Transcript for #74 India's Policy Ecosystem For Biofuels
Guest Y.B. Ramakrishna
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Intro (00:01):

You're listening to Fueling the Future of Transport hosted by Tammy Klein, the founder and CEO of Transport Energy Strategies. We'll talk all about the fuels and energy it takes to keep the world moving forward.

Tammy Klein (00:17):

Hi everyone. Welcome to the show. I am very excited to have with me today. Y.B. Ramakrishna. Let me tell you about Ramakrishna before I introduce him to the program. He is a partner in Best Associates in India and he is one of the keys, most foremost people knowledgeable and connected and involved in biofuel policymaking in India. He's been involved in the biofuel program for over two decades. He served as Chairman of Karnataka State Task Force on biofuels and Karnataka State Biofuel Development Board between 2008 and 2013. He has served as the Chairman of the National Working Group on Biofuels between 2015 and 2018. And he continues as an expert member. Ramakrishna, welcome to the program. It's so great to have you join.

Y.B. Ramakrishna (01:13):

Thank you very much, Tammy, thank you for that nice introduction, too.

Tammy Klein (01:18):

Oh, thank you. So for the listeners who may not be familiar, can you tell us a little bit more about your background and how you came to actually work on biofuels issues in India?

Y.B. Ramakrishna (01:33):

Okay. I am an Electronics Engineer and I have been working with a lot of multi-nationals as a design engineer, later on as a marketing engineer and started my own company way back in 1996. But I got involved in biofuels work through a voluntary organization, which I started way back in 1987. , this was basically focusing on the alternate energy and environment protection and rural development. And in 2000 I was introduced to some of the Biofuel work that was going on in Indian Institute of Science, which is a premier university science university in based in Bangalore. So when I got to know some of the work that they had done, I thought that this has the potential to be scaled up at the national level.

Y.B. Ramakrishna (02:32):

And then my own networking that I had with the <inaudible> In the state of Karnataka. So I started consulting them and I thought that there was an opportunity to involve the community in a big way in the biofuel program. And then we organized a national workshop, my voluntary organization, as well as the Indian Institute of Science together way back in 2003. And we invited some of the key members of the Parliament, which included the then Petroleum Minister. This happened in March 2003. And then he was so impressed with some of the presentations that were made in that national conference, the SNL lending program started in June 2003. So that's how we got into the program. Apart from ethanol, we were also looking at a biodiesel program from the various different types of tree-based non-oil seeds that are abundantly available in the country.

Y.B. Ramakrishna (03:44):

So in 2008, I was invited by the Karnataka state government to chair a task force on biofuels. And then after working there for two years as the Chairman of the task force on biofuel, we came back with a set of recommendations to the state and the state implemented all those recommendations and constituted a national state biofuel board. And I was asked to chair it. So I was also given the rank of Minister. So the kind of work that we started doing in Karnataka on the biofuel program did attract a lot of attention from across the country and from outside the country. Also, in fact the United Nations was very keen on the biofuel program model that we had in Karnataka and they adopted it and they and started implementing in countries like Kenya, Napal, Malaysia, Asia, and also northeastern parts of Brazil. So my stint with Karnataka state government lasted until 2013. And once there was a change of government, the new government did not need my services. However, I got involved with the United Nations. I was part of one of their committees and they were operating out of Kenya. So in 2014 when a new government was formed in government at Delhi, I was invited by the Petroleum Minister to be his advisor and help him with formulating a national biofuel program. In fact, in 2009, India had come up with a national biofuel policy, right. We had a good policy on hand. Those targets were there. , we didn't have an implementation plan in place. So 2009 policy did set a target of 20% blending of ethanol in gasoline and 20% biodiesel.

