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Transcript of Oral Energy History Project Interview between James Justicz and Daniel Justicz

James: So a few things I have to go over real quick before we begin - it's about informed consent. So the goal of the project is to learn more about energy history from a personal account, and tie that in with the themes of the course and reflect on the combined findings from there. The interview will just consist of background questions, and then a few more detailed questions asking about your everyday experiences with energy. You have every right to refuse to answer any of the questions, and just let me know if you prefer to not answer a question. So, my first question is: Would you mind walking me through the different places you've lived throughout your life?

Daniel: Sure. I was born in the UK in 1969. I moved to the Bahamas in 1973, or 1974, which would have been when there was an oil crisis apparently going on, although I was too young to really understand it. Moved to the US in 1977. I think it was right about the time Elvis died. And then I've lived in the US, mostly since then. But I've lived in Europe for a period of time between 1994 and 1998. And other than that, I spent a lot of time in England, during the summers in the 1980s.

James: Perfect, that's super helpful. And then what kinds of jobs and work or industries were you involved with in each of these places?

Daniel: Right. I graduated high school in 1987. So not much going on before that. And then I went to college and finished up in around 1992. So between '92 and '94, I was a banker on Wall Street at Morgan Stanley. Between '94 and '98, I would have described myself as a real estate developer in the Czech Republic. I went to business school between 1998 and the year 2000. And then I worked for a bit - went back to banking briefly for a year around the time you were born. And around the time you were born, then actually went out looking for companies to buy and ended up with a company that actually had quite a lot to do with the energy industry. They made small parts for land based gas turbines, which had a really strong time during the early 2000s when Enron was a big company in a big interesting place in terms of world news. And then worked for a company, bought a couple of companies. One was a distributor of various things for cable TV channels. One was a large manufacturer of big metal things for the military, and some such. Then I had about two years where I was out of the workforce then I worked about 10 years between 2009 and 2020. For a company that was a startup company looking to do

on-street parking technologies. And then for the last three years I've owned a water treatment company. So I have had a lot of various jobs on the way.

James: Yeah, no, that's really helpful. I mean, your career has got a lot to do with energy. I'm curious what your impressions of the energy industry as a whole are? Or you've seen many communities with energy, so how have you seen them change? For example, you started as a banker at Morgan Stanley, and now you're at a water treatment company, have your perceptions of energy changed at all?

Daniel: Sure, they've changed quite a bit, right? Because obviously you had just like today, the price of gas - and when I say gas I mean gasoline for cars - has always been a hot button political issue. And it's one of those ones that while it's not the biggest. It's obviously big, it gets a lot of press, right. And that's been a hot button issue as long as I can remember it, right. So I can remember it in the mid '70s. Actually in the late '70s, when the price of gas went to about 20 cents or 40 cents a gallon. And I can remember when it went to \$1, in the early - either late 70s or early 80s, it went to \$1. And it was like huge headline news. Wow, it's \$1 per gallon of gas. Can you believe how expensive that is? And that really hasn't changed, right? Because if you look at, let's just say that was 1980, for argument's sake, if you look at that, in the 2020 presidential election, the price of gas got up to around \$4.50. And it's, you know, it's funny that I even know these numbers, right. But the price gap got up to \$4.50 - \$5. And it was a huge political issue. And there was actually arguably manipulation of it on the world stage in order to throw the US presidential election, right. So that benchmark, as an example, has been a huge political football, as long as I can remember. Obviously, there's also the other big things I had mentioned about energy, which I think is noteworthy is that, you know, there was a lot of talk about running out of energy back in the 1980s timeframe when Jimmy Carter was the president. And you know, what I'm aware of just from most of these somewhat, because I have people, friends who worked in the industry, but also because of you know, but also reading the popular presses - with the increase with the improvement in technology - energy reserves have proven to be much broader than people perceive them to be back in 1980, when there was a lot of, are we going to run out of gas talk back then. And are we going to run out of fossil fuels back then? Similarly, I would, and I'll finish with this. Similarly, the political football of non-fossil fuel alternatives has been going around for decades, right? Jimmy Carter famously put solar panels at the White House and was mocked for it and they were pulled out by Reagan. And similarly, you know, even cartoons such as the Simpsons have joked about whether solar fuel and solar energy is whimsical, and not viable. Whereas today, you've got tons and you know, you've got, obviously alternative energies as a big business. So it's really come - the world has really changed in terms of their perceptions. And it tends to move glacially in terms of people's perceptions. It doesn't move quickly. But it's changed enormously since I was a kid when they would joke about solar energy to now where they're actually, you know, it's viable in the marketplace.

