

ENERGY FINANCE CONFERENCE INDIA 2020

Theme: The Political Economy of Energy
Transition

December
7, 9, 11, 14, 16, 18 - 2020

CONFERENCE REPORT

Organised by:
Indo-German Centre for Sustainability, IIT-Madras
Centre for Financial Accountability.

Knowledge Partner: Climate Trends

ENERGY FINANCE CONFERENCE INDIA – 2020

CONFERENCE REPORT



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PREFACE



The Energy Finance Conference-India (EFCI), in both its 2019 and 2020 editions, have been an explorative exercise to understand and deliberate on some of the key outstanding energy debates with far reaching implications for people, market and environment. The ongoing energy transition, defined largely by the choices of states to shift towards clean energy, has significantly boosted the development of renewable energy technology in both India and outside.

At a time when renewable energy is touted as the next best alternative to the used and abused coal, the Indo-German Centre for Sustainability at Indian Institute of Technology, Madras and Centre for Financial Accountability along with Climate Trends as Knowledge partner felt the need to critically look at the inevitable coal to renewable transition.

The significance of the 2020 conference stemmed from the possibility of postulating the transition from coal to renewable as not necessarily only about supplanting coal as the primary source of energy in our country and elsewhere, but also as a distinct phenomenon with its own socio-political, economic and environmental externalities.

EFCI 2020 was an online event in the midst of a looming pandemic that nevertheless witnessed the participation of various stakeholders from the industry, banking, think tanks, civil society, executive, academia and trade unions along with researchers, climate justice activists and local community members. The Conference brought out compelling narratives on the transition paradigm and explored the multi-pronged sectoral inter- linkages and overlaps within the process of energy transition, along with the policy statutes and institutional mechanisms guiding energy transition in India.

EFCI-2020 would not have been a reality without the constant encouragement and conceptual guidance from the Prayas Energy Group - Ashok Sreenivas, Ann Josey and N. Sreekumar, right from the thematic formalization and session layouts to being speakers and active commentators in the Conference. We also take this opportunity to express our sincere gratitude to the technical team that most efficiently handled the online paraphernalia and the live virtual translation by Amit Kumar that helped us take the discussions to a wider audience breaking the language barrier. The documentation team of Devika Shetty and Haifa Zubair also deserves special mention for their prompt and precise summation of the sessions.



Along with thanking all the speakers and moderators who graciously accepted our invite, we also at this juncture fondly remember Prof Dinesh Mohan, one of the finest intellects of our time who enthralled us all with his genius and sense of humour, and who we had the fortune of associating with through EFCI 2020. We lost him in May this year.

Last but not the least, we express our heartfelt gratitude to all the participants who enriched every session of EFCI 2020 with their vocal commentaries and timely interventions. We look towards a continued engagement on critical energy deliberations through the platform of EFCI in the coming years too and hope to receive continued solidarity and encouragement.

Sudhir Chella Rajan, IIT Madras

Aarti Khosla, Climate Trends

Joe Athialy, Centre for Financial Accountability

GLOSSARY

DISCOMs - Distribution Companies

EV - Electric vehicles

EWS - Efficient World Scenario

FRA - Forest Rights Act

GDP - Gross Domestic Product

GHG - Greenhouse Gases

IEA - International Energy Agency

ILO - International Labour Organization

IPCC - The Intergovernmental Panel on Climate Change

IPO - Initial Public Offering

KWH – Kilo Watt Hour

LPG - Liquefied Petroleum Gas

MSME - Micro, Small and Medium Enterprises

MSP - Minimum Support Price

NPA - Non-performing Asset

NTPC - National Thermal Power Corporation

PAT - Perform Achieve and Trade

PESA Act - Provisions of the Panchayats (Extension to the Scheduled Areas) Act, 1996

PLF - Plant Load Factor

RE - Renewable Energy

SECI - Solar Energy Corporation of India

Transition - Energy transition refers to the global energy sector's shift from fossil-based systems of energy production and consumption including oil, natural gas and coal to renewable energy sources like wind and solar. Energy transition is a significant structural change in an energy system.

