As I write this, the World is greeted with the news that Vladimir Putin has ordered the Russian invasion of Ukraine. The feeling in my stomach is the same as I had when I watched the Fukushima reactors in Japan explode in early March, 2011. It comes from thinking and remembering the people I met in Kyiv in 2006 at the 20th anniversary of the Chornobyl (Ukrainian spelling) disaster conference NEIS helped plan; the beauty of old, historic Kyiv; the memory of St. Andrew’s Church (my favorite of the many old ones, even better than St. Sophia and St. Michael.) – and how all of these are now in grave danger.

While Putin’s claims of national security and alleged ethnic and historical connections get much of the attention as pretexts for the invasion, it is important to pay attention to the role that energy also plays in the current situation.

Ukraine’s and Europe’s reliance on Russian natural gas has demonstrated the extent to which a nation can hold others hostage by constraining supply. This fact has led historically to tensions between Ukraine and Russia when the later initiated curtailment of gas supply during winter a number of years back. It has also accounted for Germany’s delayed and muted response to Russia’s build-up to the recent invasion.

On Feb. 22, 2022) Sen. Bernie Sanders’ statement on the Russian invasion made this very important point:

“…Finally, in the longer term, we must invest in a global green energy transition away from fossil fuels, not only to combat climate change, but to deny authoritarian petrostates the revenues they require to survive.”

Authoritarian petrostates. Like Russia. And Saudi Arabia. And…

Sanders has long been a champion of the green energy transformation needed. However, some – mostly opportunistic nuclear marketers – would then suggest that nuclear power play a role in this transformation.

Events in Ukraine right now argue in no uncertain terms how breathtakingly dumb that would be.

As I write this, CNN published this account:

“Ukraine’s Ambassador to the United States, Oksana Markarova, echoed Zelensky’s earlier remarks that Russian forces had attempted to seize control of the Chernobyl Nuclear Power Plant, adding that the Ukrainian National Guard is working to protect the nuclear plant from attack. [NOTE: later, AP reported that they succeeded in taking over. –DK]

“They made an attempt to seize the Chernobyl nuclear power station, and the fight is going right there with the Ukrainian National Guard protecting the Chernobyl station from the attack,” Markarova said during a press briefing.
“For the first time since the Chernobyl nuclear disaster — after which Ukraine has been protecting, together with our European and American friends and allies, the world from another nuclear disaster — we have to defend it again from the Russian forces,” she added.”

A Facebook account stated,

“CNN confirming, from several sources of Ukrainian officials at the Chernobyl station and in Kiev, that the Russian Troops have seized the Chernobyl Nuclear Power Plant. The Chernobyl exclusion zone management spokesperson told CNN “when I came into the office today, in the morning, it turned out that the nuclear power plant management had all left so there was no one to give instructions or defend it.” #Chernobyl

Later the Associated Press wrote,

“…Ukrainian authorities did not know the current condition of the facilities at Chernobyl, the site of the world’s worst nuclear disaster…. A Ukrainian official said Russian shelling hit a radioactive waste repository and an increase in radiation levels was reported…. It was not immediately possible for experts to access the repository to assess damage before Russian forces overtook the site.”

One does not have to hold advanced degrees in nuclear physics to intuit that: 1.) it’s a bad idea (and in violation of the Geneva Conventions, BTW) to target any nuclear reactor facility with artillery shells or bombs; 2.) although somewhat understandable, it’s not a good idea when “nuclear power plant management” abandons their posts (fortunately at a non-functioning reactor, but a site with radioactive wastes); and 3.) shelling a radioactive waste repository (whether high-, intermediate, or low-level radwastes) is not a good idea.

Ukraine has 15 operating nuclear reactors (the same as the United Kingdom, and just ahead of – ILLINOIS which has 11, on the worldwide list of reactor operators), all varying generations of Russian-designed VVER reactors. The reactors store their “spent”-fuel radioactive wastes in air-cooled “dry-casks” housed in an auxiliary building onsite which is less robust and protected than the reactors themselves.

The Zaporizhzhia reactors are Europe’s largest reactor complex - 6 VVER-1000s (mostly). It is 120 miles from the contested Donbas region.

