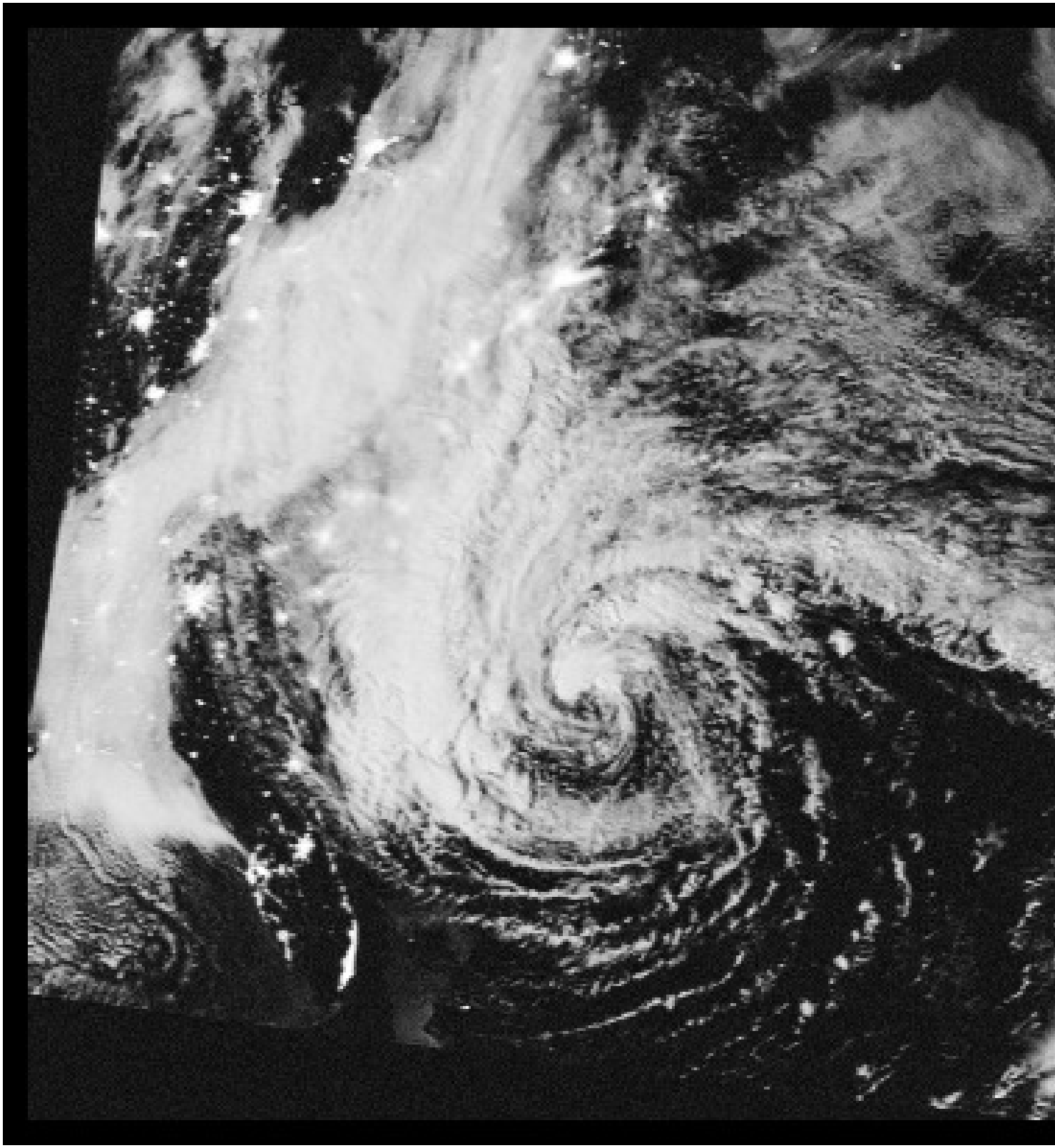
A Shrinking Footprint: Geophysicist Klaus Jacob On Rising Sea Levels, Sustainability And Indian Point

by {ga=screan1}
Thursday, January 24, 2013 09:33 PM



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NEW YORK — In this post-Superstorm Sandy era, geophysicist Klaus Jacob is regarded by many as something of a seer.

