/3603629-the-pentagon-must-prevent-its-mounting-climate-casualties/>

<sup>44</sup> <https://www.tomorrow.io/>

and microwave sounders to provide precipitation at an unprecedented resolution and revisit-rate<sup>45</sup>;

- Leesburg, Virginia's Lynker Corporation<sup>46</sup> is operating uncrewed surface vessels<sup>47</sup> for NOAA to map the seafloor in the U.S. Exclusive Economic Zone, which provides a critical boundary for the U.S. Navy's ocean models<sup>48</sup>;
- The Lynker Corporation will be teaming with the California company Sofar Ocean<sup>49</sup> to modernize the ocean observing platforms operated by NOAA's National Data Buoy Center<sup>50</sup> and used by Air Force and Navy weather forecasters;
- Tomorrow.io and ClimateAi<sup>51</sup> are providing a wide range of artificial intelligence enabled weather<sup>52</sup> and climate<sup>53</sup> decision support services to farmers and the agriculture industry to enhance food security in Africa<sup>54</sup> and Asia<sup>55</sup>, supporting Line of Effort #5 in the *DoD Climate Adaptation Plan: Enhance Adaptation and Resilience Through Collaboration*.

I close with a development that is more germane to the Committee on the Budget. This year, federal spending for the interest on our national debt is forecast to hit \$870B, exceeding the DoD budget for the first time<sup>56</sup>. Combined with inflation, such a dramatic drop in the Pentagon's purchasing power is, perhaps, a greater threat to our national security than climate change. I recommend the Committee hold future hearing on topics which focus on our increasingly unsustainable fiscal situation.

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<sup>45</sup> <https://www.washingtonpost.com/weather/2021/02/24/climacell-satellite-constellation-precipitation/>

<sup>46</sup> <https://lynker.com/>

<sup>47</sup> <https://www.linkedin.com/company/lynker/posts/?feedView=all>

<sup>48</sup> [https://www.realcleardefense.com/articles/2024/02/15/to-defend-taiwan-the-us-navy-must-retake-the-ocean-high-ground-1012018.html?mc\\_cid=8e21aac3de&mc\\_eid=a291dd073d](https://www.realcleardefense.com/articles/2024/02/15/to-defend-taiwan-the-us-navy-must-retake-the-ocean-high-ground-1012018.html?mc_cid=8e21aac3de&mc_eid=a291dd073d)

<sup>49</sup> <https://www.sofaroccean.com/>

<sup>50</sup> <https://lynker.com/ndbc-incumbent-page/>

<sup>51</sup> <https://climate.ai/>

<sup>52</sup> <https://www.tomorrow.io/blog/tomorrow-io-unveils-first-weather-climate-generative-ai/>

<sup>53</sup> <https://climate.ai/solutions-products/climatelens-overview/>

<sup>54</sup> <https://www.tomorrownow.org/>

<sup>55</sup> <https://climate.ai/case-studies/assessing-current-future-climate-risks/>

<sup>56</sup> <https://www.cbsnews.com/news/federal-debt-interest-payments-defense-medicare-children/#:~:text=Federal%20spending%20on%20interest%20payments%20is%20forecast%20to,a%20recent%20analysis%20by%20the%20Congressional%20Budget%20Office.>