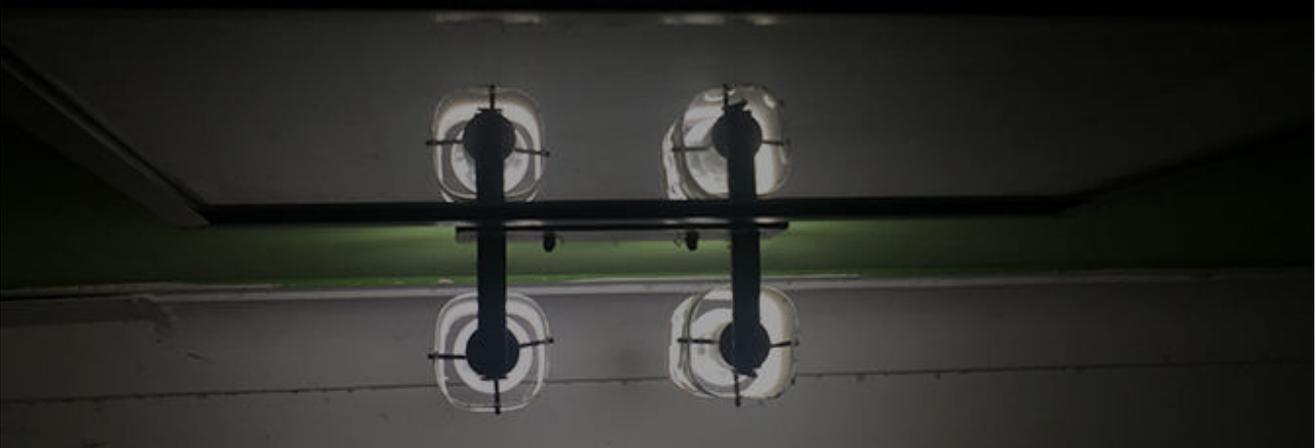
ENERGY FINANCE CONFERENCE INDIA 2020

THEME: THE POLITICAL ECONOMY OF ENERGY TRANSITION

Dates: 7, 9, 11, 14, 16, 18 December 2020 | 3-6pm (IST)

30 speakers in 6 sessions bringing in the national and global experiences together, to discuss:

Energy Transition in the Indian Context | Global Experiences | Policies and Governance Practices | Justice and Equity | Socio-Ecological Costs | Finances | Transition in Sectors



SPEAKERS:

LISA BADUM, Member of Parliament, Germany **MAKOMA LEKALAKALA**, South African Activist and Winner of 2018 Goldman Environmental Prize **VANDANA SHIVA**, Navdanya **SAGAR DHARA**, Environmental / Climate Scientist **AJAY SHANKAR**, Distinguished Fellow, TERI India **E A S SARMA**, Former Secretary, Ministry of Power & Ministry of Finance, Visakhapatnam **SUDHIR CHELLA RAJAN**, Indian Institute of Technology, Madras **AARTI KHOSLA**, Climate Trends, New Delhi **LIDY NACPIL**, Asian Energy Network, Philippines **SOUMYA DUTTA**, Advisory Board member - UN Climate Technology Centre & Network, New Delhi **RAHUL TONGIA**, Centre for Social and Economic Progress, New Delhi **THOMAS SPENCER**, The Energy and Resources Institute, New Delhi **SREEKUMAR NHALUR**, Prayas Energy Group, Hyderabad **ASHWINI SWAIN**, Centre for Policy Research, New Delhi **TEJAL KANITKAR**, National Institute of Advanced Studies, Bengaluru **GIREESH SHRIMALI**, Sustainable Finance Initiative, Stanford University, California **SREEDHAR RAMAMURTHI**, Environics Trust, New Delhi **SHRIPAD DHARMADHIKARY**, Manthan Adhyayan Kendra Pune **GAUTAM MODY**, New Trade Union Initiative, New Delhi **SAMANTHA SMITH**, Just Transitions Centre, an initiative of ITUC, Brussels **BHARGAVI RAO**, Centre for Financial Accountability, Bengaluru **MANSHI ASHER**, Himdhara, Environment Research and Action Collective, Himachal Pradesh **SIMON J STOLP**, World Bank Lead Energy Specialist & Infrastructure Program Leader, New Delhi **ASHOK SREENIVAS**, Prayas Energy Group, Pune **VIBHUTI GARG**, Institute for Energy Economics and Financial Analysis, New Delhi **JOE ATHIALY**, Centre for Financial Accountability, New Delhi **JUSTIN GUAY**, Global Climate Strategy, Sunrise Project, Utah, US **KARTHIK GANESAN**, Council on Energy, Environment and Water, New Delhi **MAHESH PATANKAR**, Interim India Program Director, Regulatory Assistance Project, New Delhi **RANDHEER SINGH**, Senior Specialist, NITI Aayog, New Delhi **ADITI MUKHERJI**, International Water Management Institute, New Delhi **DINESH MOHAN**, Emiretus Volvo Chair Professor for Transportation Planning & Safety, Indian Institute of Technology, New Delhi