But in his view, the public debate over climate change and what it means for the city has wrongly been focused on extreme weather, and not on the rise of sea levels that will reshape the footprint of the metropolis.

In the second part of Gotham Gazette's sit-down interview with Jacob, the climate change expert speaks about the city's energy policy, long-term planning for sustainability and why he thinks Indian Point nuclear power plant needs to be shut down.

Jacob was interviewed at at his office at the Columbia University Lamont-Doherty Earth Observatory in Palisades, N.Y., in late December.

Need to get caught up? Read the first part of Gotham Gazette's interview with Jacob here.

GG: So you're saying that New York City's density patterns will have to change because of our shrinking footprint due to sea level rise?

KJ: The housing density patterns of the city will have to be totally changed. When you look at the patterns of our population changes from the 2000 to 2010 census (he refers to a map on his computer screen) there are blue areas where there was a population increase. And red areas, where there was population decrease. Where are the blue areas? On the waterfront, mostly on the west side. Areas like Chelsea … Really got built up on the waterfront … All in the A zones, and A overlapping on B.

Where are the red zones? Washington Heights. Midtown. There's one little anomaly, which is around the WTC. That is red and we know why. But that's a temporary blip. In the next decade it will probably become quite blue — from 2010 to 2020 — because it will be re-occupied, both business-wise but even residential … It (density) goes up in the wrong places, and it goes down

in the wrong places.

Brooklyn Heights will become prime real estate. Morningside Heights, Washington Heights ... Our graveyards up in Queens, Brooklyn, Prospect Park, Central Park will be prime real estate. Not that I am saying we should do away with those. But the surrounding areas will be prime real estate.

GG: If you had to make any type of projection — what do you think the city's next move will be regarding planning for climate change?

KJ: There's some pretty smart people in the Department of City Planning. There's been some unfortunate personnel changes in the Office of Long Term Planning over the last year from which they had to recover. They're all working for the mayor. They can advise him, but they don't make the decisions, they can only make recommendations. But it is easy sometimes to forget the long-term vision in the day-to-day pressures of decision-making, but ultimately they are well intended.

I sit on a DCP technical advisory board, and I always stress long-term vision … I'm going very strong on that ... I have no power, except the power of the mind. The other people have the real power.

DCP has a HUD (sponsored) project that began way before Sandy, in which DCP assesses how to plan for the waterfront of NYC. How to make a plan, NOT for tomorrow — but rather for some time into the future. That's in the works … Sandy … provided (data for the study) that actually wasn't available before. Once that (plan) gets accepted by the mayor, it should influence the Department of City Planning, the Department of Environmental Protection, the Department of Buildings …

GG: How does the city's energy policy relate to planning for climate change?

KJ: Upfront, I should say I'm not an energy expert. I have limited knowledge and some opinions but they are not expertly based. They are more common sense-based. I'm also on the board of

Scenic Hudson, where we occasionally discuss relevant energy policy.

In general, the greening of the city is making relatively modest positive progress. But I would call it modest. It's not as aggressive as one could be. (Utilities) still behave in a very traditional way. They certainly are not up to sea level rise and climate change. They still look at their traditional distribution system. We are far away from a smart grid for NYC.

That is not to say that there aren't many buildings that come online in NYC that are LEED certified. But that's pretty much within the realm of what the owner wants to pay for and do. The city encourages it, but the building code doesn't necessarily have the teeth that it would need to push all these measures through in a much more accelerated way.

Again, this is slightly outside my expertise. This needs to be verified and checked.

