



Nuclear Energy Information Service

Illinois' Nuclear Power Watchdog since 1981

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17 February, 2020

The Honorable J.B. Pritzker
Governor, State of Illinois
Thompson Center, 16th floor
100 W. Randolph Street
Chicago, IL 60602

RE: "The State of the Nuclear State: 2020 energy legislation and State energy policy"

Greetings Gov. Pritzker:

We hope this packet and letter find you well. This is our third and perhaps most important correspondence to you to date (excluding our ongoing "Illinois Energy Transformation" series bulletins) concerning anticipated Spring legislation dealing with Illinois' electricity future.

As a 38-year old safe-energy, anti-nuclear environmental organization, we are no strangers to Illinois' (as well as regional, national and international) energy issues, and the politics that helps (or prevents) shaping responsible energy policy. We have testified numerous times before the appropriate House and Senate energy and environment committees; and have met with and briefed previous governors, attorneys general, and legislative leadership and their staffs. We bring a unique perspective and depth to the nuclear power and waste issues absent from all other Illinois environmental organizations. With this as background, we share this packet with you; and request an opportunity to discuss its contents in Chicago in more detail at your convenience before the Session deliberations on energy policy proceed.

Now that you have successfully launched the main facets of your first-year agenda, we believe that you will be dealing with the various competing pieces of Illinois' energy policy legislation, or lack thereof.

Given the sheer size and number of the disparate energy bills introduced last year and expected this Spring, we understand that when they are taken up again in 2020, that some major negotiation and direct intervention from your office and that of House and Senate leadership will be required to come up with some kind of omnibus legislation. Your State of the State address has made it clear that this will not become a mere check-box exercise of "business-as-usual, everybody's gotta get something" approach to energy policy, which has governed all previous efforts. But rather – and more akin to your campaign pledge and State of the State Address in support of a 100% renewable energy future, and absent the traditional "purveyors of greed and corruption" – we hope this exercise becomes a genuine pathway to creating a forward-thinking state energy policy, one focusing on the future, instead of bailing out the past.

With this in mind we urge you to finally include nuclear power issues in the discussion, and strongly consider incorporating the following recommendations in an energy omnibus package and future State energy policy. We list the considerations first, and go into separate detail for each in the enclosed report:

(continued....)

- 1.) **Bailouts:** Prevent and/or eliminate all forms of nuclear or coal power plant bailouts or subsidies (past and additional ZECs; direct bailouts, etc.).
- 2.) **Definitions:** Prevent and /or veto if necessary any legislation or regulations that would define nuclear power as “clean energy” or “emissions free.”
- 3.) **Exit Strategy:** Provide comprehensive and realistic “just-transitions” programs for community re-development for nuclear and fossil fuel communities impacted by closure of power plants and mines, by creating BOTH a.) escrowed pre-facility closure funds, and b.) post-closure economic incentives for community and worker re-development and recovery.
- 4.) **Nuclear Costs:** Take into account the avoidable negative environmental and economic consequences resulting from allowing nuclear reactors to continue to operate past closure dates that would have resulted from their inherent poor economics or environmental considerations.
- 5.) **Climate Disruption:** In an increasingly climate disrupted world, nuclear reactors will be less efficient at producing electricity, and because of their necessary reliance on water, will be more prone to unpredictable curtailment and shut-downs, as has already occurred in Illinois and elsewhere.
- 6.) **Oversight:** The “captured agency” reputation of the federal Nuclear Regulatory Commission (NRC) means it should not be viewed as a reliable protector of the public, environment or economy of Illinois; and that the State will have to create a number of unique laws, policies and mechanisms currently absent that more adequately protect Illinois’ interests.
- 7.) **The Politics of energy policy:** It is imperative that the result be a true state energy policy for the future, and not a business as usual *quid pro quo* negotiation that freezes Illinois in place rather than advancing us forward in meeting legitimate energy needs through 100% renewable energy. As a result the “politics” conducted to achieve this result can no longer be business-as-usual, either, particularly in view of the recent FBI investigations into Exelon-related lobbying activities.

In this packet we provide more detailed explanation and source materials for each of these recommended assertions. We are also able to put you or your staff in contact with credible national and international experts with vast professional experience in these areas, who can provide input and useful advice that will corroborate our contentions.

Finally, we again request meeting with you in person to discuss these and any other nuclear-related matters you wish to explore in some detail.

Thank you for your consideration of these views. We look forward to discussing them with you in greater detail; and assisting where we can in developing a real Illinois energy policy for the future. As we have repeatedly said since 2014: ***you can’t create an energy future by bailing out the past.***

Stay well, do great things.

