

CLIMATE CHANGE 2017/11/10

BROOKINGS INDIA

KAMALNAYAN BAJAJ CONFERENCE ROOM

CLIMATE CHANGE: INDIA, THE US, AND BEYOND
IN THE LATE 2017 WORLD

New Delhi
Thursday, November 16, 2017
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PROCEEDINGS

Mr Tongia: It's an opportune time since COP23 is right around the corner and that's of course one of several topics at hand but I wanted to start with a few loose questions... Some of the [alter] to people's mind are, you know, one of the elephants in the room, Trump administration...

Mr Victor: It's an orange elephant.

Mr Tongia: It's an orange elephant. We in India don't worry about the colour - saffron, orange - you can use any note for this. What has changed, I mean the declaration of intention to pull out of Paris, so this is something I learned recently, Samantha could maybe clarify that for those who don't know the nuances of what that means. That's already been with us now for some time, what has that really meant, have anything really changed on the ground in terms of what other countries think, what commercial spaces think, what investment plans are doing, is this changing anything?

A bigger question, and that's one where India and the US are two of the most important pegs or components of the global picture, are we on track or off track? And if you want to answer that question, you first ask which track? So, what does that mean and what is India's role within this? I think most people would agree that India is not to be blamed for the global climate problem but India's still part of the future and what some people think is the solution space but then the flip question becomes how much of that burden can be borne by India? Is it even realistic to expect, so even if India does heroic, 'my god, how amazing' levels of change in its trajectories, is

that itself going to be enough, for example? Or how does that play out?

COP23 Bonn, what are some expectations, what are some focus areas? And last is on sort of India's NDC's, the nationally determined contributions, these targets not only can we meet them or are they high or low, those are different discussions, but also the pathways or mechanisms to meeting them. Our previous discussion was on renewable energy, so do we need to achieve that many renewables in this timeframe to actually meet the NDC's or is just the emissions intensity sufficient, then we're on track towards that and so renewables aren't the question, it's more something else.

But a lot of excitement and investment actually seems to be on narrower things than the broader systemic system-wide economy level sorts of issues that really matter. So, these are just some questions not directed at anyone in particular but I would maybe request Samantha to open up with a few thoughts towards any of these questions, or anything including the weather outside which is somewhat relevant because it's an air pollution sort of a problem. And having spent time in Beijing maybe, you know, you also have some observations.

Ms Gross: Yeah, I won't dwell on the weather, it is definitely a rough air day and I think this is even worse than some of the rough air days I've seen in Beijing which is heart-breaking, but I understand that the reasons here are different and that's not something I'll dwell on, it's not my best area of expertise.

What I would like to talk about is the Trump administration and some of the ways we're seeing that play out in the global climate world.

President Trump really has a mistrust of multilateralism in general. We're seeing that not just with respect to climate, we're seeing it with respect to trade deals like the trans-pacific partnership, potentially NAFTA, the Iran nuclear deal, it's not just with respect to Paris, he really has a distaste for and distrust of multilateralism.

But the Paris agreement is a really important place where this is playing out and one of the reasons for this is that Paris was a real breakthrough for the world, I mean, it was a completely different way of the global community approaching the climate change problem and Trump's decision to withdraw really pokes a hole in that.

And actually, as an American, I'm more concerned with the way his decision to withdraw affects my country than in the way it affects the rest of the world and I'll tell you why: The most important thing is I feel like his decision has really painted the US as an unreliable partner in international agreements. If you look around the world, we have many allies, including India, who care deeply about this agreement and many of these countries are democracies. How the public in these countries feels about the United States and its people is really important to us when we try to exert influence on any number of issues around the world.

And so, we're in this position now where why might you trust us. We have shown that perhaps our word may be only as good as the present presidential administration. And so that as an American is really troubling to me.

But I want to point out some reasons why Trump's decisions to withdraw may not be quite as bad as it might look on its face.

One thing that I'd like to point out is that state and local governments and also companies in the US are still quite

focused on the Paris agreement. There are a number of pledges, I think David might have a number actually, of sub-national policies and pledges that are happening around the United States. And some of the most important policies that make a difference in greenhouse gas emissions are actually at the state and local level; there's certain things that the federal government can uniquely do but not everything. I'd also like to point out on the corporate level, in the investment level, that energy companies typically are making decisions that have very long lifetimes. We're talking about investments of 20-year, 30-year or 40 years and so, when you think about a four-year Trump administration, that's actually quite a short length of time when you're considering energy investments.