Y.B. Ramakrishna (05:55):

But in 2014, when I was invited by the central government when I reviewed the national blending program, we realized that the ethanol blending was happening at about 1.4% and the biodiesel blending had not started at all. So then we started looking into some of the hurdles that were there and it's a history today. We have a very good ethanol planning program in place. Plus biodiesel, we are struggling, but we have clear roadmap drawn, then we have a compressed biogas program to replace natural gas and LPG . And then we also have started a program for sustainable aviation fuel at this point time. So that's where we stand. And in 2015, I was it was a national working group that was constituted by the Ministry of Petroleum and I was asked to share that, and we came up with a new policy in 2018 with new targets, and a very clear roadmap as to how do we get there and how do we achieve those kinds of targets. So I think that's my brief background.

Tammy Klein (07:08):

So let me ask you, because there are several threads that I think are very interesting to explore with you. And first one is what is the current state of, biofuels in India, especially for ethanol. And I think one of the things that's really interesting is that the country achieved 10% ethanol penetration this year after you just talked about there have been some difficulties from the start of the program until now. So, what's the state of biofuels right now and for ethanol. And I think also what have you learned in...everyone involved in ethanol policy setting or biofuels policy setting...what have you learned that works and does not work? I think when it comes to developing and implementing and successfully reaching targets as has been done with ethanol this year?

Y.B. Ramakrishna (08:15):

Well, as I mentioned in 2014 when we reviewed program, we realized that we were at 1.4% in India as against the 20% target that we were supposed to achieve by 2017. So what we started doing was we started looking at various different hurdles which were not helping us achieve those kinds of targets. So we started removing these hurdles one by one. The very first one was, there was a lot of interstate movement restriction of ethanol, and there were interstate taxes that were being forced by the state. And then when we were pushing the oil marketing companies for blending the ethanol they would come up with a certain price, which was not acceptable to the ethanol producers. So it was a no-win situation for everybody.

Y.B. Ramakrishna (09:15):

So a couple of things that we did was removing all those hurdles that they were there, all the kind of administrative hurdles. And then on the ethanol we decided that until such time the market really develops, we will have some kind of a <inaudible> mechanism. So government came up with a certain price which was acceptable to both the ethanol producer, as well as the oil marketing companies that were blending. So though all the marketing companies were losing a little bit of money, there were some kind of support that was extended to make sure that they didn't <inaudible> because one of the major objectives of our biofuel policy was to see how we can reduce our dependency on the import of fossil fields.

Y.B. Ramakrishna (10:09):

So that was the kind of clincher. There was no looking back. After 2014, year after year, our blending went up except I think in 2015 or 16 when the sugar cane production dropped because of the <inaudible>. So but as you rightly said the new policy had set a target of achieving 10% blending by end of 2022 and 20% blending of in gasoline by 2030. So, in May this year we were able to achieve 10% of blending across the country. and that was almost about five, six months ahead of the kind of target that we had. And then by looking at the kind of the interventions that we did in first generation ethanol and broad-based the feedstock through the new policy, and also the push that was given for the second-generation ethanol, we thought that the target for 20% blending can be advanced from 2030 to 2025. And that's what we have done now. And we are very confident of achieving it by 2025. For 10% blending, we require about 5 billion liters of ethanol, which we are already producing it. And for 20% by 2025, we require about 11 billion liters of ethanol with all the steps that we have taken with regard to first- and second-generation ethanol, we believe from first generation that we will be able to produce about 15 billion liters of ethanol year after year by 2025. And then the second and third generation ethanol will be additional. So at this point of time, we are looking at E20 as blended fuel.by 2024, 2025 and also looking at marketing E100 from 2024 onwards We're already doing E100 sales in couple of places, but by 2024, 25 if not across the country, but all the major cities will have E100 sales. It's a kind an ecosystem, very similar to what you see in Brazil with E-27 and E100. And so something very similar. Probably we may not go beyond E20. E20 and E100 is what we are really looking at.

Tammy Klein (12:55):

Well, I think this is amazing. Following in the footsteps of Brazil, but I think it'll be so interesting. I mean, the circumstances are different in the United States of course, and on all levels, the politics, it's a larger fuel supply or gasoline supply, but so there are some differences, but I gotta say, it's so amazing to see that this is gonna happen and India will reach E20 penetration before the U.S. And it seems as though the government really looks at this and is supportive of this policy. And I think that's the key.