David A. Kraft, Director

enclosures

The State of the (Nuclear) State Report:

**Nuclear Power
Considerations**

in

Upcoming Energy Legislation

submitted February 17, 2020



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RECOMMENDATION #1: *Prevent and/or eliminate all forms of nuclear or coal power plant bailouts or subsidies (past and additional ZECs; direct bailouts; capacity market benefits, etc.).*

History: It is worth looking at the history of energy policy and legislation in Illinois to appreciate what is wrong with further bailouts for Exelon's uneconomic nuclear reactors:

- For 40 years Exelon (nee Commonwealth Edison) has been the largest single barrier and opponent to the more rapid build out of energy efficiency and renewable energy in Illinois.
- Exelon reactors have been paid for several times over at this point: 1.) through rates that paid for initial construction; 2.) an estimated \$6-11 billion in stranded asset compensation it received in the late-1990s when Illinois adopted a market-based energy market, largely created by negotiations with then-ComEd lobbyists; 3.) the \$2.3 billion FEJA bailout, and 4.) current ongoing profits from its ongoing operation.
- Exelon is a profitable, private corporation. Its operations and decisions are made by its Board of Directors, whose job and legal mandate it is to ensure the company's profitability, and who remain beyond the control or wishes of the public. Neither the Illinois Legislature nor the Governor should be made responsible for the profitability of a private corporation. Their job is to represent the interests of the people of Illinois. There is nothing in the Illinois State Constitution that guarantees the profitability of any private corporation, nor compels the Legislature or Governor to act in a way to guarantee that profitability, or take on the job of Exelon's Board.
- As was reported in 2015 in Midwest Energy News, Illinois Attorney General's office representative Cara Hendrickson pointed out, "Exelon was happy to embrace risk when wholesale power prices were on the rise and profits from its generation business were flowing... Only now, in a market where nuclear power is under pressure from relatively inexpensive natural gas and wind, is the company asking for help in the form of a \$300-million-a-year subsidy."
- In the 2016 FEJA bailout, Exelon originally sought a bailout of a little over \$1 billion over a 5 year period. In closed-door sessions with then Gov. Rauner, and House and Senate "leadership," Exelon secured a *10 year bailout* period and \$2.3 billion in subsidies for its uneconomic nuclear reactors.
- A PJM Market analysis report from May, 2016, had this to say about Exelon bailouts: "The simple fact that a generating facility cannot earn sufficient market revenue to cover its going-forward costs does not reasonably lead to the conclusion that wholesale markets are flawed,' PJM wrote. 'More likely, it demonstrates that the generating facility is uneconomic.'"

Be Consistent: Exelon has argued, and it was enacted in FEJA in 2016, that its reactors deserve "ZECs" – "zero-emissions credits" because society and the market have failed to recognize and reward the full environmental benefits of nuclear power. While the phrase "zero-emissions" is actually false (see below. Sec. 2) -- reactors DO have emissions, just not CO₂ – that logic would suggest that renewable energy resources are underappreciated even more than nuclear power, since in the generation of electricity they produce *neither* CO₂ *nor* radioactive wastes and emissions. Perhaps renewables should additionally be awarded "**ZRCs**" – *zero-radiation credits*, as well as RECs, if cherry-picking bailouts are the way to run electricity markets in Illinois.

A Bailout by Any Other Name Would Smell as Badly: Exelon has become creative in its approach towards getting the public and elected officials to bailout out their uneconomic reactors. In 2016 it was a direct ask. Since then Exelon has embraced a more subtle, pseudo-market approach of calling for “capacity market reform” to deliver ratepayer dollars to their shareholders.

While having the appearance of a “market-based” intervention, allowing Exelon’s reactors to participate in an allegedly “carbon-free” capacity market run by the State of Illinois is merely dressing the same issue in a different set of clothes. The result would be the same – artificially bailing out uneconomic reactors that otherwise would close. Great care must be taken in creating this newly proposed Illinois capacity market. The potential for Exelon to game or manipulate this newly created State-run capacity market for its own advantage must be kept in mind. The consequence could end up being a market that once again delays and diminishes the needed assertive build-out of renewable energy resources, while rewarding Exelon shareholders and continuing the many liabilities of continuing to use nuclear power.

CONCLUSIONS AND RECOMMENDATIONS:

1. Reject all future bailouts or non-market based financial compensation mechanisms in any form for Exelon’s reactors.
2. Be consistent #1: if Exelon’s reactors continue to receive ZECs, renewable energy resources and energy efficiency should be compensated for their ZRC qualities.
3. Be consistent #2: If the goal of the State is truly to get to 100% renewable energy by 2050, then every effort must be instituted to give **first priority** to the funding of those resources.
4. Be consistent #3: You can’t build an energy future by bailing out the past.
5. Explore ways to repeal or reverse the 2016 FEJA bailout.

RECOMMENDATION #2: *Prevent and /or veto if necessary any legislation that would define nuclear power as “clean energy” or “emissions free.”*

FACT: Nuclear power plants are NEITHER “clean” energy, NOR “emissions free.”

Words **mean** something, especially when it comes to definitions in law.

Exelon and the nuclear industry attempt to perpetuate the myth that nuclear power is “clean,” and “emissions free,” when this an obvious falsehood.

Or, as George Orwell might have said, “War is Peace; Freedom is Slavery; Nuclear is Clean and Green.”

Worse Exelon and nuclear advocates intend to enshrine this definition into state statute, a move which may have large and possibly sinister financial and environmental consequences in the future. Future funds intended for truly “clean” renewable energy resources would be syphoned off by “fake-clean” energy sources like nuclear power and so-called “clean coal,” delaying further a safe/renewable-energy future.

