Opponent Testimony HB 308 "To Include energy generated by nuclear reaction as green energy"

12/13/23 Hearing House Energy & Natural Resources Committee Hearing

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"Today's problems come from yesterday's `solutions.'" From MIT systems scientist Peter Senge's 1990 book The Fifth Discipline - a prescient warning for trying to solve climate change with nuclear power.

Current Commercially-Generated Nuclear Power is NOT green.

LIAR LIAR PANTS ON FIRE

The nuclear industry falsely claimed or recommended:

- electricity too cheap to meter "Abundant power from atom seen" 9/17/54
https://timesmachine.nytimes.com/timesmachine/1954/09/17/83884025
- radioactive waste should be removed from reactor sites in five years
"NRC views long-term storage of wastes for more than five years as a significant safety and environmental matter..." U.S. Nuclear Regulatory Commission, "Guide to the U.S. NRC's 10CFR61," Office of Nuclear Materials Safety and Safeguards, August 1989 p. 28
https://www.nrc.gov/docs/ML1207/ML120720225.pdf
- a serious accident chance of one in 1000,000 to one in a 1,000,000,000...years
"Brookhaven Report WASH-740" p. viii https://ia802301.us.archive.org/6/items/wash-740/WASH-740.pdf
1982 "Calculation of Reactor Accident Consequences"
http://ccnr.org/crac.html
"Projected Large Scale Radiological Release at U.S. Atomic Reactors"
http://static1.1.sqspcdn.com/static/f/356082/10875171/1298351245463/CRAC+2+chart.pdf?token=PGuxgz5f4FZMvil8tC45ukdF8Ks%3D
"The Case Against Nuclear Power"
https://cms.energypolicy.co.uk/243

Gregory Jazcko, former Nuclear Regulatory (NRC) Commissioner and Chairman from 2005 to 2012, is the latest among many nuclear regulators, engineers, physicists, physicians etc. to sound the alarm, writing, "I oversaw the U.S. nuclear power industry. Now I think it should be banned. The danger from climate change no longer outweighs the risks of nuclear accidents."
https://www.washingtonpost.com/outlook/i-oversaw-the-us-nuclear-power-industry-now-i-think-it-should-be-banned/2019/05/16/a3b8be52-71db-11e9-9eb4-0828f5389013_story.html

Nuclear power is not a pristine panacea for climate change. It is a catastrophically dangerous, dirty, expensive, deteriorating technology that is not "clean", "indispensable", "carbon-free", or "renewable."

Uranium is, in fact, a finite, non-renewable resource.

EXPENSIVE - Perry, alone, cost $6 billion and with Davis-Besse, the two Ohio reactors cost a whopping $9 billion and billions more in maintenance, repairs, and subsidies.
"At a cost of six billion dollars, the Perry Nuclear Power Plant is one of the most expensive ever built."
https://northperry.org/community/history/
https://www.bricker.com/insights-resources/publications/consequences-of-first-energys-electric-security-plan-rehearing-decision

Many analysts consider nuclear power the most heavily subsidized U.S. industry with estimates of hundred of billions in handouts.
https://www.iisd.org/gsi/commentary/gambling-nuclear-power-how-public-money-fuels-industry
https://thinkprogress.org/nuclear-power-is-so-uneconomical-even-bill-gates-cant-make-it-work-without-taxpayer-funding-faea0cdb60de/
https://content.time.com/time/health/article/0,8599,1812540,00.html
https://www.counterpunch.org/2016/01/01/nuclear-energy-dangerous-to-your-wallet-not-only-the-environment/
https://discover.hubpages.com/politics/The-Hidden-Costs-of-Nuclear-Energy
https://www.independent.org/news/article.asp?id=9082

