Wednesday, September 25, 2024 / AI’s nuclear option

[HALF SECOND OF SILENCE]

[BILLBOARD]

WINDOWS START UP SFX

SEAN: Think of all of the things we have thanks to Microsoft.

SCORING IN <Science Class VHS 5b (no vhs hiss) - BMC>

SEAN: Windows. Windows 95. Windows XP. That iconic background with the green hill and blue sky.

*<CLIP> ZOOLANDER: HANSEL: Wow.*

SEAN: Remember MSN Messenger?

MSN MESSENGER SFX

SEAN: Excel. Power Point. Word. Clippy! Solitaire. Zune. The Xbox. That GIF of Bill Gates dancing. That meme where Bill and Steve jobs are laughing in those red chairs.

*<CLIP> Bill and Steve laughing*

SEAN: The Bill and Melinda Gates Foundation. Aren’t they trying to get rid of mosquitoes? The latest thing Microsoft is bestowing upon us is, of all things, a nuclear power plant.

WINDOWS ERROR SFX

SCORING OUT

EVAN: What's happening here is Microsoft needs so much energy for its AI operations and its data centers that it's basically buying all the power from a nuclear plant. That's as much power as could fuel 800,000 homes.

SEAN: That’s what’s up on *Today, Explained*.

[THEME]

*<*[*BUMPER*](https://www.youtube.com/watch?v=Mk9XRBsCaug)*> Alice Cooper - Nuclear Infected*

*I want to live on Three Mile Island*

*Where things are clean and neat*

*'Cause we don't have no health freaks*

*Clutterin' up –*

AVISHAY ARTSY (producer): *Today, Explained.*

SEAN: Evan Halper writes about the energy transition for the *Washington Post*.

You know about that transition, right? The one from fossil fuels to clean energy.

That transition had a big moment on Friday when we heard that an old nuclear power reactor on Three Mile Island would be coming back online in a deal between Constellation Energy and Microsoft.

And if Three Mile Island sounds familiar. It’s because this one time, in *1979*, baby had a bit of a meltdown.

EVAN: And sort of that lack of our collective memory of Three Mile Island is, is a reason that nuclear is, is having a revival right now. I mean, a lot of people who were panicked by what happened at this plant. This was the site of the worst nuclear accident in U.S. history.

SCORING IN <Everything Is Not Fine - BMC>

*<*[*CLIP*](https://www.youtube.com/watch?v=eGI7VymjSho)*> ABC NEWS: For many years there has been a vigorous debate in this country about the safety of the nation's 72 nuclear energy power plants. That debate is likely to be intensified because of what happened early this morning at a nuclear power plant in Pennsylvania.*

EVAN: A reactor basically partially melted down. Something went wrong with one of the valves and radioactive air got released and it wasn't clear how much air was in the environment, how toxic it was, how dangerous it was to people.

*<*[*CLIP*](https://www.youtube.com/watch?v=eGI7VymjSho)*> ABC NEWS: Workers were evacuated. The plant was completely shut down. A crew from the Nuclear Regulatory Commission rushed from Washington and sped around all day testing for radiation.*

EVAN: There were lockdowns. There was all kinds of panic.

*<*[*CLIP*](https://www.youtube.com/watch?v=rCJbmUGoXXU)*> WNEP: Governor Thornburgh suggested pregnant women and preschool children within a five-mile radius of Three Mile Island leave the area, and residents within a 10-mile radius have been urged to stay indoors indefinitely.*

EVAN: In the aftermath, it was discovered that there were problems with the plant's design. There was problems with training. And it really launched in a big way the nuclear safety movement in the U.S.

*<*[*CLIP*](https://www.youtube.com/watch?v=uDYfoRKTw1c)*> DR. GEORGE WALD: I saw on the news a company official here saying, “fortunately no one at the plant got an overdose.” I want to say something plain and simple about that. Every dose is an overdose!*

EVAN: And after that partial meltdown of that reactor happened, the industry really struggled. The promise of nuclear power was looking a lot less promising than it was before all this happened. And there were all kinds of hearings and new safety rules. And the challenge of building a plant became just, just much steeper because there were all these concerns about safety.