James: Yeah, this is all super helpful, thank you. And then I guess getting into a little bit more specifics now. I'm curious about your time in the UK. So you said the UK, Bahamas and then your EU, which was mostly Rokytnice?

Daniel: When I was in Europe?

James: Yeah.

Daniel: Yeah, I was more in the center of Prague, when I lived. You know, Rokytnice, the mountain place, was more a weekend place where I might have gone every two to three weeks. But most of the time spent in the Czech Republic was in central Prague. And what was interesting about that, and it's materially different today than it was when I got there is, you know, Czechoslovakia and then the Czech Republic afterwards. We're behind the Iron Curtain, right, they're an Eastern Bloc country. And they were all about cheap energy. And one of the cheapest energies there was brown coal, which is high sulfur coal, which still exists over there, but to a much lesser extent. But as a result, the air quality in the Czech Republic when I lived there, particularly in the winter, when you'd get atmospheric inversions was unbelievably abysmal. So you would look, walking around in a fog of smoke at street level, because the coal didn't burn very hot and it would return that back to the ground level. And it smelt like, really bad everywhere. And there has been a huge gasification of that entire part of the world. But obviously, a lot of that gasification came from gas that was coming from Russia. And so that's obviously had a political consequence to it too, right. So these big energy decisions all around the world are sort of fascinating in terms of the ripple effects they have on everything from politics, to geopolitical conflicts and all this sort of stuff.

James: Yeah, that makes sense. It was the same in Rokytnice versus Prague in terms of that brown coal, or what was it like? Were there any differences between Prague and Rokytnice?

Daniel: Well, this is actually pretty fascinating, so the answer to your question is yes. A lot of people would have burned brown coal up there. But one of the interesting things that and this is worth researching, one of the interesting things that the Czechs did that was controversial. They bought and built an enormous nuclear plant called Temelin, t e m e l i n. I believe that's the right spelling, on the border of Austria, which the Austrians weren't too thrilled about getting this Soviet-era nuclear power plant right on their border with the Czech Republic. But as a result, the Czechs really electrified a lot, ala-France with nuclear power, right around the time I was there that was coming online. And then as a result, they've been far less impacted. But I think they're still a net exporter of electricity to the rest of Europe. Right. So their decision to go nuclear when the world was withdrawing from nuclear looks pretty clever right around now. Now, you know, that's obviously avoiding the implications that they could have a nuclear accident there. But it is

interesting because that was downgraded in terms of risks. You have a country that stayed more away and stayed more towards electricity, and less away from fossil fuels, unlike Germany, and has this really positive political outcome, as a result, which is that they're a net exporter of electricity.

James: That makes a lot of sense. That is really interesting. How did you say it was spelled?

Daniel: T E M E L I N? I believe I've got that right. But you should check. It would show up on a Google search for sure.

James: And then I guess I'm curious as well, for Rokytnice vs Prague, were there differences in how you saw people getting around? Or how you got around? Or like what your kitchen looked like, the different appliances that you would use?

Daniel: So, yeah, to understand a Czech kitchen, in the early 90s, it was prehistoric by American standards, right. So you would have had the electric, you'd have maybe one or two burners in a Czech kitchen. And you probably didn't, you know, you had a small refrigerator about the size of what a kid would have in college here (USA), you did not have a big American style refrigerator, you had a sink with running water, and you maybe had two little electrical burners and maybe a gas stove, maybe two gas burners. But it looked like what you would imagine a kitchen would look like in the US in the 1930s around a farm, you know, later on, but really an old style kitchen. And of course, that's all westernized today, where it's gone to much more what you would expect to find in an American apartment or an American house. Not as ornate, but the same idea. But, you know, in Prague you'd have two gas burners or two electric burners and a running sink and a tiny fridge. And that was that was it. In Rokytnice, you'd have something similar except they may not may or may not have even had the gas burners they may have had like a stove in the kitchen that runs all day that they stoke with coal and/or with wood. And there's basically a term for that in the UK called an Aga, which was basically a big stove in the kitchen from where the house derived all its heat and warmed its foods and stuff like that. So there was a lot more of that up in the mountains. Where it wasn't even as modernized as the center of Prague. That's all changed today. It's all very westernized but in the early 90s, when the Berlin Wall came down, that stuff was pretty remarkably authentically old, like you might have found on an American farm in the 1930s.