And so, in talks that I've heard from energy executives and conversations that I've had, they're not generally changing their investment strategy in response to the Trump administration or his decision to pull out of Paris and so that's something that I find very comforting and I'll answer the question that Rahul brought up at the beginning real quick before I pass the mic, and that is that there's actually a delay before the US can pull out of the Paris agreement and completely coincidentally it's right around the time of the next presidential election when the US is actually able to withdraw from the Paris agreement.

Right now, we're still in the agreement, we have a negotiating crew in Bonn at COP23 now, this is largely made up of somewhat lower-level people within the State Department but the good news on that is these are people who've done these negotiations before. So, I expected the US delegation there, we won't be leaders the way that we have been in the past but I expect that we'll be, you know, constructive people within the negotiation and that's also something that I'm quite grateful for.

Mr Victor: I don't have particular hopes for or expectations for the current negotiations. When the Paris agreement was adopted, they also adopted a list of things that needed to be done to complete the Paris agreement and that list is almost as long as the Paris agreement itself and that's normal and so they're working through the lists and this meeting is part of the working through the list process. Next year's meeting will be more important, certainly this meeting will turn out to be important if some countries get really angry and leave or say mean things at each other and so on, that's always a possibility. But my expectation is that everybody knows what the game is and that they're gonna go there, they're gonna do whatever work they can do and leave and pretend to be friendly to each other and so I think this will be largely a non-event.

I think I agree with Samantha that the effect for a few years of the United States announcing it's going to withdraw, the effect is not huge, it's not good. It's important to have the United States and agreements like this and historically, the country has played a very constructive role in lots of areas and so this is not good. But the genius of the Paris agreement is that it was supposed to be more flexible and give countries the ability to set their own commitments and one of the benefits of that, explicit benefits of that, was to make the agreement less brittle; so that if one country leaves or one country does crazy things, that the rest of the thing doesn't come crumbling down and we are now seeing a test of that brittleness hypothesis and I think it's doing well.

I don't think Syria has joined as a result of that but it'll do fine and there are some evidence that some places are doing more work.

Samantha mentioned the state local initiatives, you may never know the exact number Navroz, but I think there are

12,500 initiatives announced under the so called NASCA portal, which are different state and local and other initiatives, so there's a there's a lot of stuff happening.

Let me add a footnote: there's a lot of people saying they're going to do things, the amount of doing is yet to be seen and so the ratio of talking to doing remains very high and that I think is the key question. I think for us as analysts is actually the key question is where and how do these different state and local initiatives, where do they matter? And partly that's a technical question – where the state and local, provincial, corporate initiatives, where they have leverage on the problem and where do they actually have an incentive to go off and do something that's different that affects overall emissions.

And so, I think that, analytically, it really is hard but an interesting question but I think I would expect to see a lot of scholarship in this area, this is a very important issue.

The last thing I'll say just by way of opening comments is you asked whether we are on target or on track and so I guess, yeah, to paraphrase Bill Clinton in a very different context, it depends on what you mean by the words "on" and "track".

So, there were ambitious goals announced in Paris that were actually goals people have been talking about for a long time, well below two degrees above pre-industrial levels. My own view is that goal is not achievable, I've written a lot about that, I think actually codifying goals in terms of globally average temperature is, as a scientist, the wrong way to do it and, politically, is also the wrong way to do it. So, I understand the political reasons for setting ambitious goals, at some point reality is gonna need to intrude on that conversation and so we're not on track for that.

What's more disturbing to me is that all of the advanced industrialised countries are not on track to meet their own pledges they made. There's a paper that a group of us had in *Nature* in early August about that, that to me is very worrisome not because the numerical targets matter but because the whole logic behind Paris was that everybody's free to go off and do more or less whatever they want to do and then every once in a while we review that and see how the progress is working - some people call that 'pledge and review', some people call that 'bottom-up', although it's not really fully bottom-up because there's still a role for review and for the centre and for direction - that's a hypothesis.

And so, if we don't do very well in building the review mechanisms and we don't have volunteer countries to come forward and say, "come review me" as the United States and China did under the G20 for fossil fuel subsidies phase-out as an example, and we have all of the industrialised countries that are expected, as they should be, to be on a lead for reducing emissions failing to implement what they said they would do, then that to me is a very very big concern.

So, I think the framework remains kind of flexible and malleable but we could easily still look back on this process as Paris was an interesting start in the new direction and a hopeful one but it didn't actually have much impact on the underlying behaviour and that I think remains to be seen but that's my concern right now.