SCORING OUT

SEAN: There is a huge activism mobilization that happened around this right? There, there were people protesting nuclear power back then, the way people might protest a pipeline now.

EVAN: Yeah, it's really interesting to look at some of the footage from that era and the anti-nuclear protests that happened. I mean, there was a protest in Washington.

*<*[*CLIP*](https://www.youtube.com/watch?v=0TJsXKGe8qo)*> 1979 anti-nuclear power demonstration in Washington DC: “No more nukes! No more nukes!”*

EVAN: You had just tens of thousands of people coming, these immense crowds. This wasn't at Three Mile Island, but another plant in California, Diablo Canyon, which they recently extended the life of, I was looking at pictures back when people were trying to get that shut down.

*<*[*CLIP*](https://www.youtube.com/watch?v=4kvSlVblE4I)*> JULIA HOMICK (student participating in a 1984 protest at Diablo Canyon): I'm really afraid of this power plant. It's got too many faults. It's radioactive. Once they start it up…*

*[SINGING: “No Diablo…” through the end of the answer]*

EVAN: You know, just seas of people. I mean, these are some of the bigger protests we've seen in our history. And it was all around nuclear power and trying to get these plants shut. So it's kind of interesting now that you just don't have that anger and anxiety over nuclear energy. It's, it's kind of going the other way.

*FADE OUT SINGING: “No Diablo…”*

SEAN: And why is that? What happened? Why did that anger and anxiety dissipate?

EVAN: Well, I think one of the interesting things about Three Mile Island is people will tell you, you know, this happened 45 years ago, was the worst nuclear accident in U.S. history. But, you know, no one died. And there's disputes. People in the community say that they got sick and, you know, they've been dealing with the effects of this.

*<*[*CLIP*](https://www.youtube.com/watch?v=7Od0aJXyM8k)*> MARY STAMOS, resident, Central Pennsylvania: We went out in the driveway and the air was filled with metal and we couldn't tell if we were breathing it or eating it. It was just everywhere.*

EVAN: But the government ultimately found that they couldn't trace any cancers or any like serious disease to this accident.

*<*[*CLIP*](https://www.youtube.com/watch?v=iiRDwy28-MQ)*> THOMAS KAUFFMAN, former Three Mile Island worker: There's absolutely no medical or scientific evidence that shows that anyone outside the plant was harmed.*

EVAN: And so at this point, we're looking at climate change and we're looking at temperatures rising really quick and these crazy weather events and people are getting really scared. And people in younger generations who weren't even around when Three Mile Island happened are saying, you know, ‘Why are we not looking at nuclear?’

*<*[*CLIP*](https://www.ted.com/talks/isabelle_boemeke_nuclear_power_is_our_best_hope_to_ditch_fossil_fuels/transcript?subtitle=en)*> ISABELLE BOEMEKE, nuclear energy influencer: What if instead of viewing nuclear power as destructive, we view it as a force for energy independence?*

EVAN: Chernobyl, which was a major nuclear disaster in Ukraine, was a totally different situation …

*<*[*CLIP*](https://www.youtube.com/watch?v=as2oGJKv0EA)*> ABC NEWS: As the cloud of radiation grows so too does anxiety throughout Europe. Radiation levels in at least half a dozen countries are three to twenty times above normal. Not a serious health hazard according to officials but cause for serious concern nonetheless.*

EVAN: … you know, a lot of people were seriously injured because of that. But that was a different plant with different safety standards. And they'll say, like, this U.S. plant., we haven't seen any kind of major safety issues happen. And on top of that, they're also looking back at Fukushima, which, of course, that was when there was a tsunami in Japan and everyone had to evacuate around the Fukushima nuclear plant.