**MORE DETAILS: WWW.CENFA.ORG/EFCI
REGISTRATION: [HTTP://BIT.LY/EFCI2020](http://BIT.LY/EFCI2020)**

Organised by:
Indo-German Centre for Sustainability - Indian Institute of Technology, Madras
Centre for Financial Accountability, New Delhi

Knowledge Partner:
Climate Trends

INTRODUCTION

The Energy Finance Conference –India which began in 2019 and continued its journey into 2020, emerged as a response to the ongoing dialogues on the need to judiciously maximise the security of energy supplies in India to fuel development without burdening both man and the environment. While the ever increasing clamour for energy self-sufficiency set stage for the transition into a well-designed and efficient energy regime in the country, what got sidelined in the process was the economic and socio-ecological ramifications of India’s energy policy choices for the sake of the much avowed development goals.

The understanding that any meaningful transformation to sustainable development requires the accompaniment of a judicious outlining of the energy policy, committed to both improving the living standards of its people and preserving the ecological equilibrium, became the motivation and basis for EFCI-India in 2019. After a successful conclusion of the 1st EFCI-India meet in 2019 in collaboration with IIT Madras which witnessed the coming together of academics, energy specialists, climatologists, policy experts, activists, corporates, bankers and bureaucrats, Centre for Financial Accountability along with IIT Madras proceeded to the 2nd year of EFCI-India. This time the intent was to take the conference beyond the coal vs renewable juxtaposition that often posits coal as the leviathan against the benign renewable energy technology, to look critically at the socio-political and economic realities surrounding the emergence of renewables as the alternative energy models. In our endeavour to further the conversations on the ongoing energy transition from coal to renewables, CFA was also elated to join hands with Climate Trends as Knowledge partner. It is thus with the constant encouragement and guidance of many that the 2nd EFCI-India became an online reality.

The EFCI 2020 report is split in 6 chapters, drawing from the 6 sessions that took place online from the 7th to the 18th of December, 2020. The sessions bring together the perspectives of 30 panelists from academics, advocacy, policy building, grassroots movements and more. The 6 days’ long conference witnessed the participation of more than 1000 audience on the online Zoom platform alone, joining us from not just within the country but also from countries like South Africa, Amsterdam, Switzerland, France, Uganda, Pakistan, Australia, Norway and USA. Further, over 5000 people watched it live during the broadcast from social media platforms. We have tried to create a cross-disciplinary platform to address all key concerns of the energy and finance sector, in the context of ecological crisis, inequality, and political

authoritarianism driven by large populist interests. Compared to 2019, the year-long pandemic in 2020 was added to the cauldron of change.

With the 2nd highest population in the world, we have the unenviable challenge of meeting the energy needs of a large society across various strata. At one end we have programs being developed to improve the lives of the underserved with reliable electricity, affordable housing financing and various other schemes and at the other end is the need to cater to the growing aspirations of the population, transport, jobs, entrepreneurship opportunities, modern education, healthcare, mechanization of small industries, etc. This is perhaps around the 200th anniversary of the use of coal in industrial processes, and people say that we have coal reserves to last another 200 years and of course one can only imagine the kinds of catastrophes that a full and exhaustive coal utilization might lead to. Most estimates suggest India's energy consumption is the highest growing and will be the highest by 2040. The challenge will be to meet this demand, while reducing carbon emissions and ensuring energy security for all strata, in a socially, environmentally and financially sustainable manner.