Y.B. Ramakrishna (13:53):

Yeah. I mean, government has been proactive and government has been pushing the industry to come forward and invested into this sector. So it's kind of a change in the government approach because in the past it was always industry. We went back to the government and requesting government on the new possible economies to be created and pushing the government for new policies, but here for the first time you see that government of India has come up with those kind of policies and policy-enablers and pushing the industry to make investment which is a very welcome development in India.

Tammy Klein (14:38):

So what do you see in terms of future volumes? You talked a little bit about advanced biofuels - what kind of volumes could we see in your estimation over the next five years or so, and can you talk a little bit more about sustainable aviation fuel and the activities and the thinking and the policy setting around SAF?

Y.B. Ramakrishna (15:07):

As I mentioned to you, the 2014, 2015 most of the ethanol that was produced within the country was based on the sugar molasses. The new policy in 2018 allowed not only the sugar molasses to be converted into ethanol, but since we had excess sugar production, we also decided to divert sugar cane juice to produce ethanol and the new policy, even some of the food grains, which are not fit for human consumption to be converted into ethanol. In fact year after year in the food corporation of India go down nearly about 40 to 50 million metric tons of rice wheat to get rotten. And it is all dumped into the sea. Instead of doing that, we can think in terms of releasing these stocks, which have crossed more than two years to the ethanol industry at subsidized price, so that from grain-based, ethanol can also be produced.

Y.B. Ramakrishna (16:11):

We have something like 515 new distilleries, which are coming up, and these are the distilleries, which are going to augment the supplies in the coming years. As I mentioned, by 2025, we will have about 15 billion liters of ethanol coming from first generation ethanol. And then at this point of time, on the second generation, we are setting up four commercial plants under construction. And couple of them are going to be commissioned in August this year so and it is gonna be dedicated by the Prime Minister to the country. And I would say in the next two years' time, we will have all four or five plants commercially producing second generation ethanol. And to talk about some of the potential at this point of time, India being an agrarian society, the kind of aggregates that are being generated in the countries is in the order of something like 180 to 200 million metric tons.

Y.B. Ramakrishna (17:14):

So if all of that is available for second generation right now, we would be producing nothing less than 50 billion liters of ethanol which means that we'll be able to replace 100% of gasoline that we consume in this country. Well, it may take a while before we can get there, but that's the kind of potential India has. And also, we have been quite aggressively looking into carbon capture and utilization and converting that to ethanol. So in fact, the American company <inaudible> has been setting up a first plant, capturing all the tail end gas from a refinery and converting that is one of the plants, which is going to be coming online in August this year. So we had the potential to set up actually some 30 to 40 commercial plants in the country. And then we are also looking at various different types of biomasses, which cannot be used for our enzymatic conversion into ethanol but can go through gasification route and converting that into ethanol either through fisher crop technologies or gas fermentation technologies. So I believe that in next 20 to 30 years' time our production of ethanol would go from something like 15 billion liters per year to almost about 40 to 45 billion liters

Tammy Klein (18:40):

Oh my goodness. Wow. That is huge. Yes. Wow. So we talked about ethanol. We've talked about advanced biofuels. We've talked a little bit about sustainable aviation fuel...

Y.B. Ramakrishna (18:56):

I didn't say anything about sustainable aviation, yet.

Tammy Klein (18:59):

Can you talk a little more about that?

Y.B. Ramakrishna (19:01):

In fact we have been seriously looking into what kind of policy ecosystem has to be developed in the country. We have a research institution called Institute of Petroleum Council of Scientific and Industry research who have developed the technology to produce sustainable aviation to from various different types of oils. And we are really looking at commercializing it from whatever that has been produced. We have been able to successfully demonstrate some test flights, not only the private airlines, but Indian airports have been quite closely working with Indian Institute of Petroleum. And they have tested almost all aircrafts. They have different range of aircrafts that have been imported from Russia, France, United States. And most of them have been tested with 10% or 20% of sustainable aviation fuel blended in it and with excellent results. So India is still not <inaudible>. I think we are going to be filing that pretty soon and whatever <inaudible> targets are there we are looking at how we can meet those targets.