*<*[*CLIP*](https://www.youtube.com/watch?v=EgnORheNsrU)*> EURONEWS: First they were asked to leave. Now, it's an order. Here in Koriyama they're testing people for levels of radiation.*

EVAN: But a lot of studies have gone back and looked at, well, were there any, you know, fatalities there? There were, but they were related to the panic in the evacuation.

*<*[*CLIP*](https://www.youtube.com/watch?v=GyCNLisRuLg)*> CNA: A new report from the UN says radiation from the Fukushima nuclear disaster has not harmed the health of local residents.*

EVAN: So there's a lot of debate about the history, a lot of discussion about, well, now that climate change is such an urgent problem, are these safety risks really so big that we shouldn't be moving back to nuclear power?

SEAN: And that's what brings us to this big moment now for Three Mile Island. How do you reopen a nuclear power plant that had a meltdown?

EVAN: So it's important to distinguish that Three Mile Island had multiple units. And so the unit that had the partial reactor meltdown has been closed for decades.

SEAN: Mm.

EVAN: There was another unit that had a separate reactor right next to that one, and that one operated until 2019, actually.

SEAN: Huh.

EVAN: And then in 2019, it didn't close because it had mechanical problems. It actually closed because the cost of nuclear power was just so high.

*<*[*CLIP*](https://www.youtube.com/watch?v=aIxU2KW8eCQ)*> CBS PITTSBURGH: Exelon Corporation, the company that owns Three Mile Island, said it is in financial trouble. It has posted five years of losses because of increasing use of renewable energy sources and the natural gas drilling boom.*

EVAN: They didn't anticipate the surge in energy demand that we're dealing with right now.

SEAN: But now that there is one, they're just going to, what, reopen the whole thing?

EVAN: Well, they're not going to reopen the reactor that partially melted down.

SEAN: [laughs] They’re gonna leave that be.

EVAN: Yeah, that one is never coming back, I dare say. The one that closed in 2019, though, they're saying, look, we kept this in good condition. The company that owns the plant, Constellation Energy, they said, you know, we did not start taking this thing apart. We didn't fully decommission it. But we kept it in a kind of shape where it could be able to operate again.

*<*[*CLIP*](https://www.youtube.com/watch?v=sBehFP9UcXM)*> WTVR: Constellation says the plant meets the growing demand for clean zero-carbon energy and will create thousands of jobs, saying in a statement, “this plant was among the safest and most reliable nuclear plants on the grid and we look forward to bringing it back.”*

EVAN: They'll have to go through all kinds of regulatory hurdles and we'll see if, you know, the inspectors at the Nuclear Regulatory Commission agree with them. But it should be noted, you know, there have been many nuclear plants shut down. Very few of them could come back like this. A lot of the other plants that have been shut, they're further along in the decommissioning process. I mean, they've been taken apart.

SEAN: Mm.

EVAN: You know, there's still some pieces of them on the site, but they can't be brought back into commission easily.

SEAN: Are people mad that this site of a meltdown is reopening in Pennsylvania?

EVAN: Yeah, you're definitely seeing groups of people protesting. I mean, there's nuclear safety organizations around Three Mile Island that do not like this.

*<*[*CLIP*](https://www.youtube.com/watch?v=Sj4kLLK7n2o)*> WGAL: ANNA DALE, Londonderry Township Supervisor: Because we have people that are here since the accident and have real concerns about safety.*

EVAN: The nonproliferation people are expressing a lot of concerns. The Union of Concerned Scientists, for example, points out that, you know, Congress is trying to pass these rules to grease the skids for plants to be approved more quickly. And that raises safety concerns. They're worried that with these changes in the way that we're going to approve plants, that the regulators will miss risks. So this is not uniformly supported, but it's also not creating the kind of angst that nuclear plants have, you know, in past decades.

SEAN: Which I guess is good news for Microsoft?

EVAN: It's very good news for Microsoft.