James: That's super helpful and it's really interesting. And then you said Auga, A U G A?

Daniel: Yeah, I'll have to look it up. Because I'm at a computer now. But it's a British brand, you know how Hoover is sort of a universal word for a vacuum cleaner in some places. Aga is a British brand of these little you know, these heating stoves, like Uncle Nick, who you know, has an Aga in his house and it's just to prevent permanent heat. It's based on - I think it's oil fired or

gas fired or something. So yeah, I think it's Aga. It's famous. And now, you know, Viking makes these sorts of things, but, you know? Yeah. Aga is the answer. They do multiple things, right? They heat the house. They warm it, they have an oven, they've got burners on top of them. And they do all sorts of multiple heat concepts, right. But they're sort of, it's almost like a central heating unit for the house but it resides in the kitchen. And that construct was very common in farms and rural places in Europe and the UK.

James: And then in comparison, if you remember at all, like what the UK kitchen looked like in comparison. Even in the Bahamas, what did your kitchen look like as well?

Daniel: Yeah, our kitchen in the Bahamas looked like an American kitchen, honestly, because we were wealthy. And, you know, there's really no dramatic difference from an American kitchen and the Bahamian kitchen. In the U.S., it would have looked pretty similar. But you know, these differences in appearance and products in the kitchens really converged. Even England and the U.S. used to have different products, you know, used to say, oh, that's an English thing, or that's an American thing. And that all kind of converged around, and I'm gonna pick a date. But conceptually, it happened over time. But around 1990, there was a lot of convergence. Like in 1990, you would never see a subway, or a Starbucks or a Burger King in the UK. But around 1990 that all changed. So now you drive down a British highway and you'll see brands you recognize, right. And that's just, that's just very similar to the way things would happen in terms of what you'd see in a kitchen. They normalize. You know, if you think about it in terms of vicinities, right, the Bahamas was very close to the US. So their kitchens would look like US kitchens, even though they're a British colony, they were getting all the stuff from the US, which was, you know, literally like 60 miles away, right.

James: Yeah. Okay that makes sense, then I am curious. Going back through the UK, Europe/Czech Republic and the Bahamas. Were there any major differences in how you got around? Were you just getting around by car then? Was there public transport?

Daniel: Yeah. Right. Yeah, I'm trying to think. The cars in my lifetime - what's more interesting is, you know, your, if you go even back to your uncles and aunts, right, the cars were more tinny, and smaller. You know, the sort of, you're looking at cars that really were manufactured in the late 50s, and early 60s, in terms of your uncles and aunts, right. And there was a sort of a slow progress in cars, up until, even up until today, but in terms of their reliability is much higher, but their basic function is very similar, right? They transport you from A to B, they're more crash resistant, and things like this, and the English ones were smaller, and the US ones were bigger. But in terms of their function, really, the car in my opinion hasn't changed tremendously. I mean, some, it depends on how you define changes and change. But in terms of the utility of getting from A to B change, cars haven't really changed that much in my lifetime, in my opinion. Right? I think safety has changed a lot. Seatbelts have changed a lot, but you still throw gas in the back

of them, and they still get you from A to B. And they use a lot less gas, they're probably about 50% more efficient than they used to be back then, but in terms of function, they're largely the same, they're just a bit more reliable and substantially safer.

James: Ok, and then did you ever bike around, use public transport or anything like that? Or was it always just the car?

Daniel: But you know, you got to remember that we were a relatively wealthy family, right. So, you know, in the UK, we lived in the countryside, so there was no public transport to speak of. We might have taken a bus somewhere, but that would have been rare. Then in the Bahamas, cars everywhere. There was no public transport to speak of there. In the US, cars everywhere, because we lived in the suburbs. And then I guess I took public transport when I lived in New York for a bit but not really, because I walked to work. And then in the Czech Republic, I know your Aunt Jenny would have taken public transit, a little bit, across town. But again, Prague was a small walkable town. So my family, my nuclear family, has been relatively car-based my entire life. I'm trying to think of exceptions to that. I mean, it's cars and planes. And it's probably not that distinct from your existence in that way.