If such legislation passes with this definition intact, the Illinois Legislature will be declaring to the World it thinks that:

- 10,000+ tons of high-level radioactive waste in Illinois, and over 80,000 tons nationally is “clean;”
- Over 250 million tons of mostly unprotected and unremediated uranium mill tailings piles, and an estimated 10,000 abandoned uranium mines in the U.S. largely on Native Lands is “clean.” NEIS is prepared to put Legislators in contact with experts and tribal authorities in New Mexico and South Dakota who would fiercely dispute this self-serving utility created PR definition of cleanliness;
- Radiation releases into the air and water – either from allowable, below-regulatory standard releases, or unplanned accidental discharges such as the 6 million gallon tritium leak at Exelon’s Braidwood reactors in the 1990s, or the onsite accidental releases on the Dresden NPP site, or worse – the catastrophic releases of radioactivity from Chernobyl and Fukushima – are all “clean.”

Similarly, the contention that nuclear plants are “zero-emission facilities” is an enormous overreach of the English language:

- Reactors **must** purge and sometimes vent radioactive gases into the environment, hopefully below regulatory standards, or else the reactors could not continue to operate. These emissions are mostly in the form of noble gasses like xenon, argon and krypton. Additionally, ^{131}I and some particulate releases also occur at nuclear reactors, as has the long-term release of ^{14}C in the form of carbon dioxide or carbon monoxide and hydrocarbons. All nuclear utilities **must** file annual air and water emissions reports for each reactor with the federal NRC.
- As indicated above tritium – ^3H , a form a radioactive hydrogen, which is a component of H_2O (water) – is also released into waterways such as the Kankakee and Illinois River systems.
- The fact that nuclear reactors neither produce nor release CO_2 (or very small amounts; see above) in the process of generating the electricity only truthfully means they are “low/zero-**carbon** emitters”; point 1 above shows the fallacy of going much beyond that statement of fact.
- While reactors may be low-carbon emitters, they do release some nitrous oxides and fluorocarbons into the atmosphere in some circumstances, both of which are potent greenhouse gases; as well as ^{14}C , as mentioned above.

CONCLUSIONS AND RECOMMENDATIONS:

1. Prohibit nuclear power from being legally defined or referred to in any legislation or regulation as “clean”, “green”, or “emissions-free.”
2. Amend all existing legislation, regulations and statutes that use this industry-created terminology in reference to nuclear power.

RECOMMENDATION #3: *Enact comprehensive and realistic “just-transitions” programs for community re-development for nuclear and fossil fuel communities impacted by closure of power plants and mines, by creating BOTH a.) escrowed, “un-sweepable” pre-facility closure funds, and b.) post-closure economic incentives for community and worker re-development and recovery.*

- Illinois is grappling with the effects of a worldwide energy **transformation** which, unlike a transition, is disruptive, non-linear, destroys traditional ways of operating, picks winners and losers, and unfortunately harms some populations left behind. The best Illinois can do is lessen the negative impacts of this transformation on the communities that will be negatively affected as old energy resources like nuclear power and fossil fuel give way to new – just as blacksmiths had to give way to auto mechanics at the turn of the 20th Century.
- In 2016 in the run-up and aftermath of the passage of FEJA, NEIS asserted that it is the negatively impacted reactor and fossil fuel communities, not profitable corporation Exelon, which needed the State's bailout and financial assistance. That position holds true today.
- The lack of a pro-active “just-transitions” plan, to preserve local tax bases, protect local essential public services, and attract new industries and jobs to the localities negatively impacted by reactor closures calls for the creation of a statewide just-transitions program. NEIS wrote about this immediately after the passage of FEJA in the State Journal Register (“End the ‘nuclear hostage crisis’ now,” David Kraft, Tuesday Dec. 13, 2016; see attached). To date nothing has been done to provide these communities with “an exit strategy.” Recall the last time a government embarked on a foolish and costly endeavor “without an exit plan.”
- In the 2018 legislative session Sen. Melinda Bush had introduced **SB 29 – The Illinois Energy Transition Zone Act** – to begin the process of protecting communities from the economic ruin that awaits them if we and they do nothing to plan ahead for inevitable reactor and coal plant closures. It was not voted upon due to the State's dire financial situation and lack of a budget. This or similar legislation is needed.
- Just transitions needs to occur in two phases: 1.) prior to facility closure, and 2.) post-facility closure:
 1. **Pre closure plans:** Reactors have operating licenses that *will* expire (see attached chart). Legislation needs to be enacted requiring the establishment of an escrowed account for the communities/taxing-entities that would be negatively affected by the inevitable closure of a nuclear power station or coal plant or mine. Multiple avenues of revenue should be explored between the affected community and the corporation running the facility, and a mutually acceptable agreement established between them (or State imposed agreement, if they cannot reach an agreement independently). Such an account guarantees that some funds will definitely be available to soften the economic blow resulting from plant closure.
 2. **Post-closure plans:** these are tax and other incentives available to negatively affected communities/taxing-bodies that rely on attracting new businesses, industries, and residents to help diversify, redirect and redevelop the economic base of the affected community. Since this phase of the planning is totally reliant on the voluntary choices made by outside business entities, there is no guarantee that these programs will be able to make up all the deficits caused by the plant closure; hence, the need for the pre-closure funding plan.
- Germany is dealing with the issue of just transitions, as it has decided to phase out its nuclear reactors according to a definite timetable, and is also committed to eliminating its fossil fuel sector. Their experience in this area should be examined to help create workable programs for Illinois. The Heinrich Böll Foundation has a Washington, D.C. satellite office. They have provided useful materials on this topic, and preliminary

discussion with them indicates a willingness to set up fact-finding trips with German communities undergoing transition:

The short video “A Just Transition: The Way Forward for Coal Communities” shows the impressions of some US participants during a study tour to Germany. Lessons are applicable for nuclear communities. Short video:

<https://www.youtube.com/watch?v=9EmsA7wG2lo>

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CONCLUSIONS AND RECOMMENDATIONS:

1. Enact statewide just-transitions legislation for nuclear and fossil fuel communities/taxing bodies facing plant closures that include both pre- and post-closure programs.
2. Provide no form of financial relief to Exelon and other energy providers until a statewide just-transitions program is enacted and funded.
3. Contact the Heinrich Böll Foundation, and other such organizations with experience in setting up successful just-transitions programs to set up fact finding and information exchange programs.