I think the city could be more aggressive on the energy side. The governor has a plan to shut down Indian Point, which personally I think is a good idea. There are plans to create new power transmission to NYC by laying a DC line in the Hudson, through Lake Champlain, all the way up to Quebec … to get cheap waterfall hydro-electric power into NYC with a DC-to -AC converter station, probably in Yonkers. From then on, it would be traditional power distribution into the Con-Ed grid.

That new source would replace a good chunk of Indian Point in terms of its normal production. There is still a need for peak time additional resources if we don't change our use pattern. You still see all of the skyscrapers lit up in the night. Do you want to see black skyscrapers, or visible skyscrapers? It's not very green to have all those visible skyscrapers in the night. Would it change the character of the city? Yeah, it would. But what is more important? This is something that hasn't been discussed much. Is Times Square the right thing to do?

There's all sorts of stuff that could be changed to make it a greener city, but it would be a darker city. So the question is, how can we make the city greener and have a little bit of light for our joy and amusement and for businesses.

We have changed water use in NYC heavily by metering individual households in buildings that before had just one meter for all. Water usage over the last ten years has gone down incredibly, which saves NYC on the infrastructure side since it doesn't have to provide new capacity for the next million people … (by bringing) new water supply into the city.

We could do the same thing on the electric side. In many cases, consumption of a large building is just divided by the number of households … It's buried in the rent, not on an electric bill. If we could find means and ways to charge people for what they're really using, including inside skyscrapers … And maybe put a city tax on electricity. And then use this tax to do smart urban planning and relocation of populations. A cap and trade policy on a city basis. Which of course you can't do, because everything has to be approved up in Albany. And we know where congestion pricing went.

GG: When Gotham Gazette interviewed Deputy Mayor Cas Holloway, he told us that natural gas would be part of the city's energy strategy for the indefinite future.

KJ: It's true that natural gas is a better fuel than coal, or diesel or fuel oil that we burn in our furnaces and boilers … In the first two to three minutes there's this incredible black smog coming out. That wouldn't happen with natural gas. It's more efficient and whether we like it or not for the time being, an abundant resource. I don't trust the governor that he will clamp down forever on the fracking situation.

Holloway is probably unfortunately right on that. I say unfortunately because it feeds our fossil fuel addiction. We have to get away from that kind of energy addiction. If we would spend as much money on a smart grid with photovoltaic cells and other energy resources, (or) getting full usage out of the methane from our dumps, as on allowing for conversion of heating oil to natural gas ...

GG: How is the city policy on waste?

KJ: Our waste policy in this city is totally off the mark. Every waste. One-third of the waste in NYC is construction-related. That should not be exported. That should be handled like the Japanese do it. It's a resource. They grind it up, steel, concrete and all, and form it into bricks and make new ground. We need new ground here. The only areas that stick out … above future

flood zones (are) … a dump that's not far from Kennedy Airport … and Fresh Kills on Staten Island. That will be extraordinarily valuable high land … It's an engineering and planning issue. We should not export our construction waste to PA. We badly need it inside the city ¬—to make landfills, high grounds, for the future.

GG: Back to what you said before, why aren't we investing as much in smart grids or harnessing methane from our dumps — as we are in converting to natural gas?

KJ: That's a rhetorical question. The city doesn't really control its energy policy. It's done by the utilities. The city can only change the building code. And to the extent that buildings have a difference in their energy usage, it (the city) can influence the energy policy. It can try to influence the MTA, even though that's not a city agency, whether they have hybrid buses or not. That influences the energy footprint of the city. There are many things that the city is not in control of.

GG: But the city is facilitating construction of the Rockaway pipeline; they are moving bureaucratic hurdles.

KJ: Yes. Where the city can have influence, it moves it. But it's limited, and it has to happen not just on the city level, it has to happen on the state level. The Public Service Commission has a lot to do with it. Even if Con-Edison or LILCO wants to do something, they have to go to that commission upstate and say, "can we turn that into an add-on on the utility bill that we charge our customers?" Unless they get that approval, it won't happen.