James: Yeah, very interesting. Another question I have is a culture question. So, in the UK versus the Czech Republic versus Bahamas and America, what have your perceptions of the culture of energy been like? And generally, what I mean by culture is like: oh they don't maybe care about energy consumption that much and that sort of thing.

Daniel: Yeah, that's a really good question. And actually, that gets into, you know, I talked about the similarities between all these places, but the differences are, the marketed differences in the UK cars have always been materially smaller than US cars. So there's essentially been a big tax on gasoline, I believe, since World War Two, in Europe, and in the UK. So the gas, from a US perspective, the price of gas in Europe and the UK, has always been artificially high because of taxation. But what that did was, you know, straight economic forces of that, push people towards smaller cars, and more fuel efficient, like diesel was way more popular in Europe, and is, I think, to a large extent, because it's more fuel efficient and cheaper. And people really, budgetarily, wanted cars, just like the U.S. wanted cars, but they did it cheaper because the gas was more expensive or the fuel was more expensive, right. So, and secondarily, in the post-World War Two era, British houses were poorly insulated. So were U.S. houses, but it was a bigger part of the budget. So people were, you talked about energy much more in those countries than you did in the U.S. In the U.S., it was taken for granted, because there was never high taxation on energy. And so people just sort of said energy was cheap, and they behaved that way. And Europe, energy was always more expensive, and they behaved that way. So you know, there's a lot of talk about putting on, you know, if you're cold, put on another sweater, don't turn up the thermostat.

Whereas in the US, you would walk straight to the thermostat and jack down the A/C or jack up the heat, right.

James: Then was it the same thing in the Czech Republic and Bahamas?

Daniel: The Bahamas was its own animal, right? Because it's a temperate climate. So usually, it's just kind of just balmy, right, a lot of the year. Whereas with the Czech Republic, I would say, yes, very similar to the UK, Europe, I would say very much. You know, when it comes to energy, thoughts about energy, they're really pretty - I didn't see a big discernible difference between the way they thought about energy and the way they thought about conservation. The U.S. was markedly different. And the Bahamas was kind of its own animal. But if you had to say it was closer to, I would have said there were expatriates, like us, who were relatively wealthy, and then there were natives, right? And so the natives of the island in the Bahamas would have not really had many options, they wouldn't have even had a heating A/C unit in their window. So they wouldn't have had a choice to make those. Whereas people like us would have behaved much more like Americans, I would say, towards energy.

James: That makes sense, you talked a little about the kitchen earlier, but I'm also curious about a typical house setup in terms of energetics such as heating, A/C. Were there any major differences there?

Daniel: Yeah, so a European or British house would not have A/C right? They may today but they certainly didn't when I was there, right. A/C was sort of, they used to have funny names, I forget what they called it. They have weird names for A/C that, you know, you'd be like 'Oh, I get what they're talking about,' but they wouldn't say A/C or something like we would hear. So A/C was not a big deal in Europe and it was not a big deal in the UK. Similarly, you know, places like, this is more a little bit experiential, but more in terms of my understanding is the way that Spain would have dealt with A/C was more like the way they would have dealt with it in Texas back before A/C, right, which is you'd have a tile floor on a, you basically get a lot of your cooling from how you built the house. And there wasn't a ton of A/C and there still isn't to my understanding today. Now that stuff with these, you know, these mini-split units that you see around the world. Now, that's sort of a relatively new introduction to the way these things are done. But the U.S. houses were all designed and built around A/C and ducted heating, right. Where European houses always had a source of heat, because it was friggin cold over there. But they didn't generally have a source of air conditioning. And the mini-split units that I think were developed initially in Asia have really become a big deal now in Europe, because they're sort of an affordable way of piping, especially as you know, global warming kicks in and things get warmer. I think people in the UK are starting to think that a mini-split A/C is a pretty good idea.