SCORING IN <Brutal Lizards - BMC>

EVAN: I mean, this is unprecedented, for one company to just say, I'm going to buy all the power from a nuclear power plant and, you know, a tech company at that. It's, it's just hard to get your head around. I mean, a year ago, if you told me this was going to happen, I would just say you’re making this up. This is fiction. This is like, you know, the plot of a novel. Like how, why would one company be able to buy all this energy from a single plant? But that's where we are now.

SCORING BUMP

SEAN: Evan’s gonna tell us how we got here now when we return on *Today, Explained*.

SCORING OUT

[BREAK]

*<*[*BUMPER*](https://www.youtube.com/watch?v=XiTHxmYsGCU)*> The Simpsons, season 1, episode 3: “And so this plant harnesses the power of the atom so that we have energy to run everything from your favorite video game to yummy cotton candy machines.” [applause] “Let’s learn more about nuclear energy, shall we? Lights!” [film projector sfx]*

SEAN: *Today, Explained* is back. Evan Halper, you were saying that this is basically unprecedented, that no one saw this coming, that Microsoft is going to reopen Three Mile Island and use all of the energy for, what, AI purposes? How did this happen?

EVAN: So the tech industry is building these data centers and they're building them all over the country.

*<*[*CLIP*](https://www.youtube.com/watch?v=OA6vhoSqw2Q)*> ABC15: New at 6:30, Facebook is expanding to Mesa, the social media giant spending 800 million dollars to build a massive data center.*

*<*[*CLIP*](https://www.youtube.com/watch?v=DxLF-XL2s3c)*> 13 NEWS NOW: It doesn't look like much but soon this empty field in Virginia Beach will have a high-tech data center that opens up a world of possibilities.*

*<*[*CLIP*](https://www.youtube.com/watch?v=fEnKy5ENrr4)*> 12NEWSNOW: A $800 million data center for Facebook parent company Meta is coming to Central Texas.*

EVAN: And a lot of what is fueling the growth in data centers right now is training for AI models. There's kind of an AI arms race going on where we're trying to compete with China and possibly Russia for national security reasons, but also reasons involving, you know, your cat videos.

SEAN: <laughs>

*<*[*CLIP*](https://www.youtube.com/shorts/3BnL_67_7G4)*> funny cat meowing*

EVAN: We want to dominate the AI industry. And to do that, we're just finding it takes an immense amount of power. It's really shocking how much power that AI uses. You know, an AI search on, I think it's ChatGPT, uses like ten times the amount of energy that a Google search does, for example.

SEAN: Mmmm.

*<*[*CLIP*](https://www.youtube.com/shorts/1t6FNyW3JmE)*> @teddywang86*

*MAN: ChatGPT, show me chicken nuggets.*

*CHAT GPT: Delicious chicken nuggets.*

*MAN: Remove the ketchup!*

*CHAT GPT: Without the ketchup.*

*MAN: Sneaky move ChatGPT, but I still see it!*

*OTHER MAN?: Bruh…*

*CHAT GPT: No ketchup.*

EVAN: That's just one example. Beyond that, you're talking about, the last statistic I saw from Bloomberg Intelligence, which does research on, on energy, they said it's possible that AI by, I think it was 2030, could be using 17% of U.S. electricity.

SEAN: 17% of all of it will be AI. One in five electric activities we need will be AI.

EVAN: 17% of it would be AI and data centers. And, you know, there's also things like the cloud, but a lot of what's driving the energy growth of data centers is AI right now. And so right now, data centers, they use like less than 5%. I mean, you've read the stories about crypto-mining taking a lot of energy and, you know, just computing does take a lot of energy, but it's, it's soaring. And the tech companies are pitching this as a national security imperative that this has to happen. We need all this energy.