Mr Dubash: So, just a couple of observations and I'd like to come in on the Trump issue but before that, I'll make an observation about Paris itself. I think I want to project what some of the Indian debates around Paris have been, I think Samantha mentioned that, you know, everybody was seeing it as a breakthrough and there are some people here who do view it as a

breakthrough. There was also a lot of scepticism around Paris in India, there was a lot of sense in which in order to come to an agreement, that Paris really defanged the entire process. So, the critique was, "look, we don't have any really strong safeguards for India's priority concern of equity and thinking about burden sharing and so on and so forth" because, for the reasons David mentioned, that's not how Paris was set up.

Another way of looking at it is you've dealt with equity and burden sharing implicitly because every country gets to do what it wants, so India doesn't have to actually compromise on anything on its development objectives because you can always put whatever is in your development interests, so that's kind of the way in which Paris was set up. But because of the scepticism among some folks, the potential withdrawal of the announcement by the US takes on an additional resonance, because it basically says, okay, we bent over backwards to come up with this construct that was flexible in part with an eye to keeping the US in and even that wasn't enough potentially to keep the US in.

So, the question is, how far is the world willing to go to have the US be part of this process?

And in that sort of framing, my own view is actually, I'm not that unhappy that President Trump made the announcement he did because in a sense, it put an end to this kind of slippery slope logic and at least we've left the door open that a future US administration would come back in, that you have a floor on the process as it is now, that you don't actually have further concessions. And in the backdrop to the Trump announcement, there was a lot of discussion in the US, particularly among some US NGOs that basically said "you know, Paris doesn't really bind us, we don't have to walk away, we can do what we want and in particular, we can revise our nationally determined contributions downwards if we need to", and that, fortunately

to my mind, that point view didn't prevail because if that point of view had prevailed, then the 'pledge and review' construct is built on one important premise which is 'no backsliding' - this is a ratchet mechanism - so, a country announces and then you can only move up. Now, the negotiators, the US, have always been very clever, they've always left all kinds of loopholes, so technically according to the language, it potentially left the door open to this kind of revision downward of an NDC but, you know, there's sort of a legal debate going on and at least some of the colleagues that I have at CPR who are quite well known international law scholars, suggest that if you read that text in the spirit of the larger agreement, I'll be curious what David thinks about this, it would in fact be counter to that spirit of the agreement.

So, the point I'm trying to make is, an interpretation of the Paris agreement that said countries are allowed to go so far as to actually revise downward the nationally determined contributions, would in fact render this agreement completely meaningless.

I think if we have a context where you say you put an NDC up there and then you have to ratchet upwards, there's no particular obligation, it's more a process of global suasion, it's a process of enabling national politics, at least you're headed in the right direction but if you have no guarantee of being headed in the right direction, then we don't really have anything to work with.

And I was extremely disappointed to see some friends in the US, people in the environmental community, who are willing to actually, in a sense, completely gut the agreement to that extent as in allowing backsliding on NDCs in order to keep the US in. To me, that would be a price that would be too high and I'd actually see some positives in the way that both Samantha and David mentioned, you see an upsurge of activism and of

organising in the US, you see all the foundations who are actually quite important, sort of pulling their money, frankly I think it's a good thing, from the rest of the world and ploughing it back into the US to try and shift US politics, and I think all of those are things that actually need to happen.

So, I think ultimately, it could lead to a more focused and progressive US politics around climate change and if that's the case, that's sort of the positive spin on this, but that would only be true, as I said, if this issue isn't revisited, and it's a question to both of you, is there still some discussion about revisiting the NDC? Because that would really- or rather the US administration staying in and using a sort of a lower NDC as the basis to do that.

Mr Victor: So, I think these are very important questions. Let me just give a little back story here, Navroz and I were on the IPCC together for about 150 years, it feels like it... it might have been only four, it feels like a 150 years and so, we've had a chance to talk about these issues for a long time and whether the experience of getting the summary for policymakers more or less hacked to death during the plenary negotiations in Berlin in 2014, and I've always learned a lot from listening to Navroz. And in particular, one of the things that really impresses me is how a single agreement can be read in so many different ways around the world.

So, from the American point of view, a key virtue of this is the flexibility and I can completely understand that from an Indian point of view, this is seen as caving. I guess I have a different sort of perspective on two aspects of this; one is, I don't think it's only the Americans that wanted an agreement that was more bottom-up and more flexible. I know the Chinese, for example, and we've got to think about an agreement that engages countries that have lots of different motivations for

working on the climate problem while working on other problems, and that was true also in China. And one, almost Machiavellian way, to see the bilateral US-China announcement that was made in the fall of 2014, a year before Paris, was this was an effort by those two countries to announce what they were going to do to constrain the range of outcomes that could happen in Paris to almost guarantee, with consent to the French government and a lot of others, that you'd have a more flexible bottom-up kind of approach.