The final cost of Vogtle in Georgia, the first new reactors in decades, is estimated to be $30 billion which is the reason why the Summer plants in Sough Carolina were canceled in 2017.
https://www.chooseenergy.com/news/article/failed-v-c-summer-nuclear-project-timeline/
https://spectrum.ieee.org/abandoned-nuclear-reactors-fit-a-global-pattern-of-new-build-troubles
https://www.bizjournals.com/charlotte/news/2017/07/31/s-c-utility-votes-to-stop-building-16b-v-c-summer.html
https://www.postandcourier.com/business/georgia-s-nuclear-project-could-be-canceled-like-south-carolina/article_f8781644-d908-11e7-8116-37b0cbedd646.html#newsletter-popup
https://apnews.com/article/georgia-nuclear-power-plant-vogtle-rates-costs-75c7a413cda3935dd551be9115e88a64
https://www.msn.com/en-us/money/companies/regulators-begin-hearings-on-how-much-customers-should-pay-for-plant-vogtle-reactors/ar-AA1l1Xoy

UNNEEDED - After FirstEnergy's 2018 announcement that it would close Perry and Davis-Besse, legislative hearings were convened in 2019 on H.B. 6, the proposed $1.3 billion bailout of the two reactors and the largest corruption scandal in Ohio's history.

At one Ohio Senate committee hearing, Asim Haque, an Executive Director at PJM and former Chair of the Ohio Public Utilities Commission testified, "PJM's analysis found that FirstEnergy's deactivation of those generating units is not expected to adversely impact the reliability of the PJM transmission system..." According to PJM, the two Ohio reactors were not needed to ensure reliable, affordable electric supply to Ohio and surrounding PJM states.
Testimony of Asim J. Haque before Energy and Public Utilities Commission of Ohio Senate, June 5, 2019 https://www.documentcloud.org/documents/6131549-HB6AsimHaqueTestimony.html.

Many reactors in the U.S. and worldwide have closed without consequence.
https://www.eia.gov/nuclear/reactors/shutdown/
add Pilgrim in Mass. & Palisakes in Mich.
https://www.statista.com/statistics/513639/number-of-permanent-nuclear-reactor-shutdowns-worldwide/

NOT CARBON-FREE - The nuclear power life cycle produces copious carbon and other greenhouse gases from uranium mining, milling, refining, conversion, and enrichment; fuel fabrication; transportation; reactor construction, maintenance, decommissioning; and radioactive waste management.
https://theecologist.org/2015/feb/05/false-solution-nuclear-power-not-low-carbon
https://www.resilience.org/wp-content/uploads/2006/05/does_nuclear_energy_produce_no_co2.pdf
https://www.resilience.org/stories/2006-05-11/does-nuclear-power-produce-no-co2/

Dr. Benjamin Sovacool, Ph.D, Professor of Energy Policy at the University of Sussex, and others conclude that the nuclear fuel chain emits more greenhouse gases per kilowatt hour than all renewables including biomass, hydroelectric, solar, and wind. "Life-cycle carbon emissions from nuclear are twice as much as solar photovoltaic and six times more than wind or energy efficiency."
https://www.nirs.org/wp-content/uploads/climate/background/sovacool_nuclear_ghg.pdf
https://scholarship.law.wm.edu/cgi/viewcontent.cgi?referer=https://r.search.aol.com/_ylt=AwrE19xGWdFc9.wAxQFpCWVH;_ylu=X3oDMTBzdWd2cWI5BGNvbG8DYmYxBHBvcwMxMAR2dGlkAwRzZWMDc3I-/RV=2/RE=1557252550/RO=10/RU=http%3a%2f%2fscholarship.law.wm.edu%2fcgi%2fviewcontent.cgi%3farticle%3d1040%26context%3dwmelpr/RK=0/RS=3uQZ1jlhr1PnlWO4RURAX0cmSbU-&httpsredir=1&article=1040&context=wmelpr

While nuclear generated electricity is lower in carbon emissions than fossil fuels, it has never been carbon-free or "zero emissions." Reactors emit methane, a greenhouse gas, and radioactive carbon-14, with a 5700 year half-life meaning its hazardous life is 57,000 to 114,000 years.. The human body and the environment cannot distinguish highly volatile, biologically damaging, radioactive carbon-14 from non-radioactive carbon.