Y.B. Ramakrishna (20:29):

And we believe that if we are a major producer of sustainable aviation fuel once the guidelines are implemented across the globe, India should really become a hub for most of the international traffic that pass from Europe to Southeast Asia and Australia. So that's what we have in target. So we would like all the international traffic coming here. So for us to achieve that we need to make sure that we produce sustainable aviation here in a big way. The other route is ethanol to sustainable aviation fuel. In fact one of the Indian companies <inaudible>, which is the leader in biofields today technology, they have some kind of tie with <inaudible> from USA and they are looking at producing sustainable aviation field from ethanol. And similarly we have a <inaudible>, which is trying to set up some commercial facilities in India to produce sustainable aviation fuel through the ethanol approach. So I think the policy ecosystem is gotten to evolve, but a lot of R and D work and a lot of initiative towards commercialization and also looking at what kind of support structures had to be created within the country, something that we are working on at this time.

Tammy Klein (22:07):

I like that you call it policy ecosystem because that’s basically what is required - a systematic view of policies that touch on different aspects of the supply chain. And it seems that you all are figuring this out, those involved in policy setting and within government and industry in India are figuring this out. I think the Brazilians have figured this out as well. I'm not sure other countries look upon it in quite that way, but that's, what's necessary to make something happen.

Y.B. Ramakrishna (22:53):

Yeah, exactly. , we have to really look at what kind of resources that we have and what kind of technologies that we have to map onto these resources to get advanced biofuels. And then when you look at technologies many of these technologies are at different maturity levels. So in order to make sure that they reach the commercial levels, some kind support structure has to be created to make sure that some of the technology gaps are addressed. So you require research support, and then from scaling data from the laboratory or the <inaudible> level. So that requires a lot of different intervention, so in the entire value chain the government is very seriously looking into it. And another important aspect is when you produce different wheels from these kinds of resources, we also produce among these quantities of various different byproducts, unless realize this byproduct and a good market for them the biofuel market is not really going to become sustainable. So all the investment that we make into this sector has to be protected. So keeping all this in mind and also making this whole industry sustainable the government is quite seriously looking into the entire value chain end-to-end, the possibilities and creating a kind of atmosphere where the investment could be attractive. So that's what government is doing right now.

Tammy Klein (24:27):

So let me turn back to the diesel side of the equation. So as you very well, know hydrotreated vegetable oil, HVO, is scaling up around the world. Do you see the potential for the same trend to occur in India? And can you talk a little bit more...we've talked a lot about ethanol and SAF and advanced biofuel, but where does the biodiesel, where does the HVO piece fit into the equation for India?

Y.B. Ramakrishna (25:01):

I think as sort as the technology is concerned, we have quite well mature technology in the country. The biggest hurdle that I see is the feedstock we have in this country, different types of food-based oil switch, which can be grown. , we have something like 300 different species, which naturally occur, but they occur sporadically all over the country. So, we have to think in terms of how we can systematically start growing these trees and then start aggregating the oils, et cetera. At this point of time, though we have a target to achieve only 5% blending of biodiesel in diesel by 2030, you must realize that our diesel consumption is three times that of gasoline. Which means that even to achieve 5% of blending, we required something like 5 to 6 billion liters of biodiesel. And most of the biodiesel that we are producing in the country is based on the imported palm. And we are, again, dependent on intonation in Malaysia for the palm oil supply. And in the last five, six years, there have been a lot of ups and downs and the industry has not really been able to sustain itself. So what becomes important and critical is our indigenous feedstock production. In fact currently I'm part of a committee, which is really looking into the kind of interventions that are really required in the entire feedstock supply chain, whether it is for ethanol, biodiesel, sustainable aviation fuel, whichever advanced biofuel that we are talking about. So we are really looking at putting together a short-term, midterm and a long-term plan. It's something like a 20-year kind of a plan that we are trying to put in place to make sure that the community is involved in growing the kind of feedstock that is really required for the biodiesel, HVO, or even sustainable aviation fuel. That's where we stand at this point of time. Feedstock production is very important. It's not really the conversion technology. And if you're really talking about energy self-reliance, it doesn't make sense for us to be importing the feedstock that is really required for our biodiesel program instead we can continue to import the fossil fuel.