The issue of the pledges I think is very important. So, one way of reading the agreement is that this is a ratcheting agreement where you make pledges and then you only go forward. It's like a shark; it can only swim forward and if it stops swimming, it dies. My read of the agreement, and there's a big debate among public international lawyers about this, my read of the agreement is different; that the agreement, to put different language in it, the agreement is an experimentalist agreement, it's an agreement where countries and firms and NGOs all know they need to do something about the climate problem and control emissions, many of those actions are going to be pursued not just because people are concerned about climate change but they're concerned about local air pollution, energy security and so on, so there's now an overwhelming agreement on the need to do that; the problem is how and what.

And so, in that world, if you think about this as an experimentalist agreement, you should expect to see ratcheting forward or backwards and to the extent that you don't allow movement in both directions, if you like, then you're guaranteeing that the pledges, the NDC's, are going to be conservative and are going to be quite often far removed from what governments are actually trying to do and the whole idea here is to create incentives to go off an experiment and try things and reveal what's working and what's not working.

So, I recognise completely that there's a debate about whether that's the logic of the agreement versus a ratcheting forward logic but by that logic, I don't have as many problems with a revision of the US NDC and I think frankly, Japan is going to need to think about revising its NDC, I'm very sceptical of the EU is going to meet its NDC, I think there's a serious problem actually that all the advanced industrial democracies are under such pressure to look like they're doing something about climate change that they've all made pledges that they can't actually honour.

So, that's my take reading the agreement as a political scientist who does a lot of work in public international law.

But where I do agree with Navroz is I think the effort by the NGOs in the United States to almost pander to the Trump administration to say, "look, you know, you just need to adjust this and so on", that that was crazy, that that administration, this administration, is almost impossible to engage with.

I heard the other day that in the Trump administration, the noise is the signal, so the idea is you just have kind of chaos all the time and so long as you don't accidentally plunge the world into nuclear war, then it's gonna be fine. I think that's an irresponsible way to conduct a foreign policy, one normally doesn't go to other countries and criticise your own government but here I am doing this not as an official of the US government and I think that's an irresponsible way to operate, and so to pander to that as opposed to forcing them to be accountable for what is basically a reckless series of foreign policy actions, I don't agree with that pandering.

But I do think the underlying logic, which is an experimentalist logic, we need to recognize that that in reality means that if you try experiments and you try difficult things some of them are going to work and others are not going

to work. Navroz is now going to defend the Trump administration, we're in completely reversal mode.

Mr Tongia: This is Bizzarro world, for some of you who will catch the reference.

Mr Dubash: I want to sort of set the record straight actually on one thing, which is that I actually count myself among the relatively few voices in India that thought Paris was a good idea, and I'd actually written about this direction for the Paris agreement in 2010, the year after Copenhagen, saying this is the only way in which this thing is going to work itself out.

The problem I had was that in order to convince other people in India this is a good idea, there are certain set of minimal conditions and those minimal conditions are at risk of unravelling here in India and I suspect in other countries too. So, the credibility of this model depends, I think, on a few of those conditions and among them, I think, is actually the forward motion.

I agree this is experimental but we can't be experimenting towards multiple objectives at the same time, you can't be experimenting on how to re-carbonise your economy, the idea is to experiment towards decarbonising your economy.

And in terms of the incentives to have, you know, so David made this argument which David, I think, originally made but others including myself have followed, which is that the more top-down construct almost guarantee that you would have very very conservative targets because you're just going to negotiate to have as little a piece of the problem to deal with yourself. But the idea behind this pledge construct was supposedly to liberate countries to be a little bit more

forward-looking and the quid pro quo that allowed them to do that was not, I think, being able to move backwards but the fact that you have very weak compliance mechanisms, effectively no compliance mechanisms, that was what was supposed to allow countries to experiment, not, I think, the backward-looking.

If you have the ability to step back, then I think every political battle you win is easily then rolled back, so I would agree with the thought process that it's experimental and so on but I would say the design to achieve that is pledges plus the recompliance not pledges plus the ability to roll back.

Mr Victor: Yeah. And I would say we will let Samantha get in here. I would say that for those reasons, my guess is that no government is gonna roll back its pledge actually, that even governments that don't meet them are just gonna move beyond and so that's okay.

What I think really matters, one of the things I can say in many Indian meetings is I've listened to a very large diversity of ringtones, what I will say is that this question of credibility is vital and international law works mainly through credibility and so if we don't start having facts on the ground where firms do things, where governments do things, luckily, frankly federal policy mostly doesn't matter in this area - I mean there's a few areas where it matters a lot but the states are more important in the United States - we don't start seeing real changes on the ground and I think people are gonna raise questions about credibility. Samantha?