RECOMMENDATION #4: *Take into account the avoidable negative environmental and economic consequences resulting from allowing nuclear reactors which would otherwise close due to their inherent poor economics or environmental considerations, to continue to operate past closure dates.*

Many nuclear-related issues were left unresolved after the 2016 passage of FEJA that still have not been addressed. These include:

- **Reactor Decommissioning Inadequacies:** When reactors close, the process of tearing them down and cleaning up the radioactive contamination is called *decommissioning*. It is a costly, lengthy process; in some cases reactor decommissioning is calculated to cost more than the actual cost to construct the reactor in the first place.

NEIS' experience with the 12 year decommissioning of Exelon's Zion Nuclear Power Station north of Chicago revealed that serious gaps in the state statutes on reactor decommissioning still exist. These are only beginning to be addressed, for example, with the recently enacted bill, **HB 840**, introduced by Rep. Joyce Mason -- a good first step, but still inadequate to guarantee that \$8.3 billion currently estimated to be in reactor decommissioning funds for Exelon's Illinois reactors will be formally audited and utilized properly. However, no state or federal requirements exist that mandate: 1.) annual audits for expenditures made during decommissioning; and 2.) use of U.S. standard accounting principles and practices in keeping the books on these funds. In other words – no publicly available means exist to verify that the use of over \$8 billion will be proper, appropriate and dedicated solely for decommissioning purposes. The

NRC has publicly stated that it does *not* require this, and won't; and that if the states want to have that level of oversight, it was up to them to enact it.

- **Legislative Failure to do Due-Diligence:** In 2014 – House Speaker Michael Madigan passed HR 1146, which called on four State agencies (ICC, IPA, IEPA, DCEO) to conduct a “study” that among other things would, “...*ensure* the continued operation of the existing fleet of nuclear power plants in Illinois...” and “...include potential market-based solutions that will *ensure* that the premature closure of these nuclear power plants does not occur....” This so-called “study” was a study to show, not a study to know.

NEIS met with representatives of three of the four legislatively mandated State agencies in an attempt to insure that their work included examination of *both* the positive *and* negative impacts of continued reactor operation – i.e., a true cost/benefit study of the issue. Our inputs and request were rejected. As a result the “study” was set up to “ensure” an outcome before a full cost/benefit analysis could be made; and the parties charged to conduct the “study” were instructed to not examine the negative impacts. We were told by two representatives that it was not in their mandate to do so.

The only beneficiary of such a biased study was Exelon Corporation, since such a study would be useless for Legislators to make any rational cost/benefit decisions, and produce only results that would benefit Exelon's case to receive the reactor bailout it was then seeking. In essence four State agencies were commissioned to provide their services, at tax- and rate-payer expense, for the sole benefit of a private corporation.

NEIS maintains that the Legislature did not then, and has not since done its due diligence on this topic. Further, we asserted then, and continue to assert now, that the State should be reimbursed by Exelon Corporation for any and all expenses incurred by the four State agencies in producing this so-called “study.”

- **Radioactive Waste Issues:** As long as reactors operate, they will continue to produce high- and low-level radioactive wastes (HLRW/LLRW). HLRW is predominantly the spent-fuel rods from the reactors, which are currently stored onsite at each reactor complex, because the federal government reneged on its promise to open a permanent, deep-geologic disposal repository by 1997 (see below). Exelon's 14 Illinois reactors have generated the most HLRW of all the states in the U.S. – over 10,000 tons, adding roughly 220-330 tons each year of continued operation.
- **Inadequacies of Proposed Methods for the Storage and Transportation of Radioactive Waste:** At present, all HLRW is stored at 7 reactor sites and one non-reactor facility near Morris, IL, either under water in “spent fuel pools,” or outside of the reactor buildings in air-cooled cylinders called “dry-casks.” The Federal NRC licenses the design and construction of these dry-casks, and states that they provide adequate safety to the public and the environment staying onsite for up to 100 years.