*<*[*CLIP*](https://www.youtube.com/watch?v=riFuznlZvyY)*> MARK ZUCKERBERG: We need to rely on and build sophisticated AI tools that can help us flag certain content – terrorist content for example, where we now have AI systems that can identify and take down 99% of the Al Qaeda and ISIS-related content in our system before someone, a human, even flags it to us. I think we need to do more of that.*

EVAN: And they're scouring the country for places to find cheap energy. The traditional tech hubs that we associate them with, Silicon Valley or Northern Virginia, where they built all these data centers. They're tapped out. Their power grids cannot bring on more of these huge data centers and some of the, what they call hyperscalers, those are the giant data centers they're building, the amount of energy they take is immense. I was just in Omaha and Google and Meta wouldn't let me in. In Nebraska, that one Meta data center I saw, Meta reports its energy use. It's 1.1GW hours. And then Google has a data center across the street and Google is using even more energy from some of the statistics we looked at than Meta is. So, you know, and this is in a place I never associated with tech or data centers. You know, this is Nebraska.

SEAN: So it sounds like Google and Meta and Microsoft are all scouring the country for more power. How does Microsoft land Three Mile Island? And is that super competitive? Is everyone else jealous and envious that they got this site of a meltdown?

EVAN: Yeah, I'm guessing they are.

SEAN: Hm!

EVAN: I mean, and I think there's going to be more deals like this at other power plants. Amazon struck a deal with a power company called Talen.

*<*[*CLIP*](https://www.youtube.com/watch?v=_x67CvkMYRw)*> WNEP: Talen says Amazon's Web Services division will develop the data center right next to the nuclear facility. Talen's financial report on the transaction says it will create new jobs and potentially attract other talent and business to this part of Pennsylvania.*

EVAN: I don't think other tech companies are looking at Microsoft like they're nuts. I think they're looking at them feeling very jealous and wishing they had 835 MW of zero emissions power that they can claim credit for.

SEAN: But even those 835 MW, it sounds like from what you're saying, it won't be enough to feed the beast.

EVAN: Oh yeah. It's a drop in the bucket.

SCORING IN <Bees Ambient 3 Marble Structures - BMC>

EVAN: I mean, they're going to keep needing more and more and more power. I mean, if we're in the infancy of the AI revolution right now and Microsoft is already like needing the power of a nuclear plant, that would presumably, if you were to try to build something like that now, take, you know, ten years or more to build. And this is just a start. And there's only like one of these or, you know, 1 or 2 of these nuclear plants that can be brought back online easily. It raises the question like, you know, can they control their appetites? If this is just the start, where's the rest of the energy going to come from?

SEAN: Where's the rest of the energy going to come from?

EVAN: Well, so Microsoft, interestingly, thinks it's going to come from fusion. So nuclear fusion is like the holy grail of energy.

SEAN: Yeah.

*<*[*CLIP*](https://www.youtube.com/watch?v=4s2ynUAJ5ZU)*> CHUCK NICE on StarTalk: Everybody's talking about fusion, fusion, fusion. I'm like whoa, whoa. Is this a good thing?*

EVAN: If you can create a fusion reaction, you can have, like, bountiful, cheap energy that’s zero emissions and, you know, it would be just like limitless. No one's been able to figure out how to crack the code. No one thinks it's going to come online anytime soon. But Microsoft is just like, and other tech companies, are investing in everything they can find. You know, they're also looking at these small modular nuclear reactors.

*<*[*CLIP*](https://www.youtube.com/watch?v=yfPmsc-UsBE)*> DR. MARIANNE WALCK: These two to 20 megawatt reactors will have multiple applications, powering remote communities and industries as well as military bases and deployed troops serving abroad.*

EVAN: They sound great in theory. You build a small reactor. It's not as big of a safety problem as other reactors are. It can provide energy to a data center like right on the same property.

SCORING OUT

SEAN: But what about solar and wind and hydro? Are these things just not going to cut it for fueling AI?

EVAN: The data centers run 24 hours a day, seven days a week. And, you know, as we all know, with solar power and wind power, you know, if the sun's not shining, the wind's not blowing, they're not creating that energy. And so there's this kind of rush to create new technologies with battery storage so you can store all that solar and wind energy. But to build as much as these AI centers need, you're just talking about crazy costs. And they are consuming energy faster than the technology is getting developed to store this wind and solar energy, and faster than wind and solar farms can be built.