Tammy Klein (27:27):

So how do you see...last question...but sort of the big overarching question is, how do you see transport decarbonization happening in India and over what timeframe? How do you see, and in particular, how do you see electrification, taking off the way it seems to be taking off in China and India, how does that fit with biofuels? And then you also mentioned earlier, when you were talking about your experience sort of natural gas...I know that you've worked on methanol-related issues. How do all these fuels fit together in the matrix over time for India to reach its decarbonization goals in your view?

Y.B. Ramakrishna (28:25):

First, let's talk about the electrification part of it. I don't know if you are aware, the Indian railway is almost 90% electrified already. So it's another, probably in the next couple of years maximum five years, 100% percent of our railways would have been electrified. As far as the EVs are concerned. I mean in the recent past we have started giving a big push for it, but, um I'm a little skeptical about the whole thing unless all our electricity comes from renewable sources it doesn't make sense that we keep producing electricity from coal and then only shifting the pollution from the cities to some other place. So at this point of time, 70% of the electricity that we consume comes from coal-based power. So we have to do a lot more work with regard to moving away from coal-based to other renewable sources.

Y.B. Ramakrishna (29:31):

So having said that , we have already taken some initiative with regard to these vehicles. All two-wheelers and three-wheelers in India, whichever is going to be released into the market, after 2024 will be either EV or running on a hundred percent ethanol or hundred percent gas. It could be <inaudible>, it could be compressed by a gas. So that is really going to significantly reduce the kind of carbon that is being released into the market. And once we have the E20 and the E100 program in place, E20 itself is going to considerably reduce the pollution. And when you have E100, we are making sure that we will have a lot of flexi cards being released into the market from 2024 onwards. So that itself is going to bring down the pollution significantly.

Y.B. Ramakrishna (30:32):

So CBG compressed biogas, we have a very ambitious program. we have a program called SATAT, which stands for Sustainable Alternatives To Affordable Transportation. So where we have been producing biogas for more than hundred and 30 years in this country, but we never looked at biogas for transportation. Now in the last three or four years, we are really looking at compass biogas, which means that upgraded biogas with 94% or 95% butane be used in our vehicles and replace natural gas. So we have a target to set up about 5,000 commercial plant making use of various different types of wasted resources through fermentation process and producing about almost about 15 million metric, tons of gas, the total consumption of all gaseous fields in the country is in the order of about 45 million metric tons.

Y.B. Ramakrishna (31:43):

So, which means we are talking about replacing the fossil-based gases to an extent of about 35%. And also if you really look at the import of fossil gases, that can be reduced to an extent of about 75% when we achieve this kind of target. So we have clear cut targets with regard to what will be used and how do we really get to the kind of targets that we have as far as the net zero to be achieved in the country, India has accepted that it'll become an net zero country by 2070, but the kind steps that we are taking, I believe that we will be able to achieve it much before that. And in terms of maritime fuels, we are really looking at both methanol and hydrogen as the replacement of fuel for the current maritime fuels that is being used. So a lot of our research work, as well as commercialization opportunities in the area of methanol and hydrogen that's already happening and even hydrogen people talk about blue hydrogen, green hydrogen,

Tammy Klein (33:00):

Right.

Y.B. Ramakrishna (33:02):

We are looking at, biomass route for hydrogen. A lot of work is being done. And I think we have had a significant breakthrough in terms of research, in the next couple of years, you will see at least some three, four commercial plants producing hydrogen through the biomass.

Tammy Klein (33:23):

Ramakrishna. It's been such a pleasure to have you on the show and to talk with you about biofuels and the fuel matrix and transport to carbonization and where India' headed. It's a fascinating conversation. And I look forward to having you back as the situation continues to unfold in India. Thank you so much for being on the show today.

Speaker 1 (33:52):

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