"The radionuclide C-14 is and will be formed in all nuclear reactors due to the absorption of neutrons by carbon, nitrogen or oxygen."
C-14 Production in Nuclear Reactors (1977) prepared for the NRC by Wallace Davis, Jr. of the Oakridge National Laboratory, p.2
https://www.nrc.gov/docs/ML0934/ML093421400.pdf

"With its long half-life and high mobility in the environment, 14C is a radionuclide of considerable interest in nuclear power production...in Pressured Water Reactors-PWRs, and Boiling Water Reactors-BWRs)...Carbon-14 is present in virtually all parts of nuclear reactor primary system and has a high production rate. It is released to the environment through gaseous and liquid discharges and through the disposal of solid radioactive waste...(T)he life cycle of 14C, start(s) from its production in reactors, to its transport and its potential incorporation in natural cycles." Life cycle and management of C-14 from nuclear power generation (2006) Man-Sung Yim, Francis Caron (2005) https://www.sciencedirect.com/science/article/abs/pii/S0149197005000454

"The characteristics of C-14 that distinguish it from many other radionuclides produced by nuclear power operation, are the long half-life of 5,730 years (amount of time it takes for a radioactive isotope to lose half of its radioactivity) and the ease of assimilation into living matter...An excess of C-14 (above background levels) in environmental samples...may be found in the close vicinities of nuclear power plants due to the release of gaseous waste containing C-14."
C-14 Production by Nuclear Power Reactors - Generation and Characteristics of Gaseous, Liquid, Solid Waste (2007) Asa Magnusson, Introduction p. 1
https://www.kth.se/polopoly_fs/1.469654.1550154389!/C-14%20Produced%20by%20Nuclear%20Power%20Reactors%20%E2%80%93%20Generation%20and%20Characterization%20of%20Gaseous.pdf

UNSAFE

World renowned nuclear engineer Dr. Arjan Makhijani, Ph.D, author of the ground-breaking book Carbon-Free and Nuclear Free: A Roadmap for U.S. Energy Policy, which has been updated in many recent publications, has said, "Carbon is not the only, or necessarily the most dangerous, element on the periodic table. Many radioactive elements are."
https://www.psehealthyenergy.org/wp-content/uploads/2023/02/Energy-Affordability-in-Maryland-2023_-Final-Report.pdf
https://ieer.org/resource/carbon-emissions/technical-economic-feasibility/

Nuclear plants leak and routinely release into air, soil, and water carcinogenic, teratogenic, and mutagenic radionuclides which are chemically indistinguishable from non-radioactive, life-sustaining elements.
"Leak First, Fix Later"
https://static1.1.sqspcdn.com/static/f/356082/6590573/1271634765367/LeakFirst_FixLater_BeyondNuclear_April182010_FINAL.pdf
"Nuclear plants leak radiation and regulator faces scrutiny"
https://www.usnews.com/news/articles/2016-03-15/nuclear-plants-leak-radiation-and-regulator-faces-scrutiny
"Tritium leaks found at many nuke sites"
https://www.ap.org/press-releases/2012/part-ii-ap-impact-tritium-leaks-found-at-many-nuke-sites
"Radioactive tritium found at 48 nuke sites"
https://www.nbcnews.com/id/wbna43475479#.XOOzmZI_PDB

Nuclear power plants were not intended to operate past their initial 40 year license period. FirstEnergy applied for and was routinely granted inspection, maintenance, repair and upgrade waivers, deferrals, an exemptions. The deteriorating 40 year old Perry reactor's license extension is being challenged. https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML23332A784

In its Perry License Renewal Application, Energy Harbor acknowledges problems with aging structures, components, parts, etc. and concedes (pp. 2020-2021) that:

"The issue [of inadvertent radionuclide release] is relevant to license renewal because all commercial nuclear power plants routinely release radioactive gaseous and liquid materials into the environment. These radioactive releases are designed to be planned, monitored, documented, and released into the environment at designated discharge points. But over the years, there have been numerous events at nuclear power reactor sites that involved unknown, uncontrolled, and unmonitored releases of liquids containing radioactive material into the groundwater. The majority of the inadvertent liquid release events involved tritium, which is a radioactive isotope of hydrogen. However, other radioactive isotopes, such as cesium and strontium, have also been inadvertently

released into groundwater. The types of events include leakage from spent fuel pools, buried piping, and failed pressure relief valves on an effluent discharge line."
https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML23332A784

The scientific and medical communities, including but not limited to, the U.S. National Academy of Sciences (NAS) and the European Committee on Radiation Risk have determined that there is no safe dose or threshold of radiation exposure.
National Academies of Science Health Effects of Low-Level Exposure to Ionizing Radiation (BEIR VII)
https://nap.nationalacademies.org/resource/11340/beir_vii_final.pdf
https://www.ncbi.nlm.nih.gov/books/NBK230461/pdf/Bookshelf_NBK230461.pdf
Recommendations of the Eurpoean Committee of Radiation Risk
http://www.inaco.co.jp/isaac/shiryo/pdf/ECRR_2010_recommendations_of_the_european_committee_on_radiation_risk.pdf
University of South Carolina (2012, November 13). "Even low-level radioactivity is damaging, scientists conclude," Science Daily. https://www.sciencedaily.com/releases/2012/11/121113134224.htm

Ingested or inhaled radioactive strontium-90 and cesium-137 replace calcium and potassium respectively, irradiating bones and muscles for decades. Carcinogenic, radioactive iodine-131 is absorbed by the thyroid gland which is the reason why potassium iodide is provided to residents near reactors. Cobalt-60 is a liver, kidney, and bone carcinogen. Specks of inhaled plutonium-239, with a half-life of 24,000 years, can cause lung cancer. As noted above, Energy Harbor admits that miles of buried, inaccessible, aging, deteriorating pipes have leaked tritium, which is radioactive hydrogen, from virtually every U.S. reactor and no technology can remove it from contaminated water. In his recently published book Exploring Tritium Dangers, renowned nuclear engineer and radiation expert, Dr. Arjun Makhijani, Ph.D. states that tritium readily crosses the placental barrier and "can have significant biological consequences including damage to DNA, impaired physiology and development, reduced fertility and longevity, and can lead to elevated risks of diseases including cancer."
https://ieer.org/wp/wp-content/uploads/2023/02/Exploring-Tritum-Dangers.pdf

Strontium 90 https://radioactivity.eu.com/phenomenon/strontium_90
Cesium-137 https://radioactivity.eu.com/phenomenon/caesium_13
Iodine 131 https://radioactivity.eu.com/phenomenon/iodine_131
Cobalt 60 https://www.cdc.gov/nceh/radiation/emergencies/isotopes/cobalt.htm
"Questions and answers abut potassium Iodide American Thyroid Assn.
https://www.thyroid.org/questions-and-answers-about-potassium-iodide-ki-american-thyroid-association/
"Types of Ionizing Radiation Including Plutonium 239"
https://nuclear-news.net/2014/05/02/dr-helen-caldicott-explains-the-facts-on-radiation/