SEAN: Maybe instead of, like, helping people imagine what it would have sounded like if Kendrick Lamar’s “Not Like Us” came out in 1958…

*<*[*CLIP*](https://x.com/wordfromkdot/status/1836587153997939042?s=10)*> TikTok: Say Drake, I hear you like ‘em young*

*You better not ever go to cell block one…*

SEAN: …they could just focus all the energy of AI on cracking nuclear fusion.

EVAN: Yeah. I mean, I think <laughs> you raise, you raise a really important point. You know, as we need to start prioritizing who gets the energy, what are the impacts for the rest of us? What's it being used for? If we're using it for Snapchat…

*<*[*CLIP*](https://www.youtube.com/shorts/q_nEHBM-CIU)*> Snapchat: I’m reacting to Snapchat filters. Part 3. Go. [spits out water, laughs]*

EVAN: Then it raises the question of like, should we really put other ratepayers at risk of, like, not having air conditioning in the summer because the tech companies are taking so much energy so people can do fun things on Snapchat? I mean, there, there needs to be a way to balance those needs and prioritize them. And we are so far from finding them and our political system doesn't seem up to the task to, like, dealing with these thorny questions.

SEAN: Right. Like every other technology we've been, you know, bestowed in the past two decades, we just dive in headfirst and start playing with it without really thinking of the consequences. And this is getting real because the consequences could lead to a crisis in our grids. So, so, where do we end up in a couple of years if we don't crack this?

EVAN: Yeah, we end up in a place where prices could really start to go up quite a bit for all the rest of us. We end up in a place where we just may not have the energy that these companies need or want to do the things that they say are just urgently needed. And you know, in China, they'll build whatever power plants they decide are needed for whatever projects they want to do. And so it's much more complicated to bring more energy online here. And so the question is, how much of our energy do we need to put into winning this AI race? And what are the costs if we start to ration that energy to tech companies? But these AI facilities, they bring jobs, they bring economic growth. And a lot of politicians on all sides of the ideological spectrum are trying to muscle their way into getting them to locate in their states. Sometimes they're sorry about it after the energy crunch emerges and then they realize they've got a real problem on their hands.

SEAN: And in the meantime, this isn't something that, you know, like the average American voter is probably worrying about either because it's all happening far away in Omaha somewhere, right, at a data center, or abroad even. But when do you think the average American does start worrying about this?

EVAN: Yeah, Sean, you're totally right in that people are not paying that much attention right now because it just seems obscure unless you live near one of these data centers that's getting built or, you know, I mean, we are seeing a lot of activism in communities where people are suddenly learning that the zoning has been changed and this just 4,000,000 square foot building is going up a block away from them. And that creates community activism. But the rubber is going to meet the road for the rest of us in our utility bills. I mean, we have not felt the impact of this yet. It takes a while. But all of our energy bills are going to be going up. And this is going to be a major driver of them. And so I think that's when people are gonna start paying attention, when they look at their power bills and are like, what is going on here? And data centers are part of the reason they're paying so much.

SCORING IN <Uncle Jeff of the Cosmos - BMC>

EVAN: You could look at this Microsoft-Three Mile Island story and just sort of look at it almost like it's science fiction because that's what it looks like, unless you're, like, living right next to Three Mile Island or working for Microsoft. But when you look at your power bill and it's gone up from $150 to, you know, $230, that's going to impact you. And that's something that's going to make you pay attention.

SCORING BUMP

SEAN: You can read Evan Halper at washington post dot com.

I’m Sean Rameswaram. Our show today was produced by Avishay Artsy. We were edited by Miranda Kennedy, fact-checked by Laura Bullard and Amanda Lewellyn, and mixed by Patrick Boyd.

This is *Today, Explained*.

SCORING UP AND OUT

MICROSOFT WINDOWS SFX

[10 SECONDS OF SILENCE]