Ms Gross: I'll add a quick point about some things that Trump has said and the issues of credibility and of backsliding. One thing that the President Trump said in his quite destructive speech announcing that he was withdrawing from the agreement

but one of the things he's pointed out is he thought this agreement was very unfair to the United States, he said that he would consider re-entering if it could be renegotiated under better terms, that's crazy talk and I think everyone in this room knows that somehow renegotiating the Paris agreement to make it more favourable to the United States is not going to happen.

But you hear some talk amongst people I know in the States and in the environmental community that perhaps Trump's pulling out isn't the worst thing that could have happened and in part, because of what Navroz is saying about not backsliding, perhaps it's better that the US pulled out rather than pulling back on its NDC or rather than staying in and being somewhat destructive in the negotiations as it is, because it's somewhat downplayed in the administration, they've sent lower level but constructive people to the COP. And so, I was certainly heartbroken when the US pulled out and I did a lot of speaking and writing about it at the time but as I've reflected on it, I don't think it's necessarily the worst thing that could have happened because it is preventing this administration from poisoning the agreement in some of the ways that Navroz has described.

Mr Victor: Part of the elite, part of the one percent.

Mr Tongia: Not in carbon emissions though or money, so I'll leave you for guessing where. I mean, we heard the growth of sub-nationals in the United States and Navroz you've spent a lot of time thinking about sub-national issues, for example, DisComs so do you see the sub-national conversation happening in India? And let's separate just the electricity side to the broader emissions in carbon side, and they're not necessarily

the same but if I think about where the headlines, the money, the oxygen all flows, it seems to be towards electricity and DisComs a lot and the RE story seems to get a lot of the headlines but that's not the only instrument or lever on the table. So, your thoughts about how we untangle these or the sub-national story in India?

Mr Dubash: Yeah. I want to pick up on something that David said when he talked about the NASCA initiatives and so on, and there are many thousand plots of these out there, many of these are in fact a way of representing a lot of sort of city level, state level, sub-national, corporate, individual companies and so on. One of the challenges with that is, not only as David said, how much is talk how much is action but how much of those are additional to what is an NDC versus how much of them are actually embedded in an NDC.

This then gets us into a game of arithmetic, and I think too much frankly, and this is one of the reasons that was critical of the earlier story around climate negotiations and I'm actually a fan of the experimental sort of, you know, 'learn as you go approach', is that we spend a lot of time and energy thinking about this adding-up question, which then actually distracted, which then led to a lot of time and energy going into how you game the adding up question and not enough to creating facts on the ground.

So, I think that the challenge really is that sort of creating facts from the ground point, that is what is going to give momentum because the hope is that in 2022, I think is when the stocktake is supposed to happen, the global stocktake is that part of the top-down mechanism that David said, where you sort of add things up and you see where you are and countries are urged to take on updated pledges. The hope is that every country will find that it's actually not that difficult, that

it's not that expensive, that it's actually okay that industry has come around in your country, constituencies have come around, politics has changed and therefore it's okay to take on more ambitious pledges, that's the hope. For that to happen, you don't have to win the adding up game, you have to win the facts on the ground game, so I think that's actually really important, and I think there's probably agreement in this panel on that point.

In India, the facts on the ground story is a bit muddled by two or three things: One, climate change is simply not high enough as a factor to drive national politics and policy as a primary driver.

You know, when you look at climate change, you have the probability of a particular action being associated with the climate forcers, this is now very interesting new scientific literature which is called Weather Attributions - they actually put a probability number that a particular event is tied to climate change. So, there's some probability multiplied by in often times some sort of growing impact over time, so in 10, 20, 30 years maybe the impacts will become truly problematic, maybe they already are upon us. But you juxtapose that in India with a situation like the problem of open defecation, where we know it is having a huge impact socially on India and Indians, there's stunting of Indian children as a result of this, it's a very hard problem to solve, that's happening with more or less 100% probability. You know, we keep the windows closed here for a good reason, that's another 100% probability outcome, so there's lots of immediate things that are going to crowd out climate change.

Where climate change can come in is as an additional set of thumb on the scale, so it's this sort of co-benefits story that many of us have been talking about, that a lot of times air pollution, energy security and climate change can be solved

with similar sorts of policies and these are actually synergistic outcomes.

So, that that argument resonates much better but what you actually do with it tangibly requires technical skills, administrative skills and tools that allow you to then aggregate the benefits from a particular policy along these at least three if not more dimensions, and that's something that some of us are working towards.