James: Yeah, interesting. And also going back a little bit, you talked about brown coal in the Czech Republic. I'm wondering if you saw anything like that in other places, or had any other tangible experiences with energy? Was there anything else like that? Were there other examples of energy that you were able to see in person or you had a very direct experience with?

Daniel: Your great grandfather built this building in the center of Prague. And your grandfather got it restituted in 1991. Right. And the whole building, so about 50 apartments in one building in Prague. The whole building was heated with coal. And there was a *topič*, which is a Czech word for it. But a *topič* is basically the boiler man, right. The heater man. And so, the heater man used to get deliveries of coal dumped through a port on the sidewalk down to the boiler room. And he used to shovel, he used to have to come through two to three times a day to shovel coal into the heater to make sure that the whole building stayed warm, right. So it was a very, very tactile thing. Haha, right? You're literally getting coal dumped through a chute on the side of the building into the basement. And then the cold then the boiler guy is taking a little wheelbarrow in this smelly dusty cellar and shoveling it into a boiler just like you would on a ship. Right. So yeah, it was pretty, pretty real. And since I was in charge of the building, I would have to order the coal and I would have to make sure that when the heating guy was sick that we had someone to heat the house and things like that.

James: And then was there anywhere else you had any experiences like that? Or was that pretty unique for you to the Czech Republic?

Daniel: Yeah, good question. Right. So I certainly didn't have anything like that in Atlanta. Atlanta in the 80s was a lot like Greenwich [Connecticut] today, right in terms of the way everything worked. In the UK, we were wealthy enough that that stuff had been retrofitted to sort of pretty modern heating systems as I remember it. You know, sometimes when I go to Vermont, in the late 80s, when I was in college, they had a heating unit that took wood down in the basement. You know, they could have had oil heat had they wanted to so they had sort of, they have this ability to use a boiler with wood, like in the basement that would heat the whole house. But that was a rarity. And it was kind of just almost to make it more authentic and folksy that they did that. And then trying to think of other places, the Bahamas certainly wasn't like that. Yeah, that's my answer. The Czech Republic was very, you know, that one experience with the building was very, very tactile. By that time electricity was a bigger thing in the Czech Republic, for whatever reason, than in some places. So there is this concept called dual-tariff electricity, which actually makes a lot of sense. So you could arrange to have essentially two electric meters in your house. One was the off-peak electricity, and one was the on-peak electricity, right, and one cost way more than the other. So what we did was we put an underfloor heating system in the house, which we would heat up in the winter months with the off-peak electricity, and then not use the on-peak electricity, except, to use the blenders and the refrigerator and things like



that. We heated up the house with electricity, but we heated it with off peak electricity, if that makes sense.

James: How did it work? How were you able to just switch from on- to off-peak? What was the actual mechanism?

Daniel: You didn't switch. Some of the circuits in the house were wired to the off peak. And some of the circuits in the house were wired to the on peak electricity. But the ones that took all the big draw, I mean, the primary heavy drawers were twofold, right there was that water heater, and the house heat and the under floor heater. And so those were wired into the off-peak meter. So remember that under floor heat, there is a big lump of concrete under the house, so that'll store heat. It's like a sink for heat. And similarly, a hot water heater is, you'll be interested to hear, the Czech word for a water heater for a battery, basically a baterie(?), which basically means it's a heat battery. So it stores the heat, if that makes sense. So you heat the water up, you get one tank of water, right? You heat that water up during the off peak hours, and then all day it stays warm. And then you can use it when you want to use it. But once you use it, it doesn't heat up until the next off-peak cycle.

James: Yeah, that makes a lot of sense. That is probably all of my questions, is there anything else you think I should know that I haven't really asked about?