WHAT IS TRANSITIONING? EXAMINING NET-ZERO POLICIES AND OTHER EMERGING PARADIGMS

What would becoming net carbon neutral for India would be? What trajectories need to be taken? What could be the costs? Are there costs which are high and affordable? Or these are things we can handle quite well if we make the right kind of policy decisions? There are costs and political economy issues involved. Finances are not in short supply globally or in India and if there is a reasonable return on investment, money should not be a matter of constraint. The policy discussion should be hence on how to get an investment into what would support the transition to a green fossil-fuel free economy, and make that investment viable enough.

The dominant paradigm for discussion till 2009 was dictated by science. From the 2009 Copenhagen summit we have gone from a 'science dictated-need to do this' paradigm to a 'pledge and review' paradigm of response to climate change. The distinction between 'autonomous and endogenous transition', whether it will happen for technological or market reasons, and 'exogenous/policy drive' transition is not static, it changes as technology changes. It is important to recognize this as India moves from 'we have to

maximize India's carbon budget' to 'we have to maximize solution space for India'.

The issue of energy transition is not an issue that activists or people on the ground usually converse with, these conversations are mostly based on what they are confronted with. What we have learnt through the climate emergency is that human needs are reconcilable with nature's needs. And it is a violation of the planet's needs that is forcing human society to the very edge of its own annihilation. What we saw in Covid-19 was climate change in fast forward. Hence, how do we deal with that crisis in an acceptable, just and sustainable manner? The answer lies in a comprehensive democratic dialogue which addresses people's needs of sustainability and which propels a transition model that contributes to food sovereignty, sustainability and right to livelihood. Further, there are multiple transitions and transformations underway, not limited to just decarbonization but also changes in transportation, moving away from liquid fossil fuels and a push towards natural gas, hydrogen even. The grid of the future is thus moving towards a more decentralized and digital shift.

WHAT IS JUST AND ECONOMICAL IN ENERGY TRANSITION?

While we are convinced of the need for energy transition in India, it is very important that the energy we generate is reliable, clean, moderate and affordable to every Indian in villages and cities. It is also important, especially during the pandemic, that the energy we produce should be sustainable and be able to generate jobs. What constitutes a fair transition? The language of a fair energy transition is integrally linked to the idea of saving the planet. This might sound neutral but the positive vocabulary connected to it encapsulates net zero emissions, the urgency to respond to climate change and a natural energy shift that is being driven by circumstances, which is beyond and not limited to a technological shift. What is central to these issues is that we have to change our understanding of the nature of relationship with nature. Is nature something we use, or is it something we are a part of and use it to the extent we need it. People will get on the same page to commit to solutions only by doing things locally and thereby gain the credibility to push for a global solution.

The transition in energy cannot be seen in isolation. The planning and development pathways we choose has a big bearing on how energy transition would be unfolding and hence investment will follow the pathway. How fast is the GDP based growth in India? How intense is the industrialisation we are

planning? What is the nature of urbanization and how cities are built and transport planned will have a big bearing on how fast the energy transition will happen. Energy transition is basically about politics and a commitment to change. Change in the investment behaviour of banks cannot be limited to the energy sector, it has to be fundamental, it has to keep people and climate at the centre of the investment decisions and be transparent and accountable to people. Ultimately the realisation of India's clean energy ambitions is contingent upon how effectively policy and regulation can mitigate risk facing investors as well as address the constraints of the existing sources of finance. Policy designs and market mechanisms, either complemented or enabled by targeted fiscal support in terms of taxation and subsidies will help facilitate the flow of capital. Further policy and regulation can also augment capital flows to clean energy by disincentivising flows towards fossil fuel based generation and channeling these capital flows towards clean energy.