Just a second quick comment and then I'll stop, the second comment is the reason perhaps we're not seeing that much going on at the at the sub-national level is, a lot of this is being driven by framings from outside India. So, there's lots of networks; the C40 network, there's Italy and so on and so forth, and they are often constrained by a framing that wants to project climate change as an immediate existential challenge and that doesn't fly, that doesn't play.

So, you go into a city like Rajkot, where we've been doing some work, it's a second-tier city in Gujarat, and you go to co-operators and you go to the municipal commissioner and you try and get co-operators think about action driven by climate change, and if you go to any second-tier Indian city, that's just not going to be the number one thing you think about.

So, the framings of this by international networks, sometimes by donor agency, are not entirely productive all of the time. One of the directions of growing productivity is that a lot of the actions are now around adaptation, which does actually ring true with a lot of people and a lot of communities.

Mr Victor: Just on this quickly. I think this picture that most people are not motivated first and foremost by concerns about

climate change is not unique to India. So, Bruce Jones at Brookings and I have a paper coming out the next month or so, it's the first of a whole series of papers on rethinking the geopolitics of energy and climate change and this first paper is about where does diplomacy matter and where doesn't diplomacy matter. And one of the things we try to do in that paper quantitatively is show what fraction of world emissions comes from places where the primary motivation for the policy is concerned about global climate change and yet it's fraught with methodological problems and so those of you who are methodologists will send us lots of rude email about how we did it wrong and that's great, please do that, help us do it better next time.

But what's interesting is that maybe a quarter or maybe a fifth of the world emissions comes from those jurisdictions. It's true also in the United States, so the coasts of the United States tend to be politically more progressive than the interior parts of the country and the coasts are maybe a quarter of US emissions, maybe a little more, but they're already starting to do things to try and control emissions and so they're in some ironic sense becoming a smaller part of the overall problem, and a lot of the emissions in the country come from parts of the country that are worried about other things as well. And so, I think this is the new reality of the politics of climate change, is that for most of the world it's about this is an adder and about how do you add this as an adder in a way that results in smart policy.

Mr Tongia: I mean, your point about adaptation is spot-on because I can name lots of cities where either air pollution or flooding are two of the highest priority issues but the flipside of that is, of course, it's not necessarily fair to blame a lot of that on climate change because it's really bad

planning, zoning and even to the extent of corruption in terms of land development and who's building where; if you're building on a lake bed, I'm sorry, you will get flooded, so there's these issues...

Mr Victor: But that is the essence of what makes this, on the one hand, a hard problem, but on the other hand, if we start to think about it in politically more astute ways, it makes the solution set easier because almost all of the emission reduction efforts, at least up to a point - at some point we're gonna need a rehash of the climate policies for climate policy's sake but we're so far from that, let's just focus on today right now - almost all the effort in controlling emissions and almost all the effort in adaptation overlaps heavily with other things you'd want to do and so one of the most important adaptive measures, for example, is to help farmers with crop early forecasting, you would want to do that for a lot of reasons and then that also helps with the adaptation.

Mr Tongia: So, I mean coming to a thread that I've heard a lot, Navroz you're talking about 2022, for example, is when we'll see "oh, wow, it's actually not tough as we thought", that's one of the hopes some folks have. And the flip side of that is if technology improves to making a lot of this stuff no regrets; you don't need a COP Paris, you don't need a climate change framework, hey, this is the cheapest best, you know, win-win-win sort of situation, then we're in much better shape. But a lot of the energy space is not about win-win-win but trade-offs, winners and losers and things like that, so India and much of the world has relied on technological fixes to these problems; so solar was one of them, now batteries are part of it, EVs are another part, with a lot of cool benefits,

of course. But it's not clear if you can technologically innovate yourself out of this problem or even regulate yourself out of this problem. Samantha?

Ms Gross: I've talked about this issue in front of a number of audiences and people at different levels of thought and coming from different spaces and I often find myself pointing out, and some people find this crass and other people find it obvious, but once solutions become economic you can't stop people doing them. And so, I tend to close everything I do and everything I talk about with pointing out that what you need is investments in technology and investments in technology research. This is an obvious place for government to work, there aren't necessarily the right incentives for private companies to invest sufficiently in very basic science and technology research.

Another thing that is worth pointing out is you talked about you can't regulate your way out of this, you can't subsidise your way out of this. If you look at the size of the global energy system, it's just too big for any government to be able to push this transition by itself. I mean, you think of the different steps that you go from shallow to deep decarbonisation, these early phases you have a lot of co-benefits that you can focus on that. As you get further along you're going to need the technologies but we need to think now about making those investments that we're going to need down the road, and so you need to think about this as a sort of a continuum of things that you need to do and focus on what you can do now and then focus on the technologies that you may need for the future. But yeah, thinking that we're gonna quickly subsidise or regulate our way out of the problem, is not a great way to think.

