NUCLEAR POWER AND CLIMATE: WHY NUKES CAN'T SAVE THE PLANET

TOO MANY REACTORS; NOT ENOUGH CARBON REDUCTIONS

Major studies (from MIT, Commission on Energy Policy, and International Atomic Energy Agency, for example) agree that about 1,500-2,000 large new atomic reactors would have to be built for nuclear power to make any meaningful dent in greenhouse emissions. Operation of that many new reactors (currently about 440 exist worldwide) would cause known uranium reserves to run out in just a few decades and force mining of lower-grade uranium, which itself would lead to higher greenhouse emissions. If all of these reactors were used to replace coal plants, carbon emissions would drop by about 20% worldwide. If used entirely as new capacity, in the place of sustainable technologies like wind power, solar power, energy efficiency, etc., carbon emissions actually would increase.

TOO MUCH MONEY

Construction of 1,500 new reactors would cost trillions of dollars (U.S. reactors going online in the 1980s and 90s averaged about $4 billion apiece). Use of resources of this magnitude would make it impossible to also implement genuinely effective means of addressing global warming. Energy efficiency improvements, for example, are seven times more effective at reducing greenhouse gases, per dollar spent, than nuclear power. Yearly costs per 1000 kg avoided CO2 emissions are $68.9 for wind and $132.5 for nuclear power.

TOO MUCH TIME

Construction of 1,500 new reactors means opening a new reactor about once every two weeks, beginning today, for the next 60 years—an impossible schedule. The world's nuclear reactor manufacturers currently are capable of building about half that amount. Since reactors take 6-10 years to build (some U.S. reactors that began operation in the 1990s took more than 20 years), we are already that long behind schedule and will fall farther behind. Addressing the climate crisis cannot wait for nuclear power.

TOO MUCH WASTE

Operation of 1,500 or more new reactors would create the need for a new Yucca Mountain-sized radioactive waste dump somewhere in the world every 3-4 years. Yucca Mountain has been under study for nearly 20 years, has been vigorously opposed by the State of Nevada for just as long, and remains at least a decade from completion. The odds of identifying numerous new scientifically-defensible and publicly-acceptable waste dumps are slim. International efforts to site radioactive waste facilities are similarly behind schedule and face substantial public opposition. For this reason, the U.S. and other countries are attempting to increase reprocessing of nuclear fuel as a waste management tool—a dangerous and failed technology that increases worldwide nuclear proliferation risks.

TOO LITTLE SAFETY

Odds of a major nuclear accident are on the order of 1 in 10,000 reactor-years. Operation of some 2,000 reactors (1500 new plus 440 existing) could result in a Chernobyl-scale nuclear accident as frequently as every five years—a price the world is not likely to be willing to pay. Reactors of similar designs likely would close following a major accident, making nuclear power a risky proposition as a climate solution. And more reactors means more potential terrorist targets.

TOO MUCH PLUTONIUM

Operation of 1,500 or more new reactors would require a dozen or more new uranium enrichment plants, and would result in the production of thousands of tons of plutonium (each reactor produces

about 500 pounds of plutonium per year), posing untenable nuclear proliferation threats.

NUKES EMIT CARBON TOO!

While atomic reactors themselves are not major emitters of greenhouse gases, the nuclear fuel chain produces significant greenhouse emissions. Besides reactor operation, the chain includes uranium mining, milling, processing, enrichment, fuel fabrication, and long-term radioactive waste storage, all of which are essential components of nuclear power. At each of these steps, construction and operation of nuclear facilities results in greenhouse gas emissions. The uranium enrichment plant at Paducah, Kentucky, for example, is the largest U.S. emitter of ozone-destroying ChloroFluoroCarbons (CFCs)—banned by the Montreal Protocol (the Paducah plant was grandfathered by this treaty).

Taken together, the fuel chain greenhouse emissions approach those of natural gas—and are far higher than emissions from renewable energy sources, not to mention emissions-free energy efficiency technologies.

NOT SUITED FOR WARMING CLIMATES

Unlike solar power, nuclear power does not work well in warming climates. The summer of 2004's heat wave across Europe not only killed thousands of people, but because of dwindling river levels caused many reactors to reduce power levels and even shut down entirely. Reactors require vast quantities of water to keep the core cool; changes in water levels, and even water temperatures, can greatly affect reactor operations. Reactors in the U.S. have similarly been forced to close during heat waves.

CAN"T TAKE US TO THE MALL

Nuclear power, which can only produce electricity, does not address emissions from automobiles and other components of the transportation sector—probably the largest source of carbon emissions.

WHAT WE *CAN* DO: 30 TERRAWATTS BY 2050

Major investment in energy supply will be needed to meet growing energy demand and address the climate crisis at the same time—perhaps even as much as building 1,500 new reactors would cost.

But investing the money differently gives us much more bang for the buck: instead of a 20% reduction in carbon emissions, we can get an 80% reduction!

By 2050, the world will need about 25-30 Terrawatts of energy, or the equivalent of 25-30,000 nuclear reactors. Clearly it is not possible or affordable to build that many reactors. But it *is* possible to build that much capacity through energy efficiency improvements, and sustainable energy sources including wind, biomass, geothermal, and especially solar power—if we start making the necessary investments now.

It won't be cheap or easy, but the payoff is huge: safe, clean energy that helps alleviate rather than contribute to the climate crisis.

Our choice is stark: we can choose nuclear power, or we can address global warming. We can't do both. Fortunately, the choice is an easy one.

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