The four reactors at Rivne in Western Ukraine are VVER reactors ~ 40 mi. south of Belarusian border.

Both sites – plus the Chornobyl site north of Kyiv, just south of the border with Belarus – are in the invasion path.

It is not clear at present what kind of radioactive waste facilities and casks are deployed and have been shelled, but a controversial company called HOLTEC International had built and operated some of those in Ukraine. This company has a somewhat checkered legal history, and is attempting to site a high-level radioactive waste dump in New Mexico over the objections of almost all state and federal legislators, the Governor, and large segments of the population.
While Russian leaders deserve far more than mere criticism for targeting a nuclear reactor site, they are by no means the first, and possibly not even the worst to date to do so. A list of previous attacks at reactor facilities shows that the Western nations are also in this contemptable club:

As targets in war zones, actual or presumed:

- Israeli air force bombs Osirak reactor in Iraq in 1981; under construction, de-fueled
- Iran/Iraq war 1980-90, each side bombed each other’s nuclear-related sites
- U.S. bombs Iraq’s Tuwaitha Nuclear Research Center 1991; enriched nuclear materials present, targeted
- NATO air strikes occur near nuclear sites in The Balkans War, 1999; suspected materials present
- Iraqi failed SCUD attack of the Dimona reactor in Israel, 1993
- Israel bombs Syrian reactor site, 2007; under construction, no fuel

It is now eminently clear that despite International Law, nuclear reactors, radioactive waste storage sites, and other nuclear-related facilities are and have been deliberate and/or inadvertent targets during war; and also pre-emptively while not officially in a state of war (e.g., the Israeli bombing of Osirak). It should also be recalled that the 911 Commission verified that the Indian Point nuclear reactor north of New York City was a contemplated target of the 911 terror attackers.

The transportation of the high-level radioactive waste in the form of spent-fuel rods also opens up a new set of nuclear targets. If and when nations begin to open permanent radwaste disposal facilities, these wastes will have to be transported by trains, trucks and barges from present locations to the disposal site, using special transportation casks. Field tests at the U.S. Army’s Aberdeen Proving Ground in Maryland, June 1998, demonstrated that the shoulder-held munitions of 25 years ago were capable of penetrating a European CASTOR cask, a design more robust than those presently in use in the U.S. for either onsite storage or transport. Such a penetration hole would have released the radioactive contents of the cask. The munitions available today to militaries, para-militaries and “undesirable agents” are far more powerful, designed to penetrate the upgraded composite armor of tanks, not mere shipping casks.

TOP 10 ARMOR-PIERCING SHOULDER-HELDED WEAPONS -- 1-5
https://www.youtube.com/watch?v=b4lwsg6s3Ug&list=TLPQMTUwNTIwMjE1subb8qJNww&index=3
RPG-28 – can go through 3,000 mm of brick (125 inches)

RPG-30 – Can go through 1,500 mm of concrete (67 inches)

In a war zone such as exists currently in Ukraine, the types of bombs, shells and rockets can be more powerful than these shoulder-held, largely infantry weapons. Both sides possess them.

This is the real world that nuclear power exists in. There are 437 potential targets in 32 nations at present. We only have to be wrong once. The level and numbers of uncertainty as to whether reactors, radioactive waste dumps and storage/shipping containers have been sufficiently designed to withstand modern weaponry (and political vindictiveness) remains to be seen. Whether reactor operators in a war zone will stay at their posts under all circumstances – like those heroic “50” at Fukushima – or leave early as at Chornobyl today, introduces the prospect that reactors will become unstaffed, left to their own operational and engineering devices to operate as designed. Or not.

Should a reactor building be breached or have its safety systems sufficiently damaged, the war will be transformed into a nuclear war – without having to launch any missiles or bombers to deliver the payload. If you liked Chornobyl-1 in 1986, the mindless warlords seem eager to provide you with Chornobyl-2 in 2022.

So when Sen. Sanders and others call for, “a global green energy transition away from fossil fuels,” one can be absolutely certain that he is not advocating for expanding nuclear power in any way. Not in this world. Rational, responsible leaders and public officials should learn pre-emptively the lessons before us in Ukraine, and reach that conclusion as well.