There's so many institutional hurdles. The mayor has the power of the pulpit. He can talk to the governor, to the federal energy commission. That's where the influence is. The city can make its own buildings efficient, and make public housing efficient. But these are the few things that the city really has direct control over.

It's such a multi-layer, jurisdictional issue. A lot has to do with institutions. The city could do much better on city planning. All of these developments that are still in the pipeline —Willets Point, Hunters Point. There are these blunt instruments out there — the SEQR (State Environmental Quality Review), the Environmental Impact Statements, where developers are asked to consider certain guidelines. That's not a good policy instrument because … You have

to oblige only existing regulations based on past experience, not regulations that deal with future conditions. There's no requirement that you have to take sea-level rise into account.

The city finally insisted that a few feet (be added) in certain areas to the old FEMA regulations … Timid attempts to deal with all of these issues. And, on the energy sector, there's a limited impact that the city can have on the energy realities.

The state can influence how cheap natural gas will be in terms of this fracking business, which I have professional problems with on the earthquake side. The waste water, when re-injected into deep, geological formations — that will come from gas production wells made feasible by fracking — can trigger damaging earthquakes. But in addition, I am fundamentally against it because it fuels our fossil fuel based energy addiction, rather than pushes us toward energy conservation, efficiency, a smart grid, and alternative energy.

GG: But given what's happening with climate change, why is the city not willing to be more aggressive in moving away from fossil fuels?

KJ: There are individuals in the various city agencies that are champions, but then there's the rest. Ourselves, together with engineers are very traditional folks ... As long as it's not in the building code, the ASCE regulations, the International Building Code, nobody has an obligation. It's left essentially to the owner and to the pulpit of the mayor to convince people to go beyond the codes. Codes are minimum values — they are never reasonable values — intended to provide just minimum safety. Not desirable safety, not desirable energy efficiency.

GG: This seems to tie back to what you were saying before — that the fundamental practice of the city is 10 to 20 years behind the science.

KJ: I've been working for 10 years on the seismic building code for NYC. It was a wonderful eye-opener. I understand now why that process takes so long. Everybody wants to have their opinion in there, including the real estate board. We initially thought that we could get something through about retrofitting (existing) structures for the seismic building code, but it was very clear that the real estate board would not go for it … There is a one trillion dollar building inventory and a trillion dollar infrastructure … A lot of assets that you have to deal with.

GG: When will the NYC Panel on Climate Change meet again?

KJ: The Mayor's Office of Long-Term Planning is in charge and has set a new schedule for it.

GG: Presumably that office will exist after Mayor Bloomberg's term ends?

KJ: Yes… and the City Council embedded its task into permanence, but it is still driven by individuals on a day to day basis, what's a priority, what is not a priority…

Any personnel change can set back an agency. It happened with the MTA- they have gone through three CEO's... Jay Walter left one month after Hurricane Irene … Joe Lhota (who has since left office to run for mayor) had to learn everything from scratch … His staff probably briefed him damn well on what to do for Sandy … He whipped that agency into shape. Luckily there was a lot of pre-Sandy planning, including my own study.

But leadership changes can set an agency like the MTA back politically. The findings (from Jacob's study on potential MTA climate change adaptation measures) that were delivered internally to the MTA, and publicly to everybody — to the best of my knowledge — never went before the board of trustees. Therefore it never went up to Albany, neither to the Legislature nor to the Governor. If the MTA doesn't ask for money up there for climate proofing, they can't take it out of their existing budget to retrofit. There is always more pressure from the public to buy new subway cars, beautify subway stations …

The (recently rebuilt) Battery Park (South Ferry) subway station is totally useless in terms of climate change. Total mis-investment, and many of us told them so, that this is ridiculous. Same thing with the 2nd Avenue subway. It's fine as long as we are in midtown but … The new downtown Nassau Street station will be in the flood zone. That phase (3) has not yet been financed but the plans are ridiculous. Two stations — new, planned stations — that will be in existing flood zones, so far without protection planned in.