Mr Dubash: You know, I think the discussion, well, David made the point that there are sort of this co-benefits adder logic is true in a lot of countries and I think that's right but there are other ways in which I think different countries face questions that are quite different and there are a lot of relatively easier wins in India because we haven't locked into a lot of patterns. And I think that a lot of those things are not actually about the technology, the answers are kind of known, a lot of the challenges are actually institutional; so, for example, how we design our cities, how we design our freight corridors, how we design our buildings, all of these are going to how we design our electricity system whether it takes into account the shift towards renewable energy or not, all of these things actually are potentially, you know, I hate the phrase but it's true, sort of a win-win kind of co-benefits-like outcome.

And what is important is for India to actually seize those opportunities as best we can and not primarily for climate reasons, for all these other reasons we've talked about. And one of the problems with the earlier logic of the climate discussion, was that China took exactly the opposite path. China basically locked himself into a high carbon, high coal system from 2005-ish or 2001 really, up to about 2015 when it was just growing crazily in order to have a huge amount of headroom, and then they announced, "we're done", and it's worked. China is now seen diplomatically as the global leader and substantively its emissions have increased by an enormous magnitude in the last 15 years.

The risk for it in India is we look at that and we think, "well, that worked pretty well for them, maybe we should do something similar", and I think it's incumbent on us, certainly us here, to argue that that would be self-defeating, and this is where I want to pick up on Samantha's point, I think we were headed down the track of saying 'let's try and defend as much

space we can for coal, even though if we don't know if we need it until the price is seemingly flipped'. Once the price has changed, then the argument really was hard to sustain but I think where I want to go with this is that there's a bunch of things on the demand and infrastructure side, you know, the physical structure of your economy, that I think are going to be really really big gains for a country like India, and we should spend a good amount of time thinking about those.

Mr Tongia: So, now the fact that we all have mics now, so people can now jump in, we don't have to share, so please don't necessarily ask me to jump in, so please do. You talked about we can't regulate ourselves and I think people would tend to agree. One of the instruments that's been talked of, it's not quite like global cold fusion, it's just coming tomorrow but carbon prices, carbon markets, how do we see that playing out, is that going to help at least in pockets? Because there's gonna be more regional growth of that as opposed to more structural, forget global sort of prices. India keeps talking about having a carbon tax but that's a de-facto style carbon tax, it's not really a carbon tax, so if you do the math, they use a 400 rupees per ton, that's on coal, for example, but for CO₂, I think that's only about what... my colleagues will correct me I'm sure, three and a half dollars ... but it's quite low actually, so what do folks think? So, it's not just taxes, there's markets, trading, what else, I mean so what are the other new instruments or what are things we could or should look for or think about?

Mr Victor: Well, I don't know if there's gonna be a magic wand there. I will say that a lot of my colleagues are enthusiastic about using market-based instruments, this is a big debate we had in the IPCC and I love the idea of a carbon tax, it sends a

clean signal, it's reliable, if done properly it generates huge revenues, the revenues can be used for other political purposes, it can wash the dishes at the same time, like it solves all problems.

I don't see a lot of jurisdictions being able to do that, I see more jurisdictions doing cap-and-trade systems, a lot of people like to think that they're the same, they're actually very much not the same, most cap-and-trade systems are set up so that they are layered on top of existing regulatory instruments and so what happens is the regulatory instruments do all the work, if you like, and then what gets traded is whatever's left over and so what's traded is residual. And not surprising that then all these cap-and-trade systems have prices that are very low because they're not trading the real marginal effort, they're trading the residual.

Why is that? Now, I used to think for a long time that's just because not enough policymakers went to our classes and, you know, studied, they were all out drinking or doing whatever they're not supposed to be doing and so on, but I've come to a conclusion that it's actually because their geniuses, they understand that everything that we as economically trained academics like about market instruments - they're transparent, they allow competition and so on - is distasteful to somebody who's politically powerful. You don't want to have a lot of transparency quite often, you don't want to have perfect competition between different energy sources because you want the renewables to win or you want the coal to win or you want the nuclear to win or you want your mother-in-law to win or whatever it is and so, I think we are in a situation where the politics of the problem are going lead us to use a lot more regulation and non-market instruments than would be optimal.

And for that same reason, all this talk - I've become increasingly sceptical about this linking of different cap-and-

trade systems - I can understand the logic of how you might want to link different cap-and-trade systems because that eventually would create a more global international system, but if you think that the rules in each different jurisdiction are going to be different because the politics are different, then there's no way to link the systems because the underlying value of the currency, if you like, think about this as inventing money and Gresham's Law, the underlying value of the currency is different in each of the different markets.