THREE DISASTERS IN 34 YEARS - occurred at Three Mile Island (1979), Chernobyl (1986), and Fukushima (2011), and at many other reactors worldwide since the 1950s. The U.S. has 23 Fukushima-type GE Mark I reactors at 16 sites. The NRC and other researchers postulate a 50% chance of another catastrophic accident in approximately the next 20 years.
"Root Causes and Impacts of Severe Accidents at Large Nuclear Power Plants"
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3606704/
"Nuclear Meltdowns and Disasters"
https://www.cnbc.com/2011/03/16/11-Nuclear-Meltdowns-and-Disasters.html
"Nuclear Disasters"
https://www.processindustryforum.com/hot-topics/nucleardisasters
Fukushima GE Mark I reactors used in U.S. and long criticized
https://www.nytimes.com/2011/03/16/world/asia/16contain.html
"The next nuclear meltdown"
https://www.nytimes.com/1985/05/08/opinion/the-next-nuclear-meltdown.html
"50% chance of another Chernobyl by 2030"
https://www.technologyreview.com/s/536886/the-chances-of-another-chernobyl-before-2050-50-say-safety-specialists/
"U.S. nuclear agency hid concerns, hailed safety record as Fukushima melted"
https://www.nbcnews.com/storyline/fukushima-anniversary/u-s-nuclear-agency-hid-concerns-hailed-safety-record-fukushima-n48561

"Five years after Fukushima, U.S. safety upgrades lagging"
https://www.huffpost.com/entry/five-years-after-fukushim_b_9402962

To limit utility liability, Congress passed the 1957 Price Anderson Act which currently caps accident compensation at $12.6 billion; however, a 1982 NRC-commissioned study conducted by U.S. Sandia National Labs calculated a severe accident could result in 50,000 fatalities, contaminate an area the size of Pennsylvania, and cause $314 billion in property damage which is $720 billion today's dollars. All private insurers exclude reactor accidents, and according to the NRC, state governments will cover "injury, sickness, disease, death, property damage, loss and living expenses for evacuees."" Nuclear industry shielded from big accident costs"
https://money.cnn.com/2011/03/25/news/economy/nuclear_accident_costs/index.htm

WASTE - "A thousand-megawatt reactor contains as much long-lived radiation as...1,000 Hiroshima-sized bombs" from which humans and the environment must be protected forever, **(28)** but the NRC admits that no engineered structure can last the time required to isolate these wastes and that leakage will occur.
"Nuclear Madness"
https://www.cropcircleresearch.com/articles/e007-madness.html

Early warnings by nuclear insiders to resolve radioactive waste before licensing new reactors were ignored. There are 90,000 tons of irradiated fuel "temporarily" stored in problem-plagued spent fuel pools and dry casks at 75 environmentally unsuitable reactor sites in 33 states because no permanent repository exists.
Government Accountability Office "Congressional action needed for spent nuclear fuel"
https://www.gao.gov/products/gao-21-603

"There is no way to guarantee that any disposal facility, for any waste, will not release some amount of radioactivity...No structure or site can be guaranteed to contain radioactive waste in perpetuity. Given the fact that facilities deteriorate and human institutions may not maintain complete control, NRC chose to rely on the more realistic requirements of 100 years of institutional care..."
p. 28 https://www.nrc.gov/docs/ML1207/ML120720225.pdf

OHIO ARE YOU LISTENING?!

CONCLUSIONS AND RECOMMENDATIONS - HB 6 eliminated Ohio's modest, but mandatory 2008 renewable energy and efficiency standards. These must be restored. Ohio is ideal for wind energy, and was 13th in the country for wind power until passage in 2014 of SB 310 severely restricting wind turbine siting. Despite polling showing Ohioans' strong preference for wind and solar, the General Assembly has passed additional laws like SB 52 allowing counties to kill wind and solar projects since 2014 decimating renewable energy to force reliance on fossil fuels and nuclear power. These laws must be revoked and laws funding legitimate wind and solar projects as well as battery storage research must be passed.
https://www.cleveland.com/open/2015/01/ohio_renewable_energy_policies.html
https://www.cleveland.com/business/2017/05/ohio_wind_law_crippling_wind_d.html
https://www.cleveland.com/open/2023/01/house-bill-6-left-ohio-with-least-stringent-clean-energy-program-in-us-study-shows.html
https://www.cleveland.com/business/2019/02/conservative-ohio-voters-want-most-of-ohios-electricity-to-come-from-renewable-sources.html