THE NEED FOR DEVELOPING A POLITICAL WILL FOR TRANSFORMATION

There is a need to explore the ramifications of policy decisions on energy supply infrastructure in India and understand the linkages of governance institutions to equitable and clean energy distribution across the states. This helps in moving towards the best available framework for policy focus within the country, to be able to move away from a primarily federal framework to a more regionally concentrated structure. The emerging consensus over states having failed to achieve the reform objectives and transition towards clean energy alternatives have put a greater emphasis on transferring the responsibilities to the Centre. This is best reflected in the increasing tendency towards centralisation in the decision making process over the last many years. Thus the ongoing energy transition in India is happening under the above mentioned scepticism, and under the assumption that states have limited capacity and so the Centre has to play a bigger role. However, the danger of a highly centralized model lies in inefficient delivery of economic and social services at the grassroots level and asymmetrical economic democracy, thereby creating uneven playing fields within the national energy paradigm. Energy transition is a time consuming exercise as it requires and necessitates an institutional change. It also ushers in material change in the lives of people. The transition stage in India today is faced with multiple challenges of the COVID crisis management, the post-COVID economic recovery and the ability of augment and make use of the domestic manufacturing base amidst disruption of the global renewable energy

chains. While development of renewable energy constitutes the central framework of India's intent to undertake a meaningful and sustainable energy transition, the institutional pathways and the multiple complimentary engagements with diverse stakeholders must put lives, livelihoods and environmental concerns at the summit of the RE dream.



THE POLITICAL ECONOMY OF ENERGY TRANSITION



VANDANA SHIVA
Environmental Activist &
Food Sovereignty Advocate



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Distinguished Fellow,
TERI India



MAKOMA LEKALAKALA
South African Activist & Winner
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Member of Parliament,
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Environmental / Climate
Scientist

ENERGY FINANCE CONFERENCE INDIA 2020

INAUGURAL SESSION: DECEMBER 7, 2020 3-6 PM (INDIA TIME)

Zoom Meeting ID: 964 1278 3292 Passcode: 333444

For more details & registration: www.cenfa.org/efci



CFA
Centre for Financial Accountability



Inaugural session of the Energy Finance Conference India, 7th Dec 2020



Chair: **Sudhir Chella Rajan**, Professor, Indian Institute of Technology, Madras

Speakers:

[A People Centric Transition Plan](#)

Makoma Lekalakala, South African Activist and Winner of 2018 Goldman Environmental Prize

[The Need For An Indian Vision Of Energy Transition](#)

Ajay Shankar, Distinguished Fellow, TERI India

[Decolonising The Transition Process](#)

Vandana Shiva, Environmental Activist & Food Sovereignty Advocate

[Reducing The Poverty Footprint While Transitioning](#)

E A S Sarma, Former Secretary, Ministry of Power & Ministry of Finance

[The Global Vs The Local And The Unsolvable](#)

Sagar Dhara, Environmental / Climate Scientist

SESSION NOTES

The session was chaired by Prof. Sudhir Chella Rajan who began the inaugural address by harping on the significance of diverse interest groups and stakeholders coming together to create an ambitious cross-disciplinary platform to address all key concerns of the energy and finance sector through the energy justice prism, including equitable access to energy services, sustainable deployment of energy resources for accessing modern energy reserves and energy transition in line with the aspirations of the global climate justice movement.

A PEOPLE CENTRIC TRANSITION PLAN BY MAKOMA LEKALAKALA

Video Link: <https://bit.ly/makomal>

“The issue of energy transition is not an issue that activists or people on the ground usually converse with, these conversations are mostly based on what they are confronted with, without using big terms that are otherwise used”.

What is termed as a just transition is not an overnight event. It is a constant, unceasing process that requires systemic planning, implementation oversight and a high level of political will. However, one can draw lessons from the hits and misses in other countries which have been in similar positions. South Africa, similar to India, needs to go through fundamental and meaningful energy transitions because of the reality of energy poverty that both the countries are having to negotiate with. We are talking about this in the backdrop of the existential threat of climate change and the IPCC warnings that says that human race is up against a climate catastrophe and not just any ordinary climate change. While the Paris agreement is seen as a milestone, there are concerns particularly from the African continent around how it could work in favour and could probably also preclude the continent's much required surge ahead. Nevertheless, South Africa is one of the countries that has pledged to honour the Paris commitments, including investments in various sectors towards decarbonising society in line with the International Labour Organisation's (ILO) model for just transition.