Recently, private vendors seeking to corner a market in HLRW storage have proposed to move all HLRW to what they call temporary “consolidated interim storage” (CIS) facilities, for storage until the Federal Government finally opens a permanent disposal facility, something which should have happened by 1997, and did not – largely for political reasons (see below). Many concerns have been raised about these proposed CIS facilities:

- Since the NRC has stated that HLRW can be stored with adequate safety onsite at the reactor sites for up to 100 years, there is no urgent or compelling safety issue that would warrant creating these expensive CIS facilities, which simply would be duplicating a service already in place.
 - Building CIS facilities would simply create even more contaminated sites that would later have to be decommissioned and decontaminated, at great cost and increased risk.
 - It would require unnecessary, redundant transportation of HLRW on a national road/rail/and waterway infrastructure that is in need of huge and costly repair, increasing transportation risks unnecessarily.
 - The sites currently under consideration in Texas and New Mexico are in or near communities of people of color or low-income, and are locally opposed, making CIS construction an environmental justice issue.
- **Failure of the Federal Government to Provide Permanent Disposal of Radioactive Waste:** As previously stated, the Federal Government was supposed to have opened a permanent disposal facility for HLRW in 1997, and has failed to do so. To date attention, study and over \$9 billion was expended on characterizing a site in Nevada called Yucca Mt. – a site which was selected repeatedly by politics over sound science. Several points need to be appreciated regarding the Yucca Mt. site:
 - Despite being “designated” by Congress in 2001 to serve as the Nation’s first HLRW disposal facility, the selection was largely driven by politics and not sound science. Local and state opposition prevented its opening; and the Obama Administration defunded the project in 2007.
 - The site was the only site that Congress would permit DOE to study, despite the numerous flaws identified that demonstrated the site would fail and leak radioactive contamination.
 - In the most recent political move, the Trump Administration signaled on Feb. 6, 2020, that it no longer would support Yucca Mt. as the national disposal site. This means that currently, NO sites are being considered in the U.S. for HLRW disposal, meaning that all HLRW generated to date, and all waste the will be generated in the future has no place for environmentally responsible, permanent disposal. All HLRW is now “orphaned,” and must stay at reactor sites until such time as a new disposal site is identified and a facility constructed.
 - Since all HLRW must remain at reactor sites, and because there is simply no way to know if/when the Federal Government will open a disposal facility, the 10,000+ tons of HLRW generated to date by Exelon’s reactors should be considered *indefinitely orphaned*, and therefore *must* be stored in as safe a manner as possible, using the best technology and engineering available to protect the public and the environment.
 - **Absent Federal Action, Protect Illinois and the Reactor Communities:** While the NRC’s regulations only require providing “adequate” levels of safety, NEIS believes that “good enough isn’t good enough.” NEIS believes that *enhanced safety* of the HLRW is required in this new age of terrorism and catastrophic climate-related events that could make “adequate” storage dry-casks vulnerable to breach. NEIS has repeatedly urged that the state and federal legislators from Illinois to champion at the federal level for the NRC to mandate an enhanced form of HLRW storage – **“hardened on-site storage” (HOSS; see attached)** to provide Illinois residents – arguably the most vulnerable probabilistically speaking – with the maximum amount of safety and security if they are

being forced to have their communities turned into *de facto* HLRW dumps. To date, no initiative has come from any level of Illinois government, from governor on down, or in Congress.

- **Avoid Unnecessary Waste Generation:** Illinois currently has a reactor construction moratorium law on the books prohibiting the construction of new nuclear reactors in the state pending the Federal Government developing and opening a permanent disposal facility for HLRW. Since the issue of generating more radioactive waste with no place to go was once considered serious enough to prohibit new reactor construction in Illinois, it is counter-intuitive that the State would enact legislation that would promote the unnecessary generation of additional radioactive waste that could be avoided.

NEIS has calculated what it will mean to the Illinois HLRW inventory should the reactors that Exelon recently described as potentially “financially distressed” – Dresden, Byron and Braidwood – are *not* closed by the date Exelon announced, and instead continue to operate to the end of their 60 year operating licenses. We assumed that it would take up to two years to get to complete closure, so subtracted those years. We also used a range for the amount of HLRW produced annually by a reactor, based on industry standard estimates – 20 to 30 tons per year. Our results are summarized below:

ADDITIONAL HLRW CREATED IF EXELON REACTORS ARE NOT CLOSED

Reactor	License expiration	# of years left operating (minus 2 years to close)	HLRW generated (20 Tons / 30 Tons)
Dresden 2	2030	9	180/270
Dresden 3	2031	10	200/300
Braidwood 1	2045	24	480/720
Braidwood 2	2047	26	520/780
Byron 1	2047	26	520/780
Byron 2	2048	27	540/810
TOTAL			2,440 / 3,760

If Exelon were to close these reactors, an estimated 2,440 to 3,760 tons of HLRW would *not* be generated. This is an enormous positive societal benefit not considered in FEJA, CEJA and the Exelon legislation, nor calculated in the HR 1146 State Agencies report of 2014.

Recently the federal NRC has also been open to issuing extensions to reactor operating licenses that would result in approved reactors operating for up to 80 years – 40 years past original license design. This initiative has serious negative implications, which are quickly grasped if you arrived at work today in your 1940 DeSoto.

Currently, all Illinois Exelon reactors have received NRC license extensions to operate out to 60 years – except for the Clinton-1 reactor. The nuclear industry is attempting to make this -

80-year operating license the new industry standard. If the current crop of Exelon reactors is so vulnerable to market and technology changes that it needs bailouts and rigged-capacity markets, one can only expect that the request for future bailouts will be magnified if this proposal becomes the norm, and Exelon applies and is approved for such license extensions. The quantity of HLRW in Illinois will also rise astronomically.

- **Environmental Attributes:** If as Exelon suggests nuclear power is to be appreciated and compensated for its “environmental attributes” of not producing CO₂ while generating electricity, then renewables and efficiency should also be properly appreciated and compensated for that same attribute, **plus** doing it without producing high-level radioactive waste.