Daniel: Yeah, let me think about that for a second. Yeah, I think there's a big sub-story to this, to all of this, right, which is the world you know, the world discovered, and I'm not trying to make a political point here. I'm trying to make a practical point. The world discovered a system with a lot of its energy problems, which was nuclear fission, a long ass time ago, right. And there were some pivotal events that happened during my lifetime. The Three Mile Island disaster in the US, which was followed up by a famous movie with Jane Fonda. And I'm forgetting the name of it right now. But it basically paralleled that experience. It was called. It was about a nuclear meltdown. But it got tons of press in this country, because of the Three Mile Island disaster. And then obviously, Chernobyl was a huge one. I mean, I was in England at the time. And, you know, there was a cloud, and you know, you couldn't eat lamb for a while, because the lamb got irradiated by this big nuclear disaster. So there was this incredible, absolutely remarkable source of energy, which became politically unviable in certain places, because people weren't willing to bear the cost of the potential disasters, if that makes sense. And so you have these, I think I would give you this construct, which I think is helpful. The guy that sold me this business here had a saying he liked to say, which is, as in all things in life, there are tradeoffs, right. So there are huge trade offs between you know, obviously, with nuclear, with fossil fuels. It's cheap, it's abundant. It's relatively easy to transport, and it's incredibly energy dense. But you got this, you know, global warming end of the earth problem with it, right? You've got nuclear fuel, nuclear power, which is remarkably efficient, is safe with an asterisk, except when it isn't. And, you

know, really well known how to control it, except, oh, occasionally they blow up, right, or they have a risk of blowing up. And then you have solar fuel and wind farms, which sound great, but then, you know, the wind farms, they're an eyesore. The solar farms have issues with you know, they've got, you got to really have a battery solution to store the energy. Right. And candidly, that technology has really only been there for the last 10 to 20 years, it really wasn't viable prior to that. So you know, all that and it's costly. And so you've got these tradeoffs with everything, you know, the world is hungry for power, hungry for all the power the way we're describing it, not political power. But you've got tradeoffs to every major way of doing it. And I think that, to me, the intuitive answer is, well, you know, you need to borrow what's best from all of it. versus, you know, people tend to think of these as 0 1, all this or all that strategies, and I think it makes more sense to me, right. With the possible exception of fossil fuels, because there's always going to be room for some fossil fuels. But I think because of the dramatic, you know, ending the world is a pretty bad outcome. So, you know, the migration caused by global warming is a pretty bad outcome. So you've got to weigh that heavily. You take some economics, right, James?

James: Yeah.

Daniel: So the concept of an externality and an economic system is something you're familiar with, then right? Arguably, Europe weighed the real cost, because they tax the shit out of their gas as an example. They approximated the true cost of energy better than the U.S. did, right. The US never put any pricing externality into their gas prices. So people use gas accordingly. Right. And, you know, by not having a carbon tax and things, they got some, some peculiar outcomes in terms of the way they used energy. I think the last thing I would tell you in terms of, you know, my experience with energy, what was it? Yeah, look, I think that making these forms of energy bear the cost of the external things that they're bringing to the picture, like, you know, fossil fuels are bringing carbon problems. Nuclear fuels are bringing possibilities with you know, with nuclear meltdowns. Renewables have issues with making peak demand. So they've got to have battery substations, right. So all of these things can be worked into an equation, I think that solves these problems. But you get a lot of distortion in them because of political machinations. It's unbelievable how big these things are as a political football. Right. That's a big deal.

James: Yeah, I mean, it makes sense. You mentioned the Three Mile Island accident, what was your experience with that?

Daniel: I remember reading the front page of Time Magazine and seeing this, you know, this big disaster happens. It was pretty freaky, right? One thing that's different about your generation, I think, than mine, is that it wasn't like the 50s. But the notion of a nuclear accident was very, or a nuclear bomb, or a nuclear accident was much more in the public consciousness than it is today. Right? You know we had an enemy, we had Russia, actually, the USSR was the enemy and they might nuke us, right. So we thought about that stuff more than people do today, more than I do

today. Candidly. And that was true for nuclear accidents. You know, what is probably the best example, you know, climate change for some people took the place of nuclear accidents that we used to have that occupy a similar part of the public consciousness, if that makes sense. Because, you know - The China Syndrome was the name of that movie with Jane Fonda, by the way. Then there was a movie about nuclear war called The Day After, right? The Day After was all about what the U.S. looked like today after a bunch of bombs went off. And, you know, today, you've got as many TV channels as you can imagine, right? Back then we had three TV channels. So ABC put on a special called the Day After, and the whole country was watching this thing. And it really seeped into the public consciousness much more than you have the ability to, today, if that makes sense. There's not as much of a single public megaphone as there used to be. And so when Three Mile Island went up, you know, all the newspapers had it. All the newspapers had it, all of the periodicals like Time and Newsweek had it. And it flashed on the nightly news by three guys at the same hour, there's been a big accident. So when a big thing happened, it was much more of an everybody knew it. It wasn't as refracted as it is today.