South Africa, like many other developing states, is faced with the reality of some of the state policies lacking a human face amidst the clamour for more scientific and academic-oriented policies. In South Africa, those who are most impacted are often not let into the policy-level debates and discussions which shape the contours of energy transition. The more organised forums where energy is debated and discussed leaves no or little space for ordinary people, workers or union members to voice their concerns and contribute towards discussions on just transition in the economy as a whole. The debates taking place more at a macro-national level, not involving the larger communities and ordinary people at grassroot level, are thereby excluding the large mass who have to be the real drivers of this transition for the sake of food sovereignty and independence.

We see that, many at times, the transition to renewables is driven by political and economic factors. Climate change impacts have had a negative consequence on our people. Hence it is important to make sure that transition is just, fair and inclusive and that the process has an inclusive approach in engaging the most marginalised local communities. This would include lending from our own indigenous systems. It is important to understand what is that we already know, what is that which is in practice amongst our people and what is that which benefits them. In many countries like India and South Africa, there are a lot of initiatives from people on the ground; traditional ways of agricultural practices, cooking, saving food etc. which should then make way in to the policy

space to ensure that the intended energy transition is fair to everyone and not just for those who are driven by profit. Just transition should thus speak to the needs of the people.

We also need to look into investments like the Green Climate Fund, through their business operations in different countries. It is high time that fossil fuel companies changed their ways. We know that fossils are history, and the use of fossils is exploitative. The financing of fossil fuel industries should be channelised towards a people driven, people centered development which brings about a low carbon development. Our challenge to fossil fuel companies should be to ask them to move away from the damage and threats they have caused and make way for people to decide and direct and drive where the investment should be, and discontinue the investments which bring about oppression, exploitation and threatens the health and well-being of people. We should challenge the development banks from developed countries to desist from supporting and financing carbon intensive electricity generation, like coal and to instead support and finance people's electricity generation methods like decentralized solar and wind plants. Challenge the World Bank and the African Development Bank and other development banks to say that you are financing destruction, and it's time you moved away from it. People have made progress by financing more renewable energy technologies and by investing in decentralised electricity systems as that would bring about the real just transition.

The finance and politics of just transition should be embedded in the decisions of ordinary people. We need to call for a payment of reparations from the investment companies that have financed coal, nuclear, gas for a very long time and challenge them to repay what they have destroyed. We can hold them responsible for the situation the future generations are faced with. In our times we must amplify and intensify the challenging of financing fossil fuels extraction and focus diligently on clean energy projects so that we can have an inclusive, robust transition that would be led by people from below.

THE NEED FOR AN INDIAN VISION OF ENERGY TRANSITION BY AJAY SHANKAR

Video Link: <https://bit.ly/ajayshankar>

In the early days our position on climate change was this is a problem created by the developed world and so they should bear the primary responsibility of setting things right.

For the developing country the primary goal was always development and if they were required to incur the additional cost of addressing climate change, there were to be some sort of financial flows from the developed countries. There was a huge international tension between us and them, because the developed world took the position that what mattered were not per capita entitlements or per capita carbon transmission, but emissions from the country; India being a large country was bound to have high carbon emission rates. We hence saw it as a way of either capping our development process or imposing costs we couldn't bear. This carried on till the Paris agreement where those from India who have been taking the conventional position felt that we agreed to an agreement that diluted the principles of common but differentiated responsibilities. In the build up to all this we had been articulating a position that per capita entitlements on the carbon space on the planet/ carbon emissions should be the same.