To correct this oversight, we propose the creation of “**zero-radiation credits**”, or “**ZRCs**”, which would be credits available to energy resources which produce **neither** CO₂ (or its equivalent effects if from another chemical) **nor radiation** during or as a by-product of its production of electricity; and priority selection of energy dispatch. Such a credit would not only be unavailable for nuclear plants, but also coal and gas facilities and wells, and coal ash piles, since all of these have demonstrated to release radionuclides into the environment during both mining and combustion.

CONCLUSIONS AND RECOMMENDATIONS:

1. Enact state legislation requiring that each reactor decommissioning project must hire a reputable auditing firm that will conduct annual audits of the project, to be reported in detail to the Legislature and the public; and require that all accounting will be done in accordance to U.S. standard principles and practices, both prior to commencement of site work.
2. Since the Legislature has already completed half of the cost/benefit analysis through HR-1146, commission a state blue-ribbon panel of experts to determine 1.) the negative effects on the economy and the environment of keeping uneconomic nuclear reactors operating (via bailouts, rigged-capacity markets, etc.); and 2.) the steps necessary to phase out nuclear power in Illinois.
3. Avoid the unnecessary creation of more HLRW by opposing any and all means of prolonging nuclear reactor life, such as bailouts, rigged-capacity markets, etc.
4. Submit a letter to the U.S. NRC in opposition to their intentions to extend the operating licenses of reactors to 80 years; and instruct the State’s legislative liaison to the Illinois Delegation to Congress requesting that the Delegation introduce and enact legislation prohibiting reactor operating licenses from exceeding 60 years.
5. Instruct the State’s legislative liaison to the Illinois Delegation to Congress to have the Delegation advocate for the immediate national requirement that HLRW held at nuclear plant sites utilize “hardened on-site storage” techniques.
6. As an adjunct to Recommendation #3 above, instruct the liaison to ask the Delegation to oppose national legislation that would support either “CIS” facilities, or re-institute funding and characterization of the failed Yucca Mt. Project. Urge the Delegation to champion institution of a national Commission to re-examine best methods for HLRW disposal; and create a program to achieve those methods.
7. To fully reward and acknowledge the total positive environmental impact of renewable energy and energy efficiency and their preferability to the continued use of fossil and nuclear power, create “zero-radiation credits” as a means of expanding market penetration for EE/RE resources.

RECOMMENDATION #5: *Understand that in an increasingly climate disrupted world, nuclear reactors will be less efficient at producing electricity, and because of their necessary reliance on water, will be more prone to unpredictable curtailment and shut-downs, as has already occurred in Illinois, Michigan, the U.S. Southeast, Europe and elsewhere.*

Reactor power curtailment and shutdowns in a climate disrupted world:: In a climate disrupted world, water will be the paramount resource (if it isn't already):

- Insufficient water ultimately forces reactors to reduce power output, or shut down completely. Intake water is needed both to cool the reactors to keep them from melting down; and to produce steam to generate electricity. Discharge water that is too hot for already overheated river systems necessitate reactor power reduction or shutdown due to the discharge water exceeding U.S. EPA standards for thermal discharge. This happened in Illinois frequently during the summer of 1988 during a severe drought. Reactors were forced to shut down when needed most to provide power during the drought and heat waves. This has happened numerous times worldwide as well.
- Too much water will prevent reactors from running safely due to massive flooding and sea level rise. The catastrophic flooding along the Missouri River in 2011 resulted in the shut down and total isolation of the Fort Calhoun reactor in Nebraska. For weeks the reactor was totally surrounded by water, held back only by a thin wall of sand bags and air barriers (which were accidentally breached once). The only way to access the site was by boat or helicopter. When flood waters receded, engineers were concerned that the constant emersion underwater for weeks may have weakened the foundation of the reactor. Since then other reactors have been similarly threatened by flood waters, although not totally isolated: the 2012 floods at Salem (hurricane Sandy) & Oyster Creek in New England, the 2017 flood threatening the South Texas Project from Hurricane Harvey, and the 2019 problem at Cooper NPP, Nebraska.
- Excessively high external air temperatures can also force reactors to automatically shut down if the temperatures in the reactor buildings exceed NRC standards. This has already happened to reactors in Michigan during summer heat waves.
- Climate model predictions for the Illinois area over the next several decades indicate a transition resulting in "normal" temperatures becoming similar to current day West Texas. Precipitation will be higher; however, it will not come evenly, but rather in alternating patterns of intense deluge and flooding, followed by periods of high heat and drought. This makes preparing reactor sites for safe operation more difficult.
- Intense weather events (tornadoes, hail, high-wind deluge rains, etc.) are expected to increase in frequency and magnitude. These can have a very disruptive effect on presently configured traditional power grids. Since reactors rely on grid electricity to power safety systems onsite, loss of grid power has significant safety implications for Illinois.

Reactors are less-efficient during high-heat events: The power output of reactors continuing to operate is diminished during periods of drought due to higher river water temperatures. A Union of Concerned Scientists paper ("Nuclear Heat," Issues Brief, Union of Concerned Scientists, 2006. www.ucsusa.org) notes that, with higher ambient water temperatures in rivers and lakes, "...the effectiveness of the condenser in converting steam back into water decreases. As a result, steam is not "pulled" through the turbine as swiftly and less electricity is "cranked" out."