That came up in the MTA blue ribbon commission in which I was raising hell as an observer. I said, "you're not dealing with the elephant in the room … sea level rise and climate change and

all your plans ... But what about the tens of billions of dollars that you have to spend in fixing up your subway system?"… I made a presentation (at the next meeting) and there was silence in the room. It was someone on that blue ribbon commission who agreed, "I opt for a chapter on adaptation to be included in the commission's report." Before that, it was all about mitigation in the climate sense; greening, water use, energy, reducing heat island effects … But not adaptation to sea level rise.

I was asked to write the chapter on climate change adaptation. It's on the books of the MTA, all these recommendations. But the MTA fell terribly behind in the first year and they have never kept up with the recommendations, at least in part, because the board was never confronted with it.

GG: The media presents the MTA's performance during and after Sandy as something akin to a miracle.

KJ: And rightfully so, in terms of response to the storm. But few covered the real consequence and fallout from all the state-sponsored research — we haven't changed our risk profile. Our vulnerability is exactly the same as it was five years ago — or even three months ago. Irene should have been the wake up call, and it wasn't at the MTA, perhaps because of the change in the CEO.

Sept. 11 threw the whole nation back on natural disaster preparedness by about 10 years. You couldn't talk to FEMA, the Department of Homeland Security about earthquakes, climate change, floods. It was all about terrorism … Who could care about a Sandy coming? That's the reality. Bin Laden did considerable damage to this country — institutional damage.

GG: Can you talk more about your research on Indian Point?

KJ: We had an earthquake in Virginia in August, 2011 and assessed recordings from a nuclear power plant in the vicinity of that earthquake; they need to be applied as a shaking level to Indian Point to see what could happen. In the mid 1990s we did a study of the Tappan Zee Bridge and provided synthetic ground motions for magnitude 5, 6, 7 earthquakes at various distances from the bridge; they also need to be applied to Indian Point in terms of the dynamic analysis of the structure. I am also concerned about stored fuel on the site which is not

protected by any concrete eggshell structure.

The last point is that the guidelines of the Nuclear Regulatory Commission are that a reactor meltdown should have an annual probability of lower than 10 to the minus 6 per year —one in one million chance in a given year. For this you should at least take into account any natural hazard, with an annual probability of 10 to the minus four, or an event with a chance of one in 10,000 in any given year.

If you were to take such a hazard, say a storm surge, a 10,000-year storm surge, in the Hudson River that comes up from the Harbor, then I believe you could potentially be in trouble … I want to see that calculation done. I believe (although I don't know this for sure) the Indian Point control room is at 15 feet elevation. The Sandy surge was 10, 11, 12 feet. Three or more feet for a 10,000-year surge could get you into trouble.

I don't know that for sure but I want to see the study done for the 10 to the minus four storm surge passing by Indian Point, and see whether you have control over your standby power that controls the cooling of the nuclear reactors so you don't get a Fukushima scenario.

GG: Do you believe that Indian Point should be closed?

KJ: Yes. I was not for closing it — suddenly — in the past, but I always said, "no extension of the current licenses." By the end of 2013, for Reactor #2; 2015 for Reactor #3, that's it … This 10,000-year storm surge is of concern to me … We are essentially operating a plant where we have requirements on the books in terms of safety that were never fully researched or enforced.

GG: Finally, is there anything that you want to say — relative to climate change — that we haven't discussed?

KJ: We must not do anything that would produce avoidable risk to future generations. That's the guiding principle. It's environmental justice in a way, inter-generational environmental justice. Just like we have environmental in-justice right now. We are creating a problem for future generations, as we have done with greenhouse gases … We shouldn't add to that burden.

Now you can translate that it into all sorts of details, like developments on the waterfront. We will live to regret this. They (future generations) will have to pay to remove this misplaced junk in the water, and move to higher ground, when we could have done that right now.

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Image of Hurricane Sandy at night courtesy of NASA.