So, I think this is an area where frankly a lot of academic advice has been just deeply misleading, not about what might be an ideal outcome but what's likely to actually happen and that tells me that we're actually going to see a lot of good old-fashioned regulation.

It might well be that the net cost of all this is going to get a lot lower than we expect because of innovation and so many people forget that in the early days of the Montreal Protocol in the ozone layer, that looked like a really hard problem that was going to cost a lot of money and then, you know, for accidental reasons fairly quickly people looked to substitutes and alternatives and so on, they found a lot and so the cost came down, the politics followed very quickly. I don't think, structurally, energy is like that but it might be.

Mr Tongia: So, just to pick up on that point. You mentioned that there's a residual is what carbon often plays at and so if we look at the Indian, just to use electricity as one big subset of this entire space, we don't yet even have well-developed institutions in the electricity space. So, when India says that we're bidding for power plants, they're not bidding for the electricity, they're bidding for the power plant and those are two very different sort of bidding outcomes, so you've got distortions in how electricity's procured is below

the electricity you've got distortions and how the coal is procured and so forth and so forth. So, it's unclear maybe you folks have some views. Is this a problem that you can only solve if you solve all of them together, which then makes it that much harder to solve? Or if you do it incrementally, then by the time you're done and you solve it at the end, it's much harder to do it piecemeal and you should have actually put in the effort to do it all at once. There's two different schools of thought towards that.

Mr Dubash: Well, if I understand the question correctly, I mean I don't think one necessarily, incidentally the current mantra at the COP is 'nothing is agreed until everything is agreed', so they're actually taking one of those which is, of course, gonna be the [indistinct crosstalk - 47:08] hard tweaks, yeah. So, I don't think that that necessarily is an approach that we have to be bound to, at least looking at the situation in India. For one, I think that just coming back to the early discussion about regulation versus markets and so on and so forth, I think in India, because you're looking at a lot of future infrastructure locking with a very large public signal role, it may be necessary to actually have a regulation- and policy-led approach to get some of those things to happen, many of those things may not happen, you know, just with market signal, in other words, you even if you set up a carbon market here, that's certainly no guarantee unless it's very cleverly set up that you're gonna build rail freight versus road freight, for example, that's like a straight policy decision. So, there's big lumpy things and, you know, you need to have sensible policy signalling and regulation to drive that.

In terms of the some taking the example of the electricity sector, I mean I think the way we have to think about this is, as I said in my question at the end of the last

session, you know we got sort of next century's problems and last century's problems kind of overlapping and we need to think very sensibly about whether the new technologies in what areas will they exacerbate the old problems, in what areas will they help compensate for them and where will they just bypass them? And then you have sort of three buckets to think about and you would actually work differently depending on your answer ex-ante as to whether which of those three things, you know, what sort of interaction will happen between those.

So, I think we have to sort of think through what we're trying to achieve and what the likely interactions are and then design your policy instruments around it. so, I think we often think of the policy instrument as the end, it should be a means to some end. We have to figure out what that transition path is and then harness your policy instruments sensibly to get us from point A to point B.

Mr Tongia: Yeah. Just saying that 'oh look, we've got a good carbon market' is a means to an end at best.

Mr Dubash: That's right.

Mr Tongia: So, I mean is it just an issue that the signalling may not be enough with such a mechanism, so is there a carbon price that could actually say 'no trucking but let's build out more railways'? Because the Clean Air Act had, you know, emissions markets in the US that started higher and then just fell, look at carbon prices in Europe today I think they're very low, so is it just that those are doomed to stay low?

Mr Dubash: None of the issue is when you build the roads and when you build the tracks, that's not gonna be driven by a carbon market.

Mr Victor: Yeah, and these system-wide behaviour is about system level planning and the idea behind the markets is to create incentives for individuals to behave differently. I mean, yes, you could have the Norwegian carbon tax, for example, there's a lot of stuff happening in Norway that isn't scented by that carbon tax and a whole set of other ancillary policies that are market-driven, it's a market with a giant hammer hitting people over the head but you have a tremendous deployment of electric vehicles...

Mr Tongia: but that's not just because of carbon pricing

Mr Victor: Not just because of carbon pricing, you have the world's leader in carbon capture and storage, you have now with additional government support a project in western Norway to gather carbon-dioxide from industrial sources and then collect that and sequester it underground, so there's all kinds of things that are the technologies you would think would be important to address the climate problem that you could imagine coming in with a market signal like that, it's just that that's very rare to observe.

Mr Tongia: I'm gonna open it up to questions because last time we didn't quite get through a lot questions...