To be fair this condition applies to any steam-cycle electricity generator, whether powered by coal, nuclear or gas. But to be equally fair, this point should be held pointblank in mind when considering new sources of electricity in a difficult to model but seemingly imminent climate-disrupted world. Wherever drought becomes the norm, the steam-cycle for power generation will compete head on with more basic human needs and uses for water. And in an agricultural state like Illinois – which already uses over 80% of its surface waters for power generation – expanding reliance on the steam-cycle becomes a liability.

It's worth noting that 1.) reactor shutdowns already happened in Illinois in 1988, and almost again in 2005-06; and 2.) 100% of Exelon's Illinois reactors are river-dependent.

Federal Regulators at NRC have either ignored or falsified the degree of risk possible from climate disruption: As will be seen below (Sec. #6) the NRC has failed to properly respond to the increased risk to reactors from climate-related flooding and catastrophic weather events, and has failed to do so on several occasions over the past decade. This places all of Exelon's Illinois reactors – which are river-dependent facilities -- at some degree of less-predictable or increased risk as climate disruption worsens.

CONCLUSIONS AND RECOMMENDATIONS:

1. Because of the reduced ability for reactors to function, and function safely, in a further climate disrupted world, prudent energy planning calls for a rapid transition away from steam-cycle electricity production (nuclear power and fossil fuels) and towards non-water dependent sources of renewable energy – solar, wind, geothermal and energy efficiency.
2. Electric grids of the future need to become more decentralized, distributed and redundant, and equipped with the latest SCADA (supervisory control and data acquisition) equipment to minimize loss of power and outage duration times and size occurring as a result of more intense weather events.
3. Order the Illinois Dept. of Nuclear Safety to conduct its own assessment of climate-related risk to Illinois reactors, and develop state-based response capabilities to identify emergency situations. Require IDNS onsite inspectors at Exelon reactors to personally review NRC and Exelon reactor site safety reviews related to weather-related events, and onsite emergency planning and loss of offsite power events; and report site status assessments to the Legislature and the Governor.

RECOMMENDATION #6: *Understand that the “captured agency” reputation of the federal Nuclear Regulatory Commission (NRC) means it should not be viewed as a reliable protector of the environment or economy of Illinois; and that the State will have to create a number of unique laws, policies and mechanisms currently absent that more adequately protect the people, environment and economy of Illinois.*

- Do not think that because we have a federal Nuclear Regulatory Commission (NRC) tasked with watch-dogging the nuclear industry, that Illinois public safety is being safeguarded:
 - In January 2019 the 5-person, politically appointed Commission on a 3-2 vote overruled its own technical staff and denied implementation of critically important safety systems to guard against catastrophic flooding. (Source: *“Republicans at U.S. nuclear regulator pass stripped down safety rule,”* Timothy Gardner, Reuters, January 24, 2019). In March 2019 the Midwest experienced catastrophic flooding, expected to be increasingly likely in the future. An analysis done by the Agency indicates that 55 of the 61 U.S. nuclear sites were found to confront flooding hazards *beyond what they were designed to withstand*. Among those are Exelon’s Quad Cities 1&2 and Dresden 2&3 reactors.
 - In March 2019 the nuclear industry and their Nuclear Energy Institute (NEI) trade group petitioned the NRC Commissioners to begin *self-regulating* certain aspects of nuclear operation (Source: *“Nuclear industry pushing for fewer inspections at plants,”* Ellen Knickmeyer, 3/14/19, Associated Press) Also in March 2019, investigation into the two crashes of Boeing 737-MAX airliners suggested that part of the problem may be traced to similar self-regulation circumstances in approving certain design features of the 737s possibly related to the crashes. (*“Boeing role in vetting its own jets coming under fire,”* 3/19/19, Chicago Tribune.)

To paraphrase NRC inspector Ross Landsman, formerly with Region III in Illinois, “This is the kind of thinking that cashes space shuttles.” – and possibly Illinois reactors the longer they operate.

- The former Chairman of the U.S. NRC, Dr. Gregory Jaczko, has been critical both of the level of safety standards tolerated by the NRC Commissioners, and with nuclear power’s inability to provide a meaningful contribution in dealing with the climate crisis. (**NOTE:** we provide a copy of his recent book, which goes into detail about both of these positions. It’s clearly written, and a fast read.):

“From everything I’ve seen and experienced with this industry, I think that’s a fool’s errand, and I think it’s gonna fail the planet when it comes to dealing with climate change.”

“I think the current type of reactors we have in this country will always operate kind of on this narrow precipice of safe operation and catastrophe on the other side.

“This idea that nuclear power can solve this climate problem and be made free of accidents — those things just aren’t true. There’s always going to be the risk of accidents in nuclear power plants, and really, the only way to eliminate the risk of accidents with the current design is you just make them so small that they’re just not useful for generating electricity.”