James: Yeah, that makes a lot of sense. Where were you when it happened?

Daniel: Where? Three Mile Island? I would have been probably in the sixth grade or seventh grade. But I was very aware of it. I remember being very aware of it. I don't remember what year I think it was 1979 or some such. But I remember being, you know, I was nine or 10 years old, but I was very aware that it had happened.

James: Then one last question I thought of is: In terms of your perception of the safety of each of these types of energy. Did you find after, say Three Mile Island, that you felt less comfortable with the use of nuclear energy?

Daniel: Yeah, the evolution of my perception of the safety of these things. I think I was pretty early, because I wrote a really shitty paper in college about global warming. It really wasn't my best work. But I was sort of an early believer that that made sense to me. So by the late 80s, I wrote a college paper on that. The nuclear stuff scared me for sure, and my consciousness and I was always fascinated by solar and wind and stuff like that. And I always like playing with the little toys you could play with. But you know, there was always this perception that they weren't viable. And, then when you get over to, you know, one thing I forgot to tell you remember, I said I forgot something. I actually owned a metal bending company - I mentioned it along the way. And we used to make nuclear fuel containment vessels. So it turns out that in France, this is worth reading about. France has a cradle-to-grave nuclear plant. So they mined the uranium in France and brought it in from other places. They refine it, they put it in nuclear power plants, they deplete it, and then they recycle it. So they've got this full circle of using nuclear fuel. The U.S. was on that trajectory. But after Three Mile Island, Jimmy Carter canceled it. But they have all these plants built, right. So now all these plants, and this is a dirty little secret, quite literally,

all these plants around the US, have all the spent nuclear fuel on site at the, at these plants, which is a really bad idea, right? Because you've got this very distributed, nasty, dirty problem. And they've got a NIMBY problem. I don't know if you've ever heard the term, NIMBY, but not in my backyard problem. Which is the stuff is at these plants, but no one wants to transport it because you can imagine the political football of transporting nuclear waste down the local highway. Nobody wants it to go through their city, and nobody wants to be the place where they dump all this shit. So as a result, all the nuclear power plants in the US have all this stuff built up there and we used to build these big garbage cans for the nuclear fuel on site. But that's a problem too, right? Because then you got this distributed, dirty problem everywhere. And if somebody, a terrorist were to come up with the idea, they could make a mess out of a nuclear power plant pretty easily. And I won't go into details of that. But suffice it to say, that a person with the wrong intentions and a little bit of explosives could make a big mess at a nuclear power plant. And they wouldn't even bomb the reactor. They would bomb the spent fuel out back, if that makes sense.

James: Yeah, that makes sense. Yeah, wow, thank you, this is all super, super helpful.

Daniel: Yeah, I know, the public consciousness of energy is a big one. Right? But yeah, I don't know how you summarize all that...

James: And we did do a reading about Three Mile Island, so it was cool to hear you bring it up.

Daniel: But it sort of permeates a lot of things right. Across a lot of - anyways... Well, if Three Mile Island was bad, Fukushima, and Fukushima. And, you know, I know a little bit about these, because I know people who get captivated by them. And if Three Mile Island was bad, Fukushima, and Chernobyl was a fuck-ton worse than all of them. Which happened, which happened recently, right? That was really bad. Like, that was a huge, much bigger issue than most, that was underreported in my opinion, in terms of - it was a really bad problem. And obviously, Chernobyl was huge because it sent a plume of shit and in the end, it almost didn't get contained. I don't know if you've seen the movie, the HBO series on Chernobyl, but it was fabulous. And I think it was very true to life.

James: Yeah, I have not given it a watch, but I will try to as it looks interesting. I also didn't really hear much about Fukushima. So it seems like it was definitely underreported.

Daniel: Fukushima was a huge thing, and it happened about 10 years ago in Japan when there was a tsunami. Right. And it was bad. It was bad. Bad. Like I think they're still pumping out radioactive water into the ocean today. So it's one of those underreported big fucking problems. But yeah. Alright, James I got to go watch Teddy's hockey game, good to speak to you though, have a good one.

James: You too. Thank you so much for taking the time.

Daniel: No problem. Take care.