- In its 2017 3-part, year-long investigative report on the nuclear industry in Illinois, BGA reporters Madison Hopkins and Brett Chase report: “Employees at the nation’s nuclear power plants filed nearly 700 whistleblower complaints with the Nuclear Regulatory Commission in recent years. It upheld *zero*.” (*“Nobody Really Cares”*, Madison Hopkins and Brett Chase, Better Government Association Dec. 20, 2017.). This has been a consistent pattern with NRC that NEIS has observed for three decades, resulting in our conclusion that “NRC” stands for “not really concerned.”
- Nuclear utilities are pushing the NRC to extend the operating licenses of reactors a second time, out to 80 years. NRC granted the first such license recently. This plan is fraught with increased risk – from materials aging and degradation, increased O&M costs, unavailability of replacement parts, loss of institutional memory among staff, and insufficient numbers of trained capable operators over that period as university training programs dwindle.

CONCLUSIONS AND RECOMMENDATIONS:

1. Obtain independent professional second opinion regarding NRC actions, existing rules and rulemaking, and their effects on and implications for Illinois.
2. Instruct the Illinois Department of Nuclear Safety (IDNS) to issue their analysis of NRC actions and rules as they apply to Illinois; present these to the Governor and Legislature.
3. Instruct IDNS to issue analysis and opinions on federal legislation regarding nuclear power and waste, and their effects on and implications for Illinois. Have these reports presented to the Governor and Legislature; and posted available for public review on the IDNS/IEMA webpage of State government Agencies.
4. Instruct IDNS to develop a letter to be signed by the Governor in opposition to 80-year operating licenses at reactors. Explore other ways of prohibiting this in Illinois, exercising appropriate state-purview authority.

RECOMMENDATION #7: *The Politics of energy policy: It is imperative that the result be a true state energy policy for the future, and not a business as usual quid pro quo negotiation that freezes Illinois in place in implementing renewable energy and efficiency, rather than advancing us forward in meeting legitimate energy needs. As a result the “politics” conducted to achieve this result can no longer be business-as-usual, particularly in view of the recent FBI investigations into Exelon’s and ComEd’s energy-related lobbying activities.*

From the Governor’s State of the State address:

“It’s time to end the practice of legislators serving as paid lobbyists. In fact it’s time to end the for-profit influence peddling among all elected officials at every level of government in Illinois...”

“Our spring agenda must also address the pressing issue of adopting new clean energy legislation that reduces carbon pollution, promotes renewable energy, and accelerates electrification of our transportation sector.”

“Urgent action is needed, but let me be clear: the old ways of negotiating energy legislation are over. It’s time to support consumers and climate first. I am not going to sign an energy bill written by the utility companies.”

-- Gov. J.B. Pritzker, State of the State Message, Jan. 29, 2020

NEIS would wholeheartedly agree and commends the Governor for this statement, and add that this is long overdue.

As the State begins a more credible process of creating an energy future it is important to keep in mind a number of things:

- Historically, Exelon/ComEd and its antecedents have been the largest and most consistent barriers and opponents to the more widespread implementation of energy efficiency (EE) and renewable energy (RE) resources than possibly any other entity. They will not become allies and promoters of RE in the future – at least not voluntarily.
- Historically, progress in increasing EE/RE in Illinois never occurred without some simultaneous agreement, perk or program that would enhance nuclear power generation or greater control of energy programs/systems by Exelon (nee ComEd). Most recently, this is evidenced in the 2016 FEJA legislation, which increased EE/RE, but at a cost of a \$2.3 billion bailout of three uneconomic Exelon reactors which allegedly would have closed otherwise. Ironically – or not -- during the negotiation leading up to the passage of FEJA, Exelon had sought a smaller amount over a 5-year period. Then-Governor Bruce Rauner and Legislative “leadership” agreed to the \$2.3 billion figure, and a longer 10 year bailout period -- demonstrating the influence and control Exelon has held over the energy/political process.
- As recently as early 2019, ComEd/Exelon asked the ICC to intervene and delay the legitimate sale of transmission power lines owned by the community of Rochelle, IL to NextEra Energy of Florida, a company specializing in renewable energy, and an Exelon competitor. This sale would have brought additional wind RE from Iowa into Illinois that has now been delayed – demonstrating that the so-called “wisdom” that Illinois may not have enough RE energy to replace both fossil fuels and nuclear plants may be as much

self-fulfilling prophecy orchestrated by Exelon as true technological or engineering bottle-neck.

- The 2019 FBI investigations into the questionable lobbying activities of ComEd and Exelon indicate that past relations and negotiations with them are potentially corrupt; and future relationships with them should and must be viewed with great skepticism. Any relationship with ComEd and Exelon moving forward should be considered potentially toxic in nature.

CONCLUSIONS AND RECOMMENDATIONS:

1. Commission a state blue-ribbon panel of independent energy experts to 1.) draft a State energy policy reflective of the stated goal of achieving 100% renewable energy generation by the year 2050; 2.) determine the negative effects on the economy and the environment of keeping uneconomic nuclear reactors operating (via bailouts, rigged-capacity markets, etc.); and 3.) determine the steps necessary to phase out nuclear power in Illinois. (See: Sec.4.2 above)
2. Conduct Illinois energy policy in a manner that disallows even the appearance of a conflict of interest on the part of any State public official; and mandatory recusal of individuals who would present that appearance from engaging in energy-related decision making.
3. Explore attracting new and alternative energy suppliers – particularly those specializing the renewable energy technologies -- to Illinois to increase the diversity and market competition among energy suppliers, and to further the stated energy goal of achieving 100% renewable energy generation by the year 2050..



Supplemental Documents