Now we are at a juncture where the UK and France have formally taken a position through their parliament that by 2050 they will become net carbon neutral economies. This is how the world has changed; science is very clear that the Paris Agreement even if fully implemented will deliver far too little. If we look at our own evolution in terms of renewable energy transition, this is one area where Indian can legitimately feel that we have succeeded beyond our initial expectations. So when the National Solar Mission began with the expectations of touching 20,000 megawatts solar power generation, we are way beyond that already. And what has also been an encouraging development is that we have been achieving most of it without government subsidies and through private investments. When the ambition was raised to say 170,000 or 40% of capacity generation from renewables by 2030 it appeared daunting. However, 450,000 MW today does not appear that daunting or difficult.

What would becoming net carbon neutral for India would be like? What trajectories would be required to reach the target? What could be the costs? Are there costs which are high and affordable? Or these are things we can handle quite well if we make the right kind of policy decisions? If we want to take energy transition to a point where we are net carbon neutral, then we need some parallel transitions when we try to phase it out. One would be that electricity has to come entirely from renewable sources. The tougher one is take care of the transportation which again needs to move away from fossil fuels. Once electricity and transport are taken care of, what remains is the industrial sector, and there again technology has moved quite well across the world and

there is hope that in 8-10 years we would achieve the targeted industrial production we require without exhausting fossil fuels.

There are bound to be roadblocks too. In India the established auto industry, for instance, would naturally like to delay the transition to electric vehicles as a transition would necessitate the auto component industry to either re-engineer itself or perish completely. Similarly the coal mining industry which is huge and a major employer in India would need to go and so there are costs and political economy issues involved in the transition from coal to clean energy paradigm. And hence it would be best if these are examined and discussed in a transparent manner and the implications are openly discussed amongst the civil society and political leadership, so that better, more rational and informed decisions could be taken.

The other area we have not had enough discussions on is the proposition of looking at gas as an arena of transition. In India we do not have natural gas preserves within our own country and so we could ponder more on how we can avoid getting locked into a pre-dominantly gas based economy and thereby bring about two different kinds of transitions; one away from fossil fuels for generating electricity and other away from fossil fuels for cooking, transport and in industry.

Finances are not in short supply globally or in India; if there is a reasonable return on investment, money ought not to be a constraint. The policy discussion should be on how to get investments into what would support the transition to a green fossil-fuel free economy, and make that investment viable enough. For renewable energy, the industry has provided that regulatory commissions would prescribe the share of electricity that must come from renewables. Similarly the same instrument could be used for storage. The focus should be in seeing the big transition picture and then phase out into details of what policy and regulatory measures are needed to push forth the transition. Instead of demanding money and technology for transition from the west, we should see how we can make use of the domestic within the country technology, along with market and policy instruments, and usher in a net carbon neutral economy.

DECOLONISING THE TRANSITION PROCESS BY VANDANA SHIVA

Video Link: <https://bit.ly/vandanashivaa>

Part of what the fossil fuel transition did is make us forget about other energies.

Our history of agriculture has the British treating India as their empire for cotton and opium; it was a raw material supplier system and they wanted to improve the production. They sent Albert Howard, who was an economic botanist, as there was no agricultural discipline then to improve agriculture in India. Upon arrival in Bihar, he saw the fertile soil with no pests and famously remarked that he is in no position to teach Indians how to do agriculture and instead must make the Indian peasant his professor.

The fossil fuel trajectory has always been riding on colonialism. They were able to create an empire where they treated the labour of Africans they called slaves a zero value. But because of the mechanistic reductionism which is both a mindset and also a means to define efficiency and productivity, all of this production by peasants and slaves of the worlds was rated as miracle manufacture of the mills. It wasn't by accident that Gandhi pulled out the charkha. Gandhi wasn't just spinning cloth, but he was spinning another world view of energy, namely, the dignity of labour. When he marched to Champaran to free the starving and naked peasants who could not grow their own food, it was to show that fossil fuel driven colonialism was a slave system. And in fact, the farmers who are protesting today in the Delhi NCR against the farm acts, as they protested in 1984, are protesting against the slavery woven around the spins and stories of the miracle fossil fuels. The next step was the age of oil, the age of petrochemicals that gave us the agrochemical industry and the pharmaceutical industry which has the same roots. The next unjust unsustainable transition was the imposition of Green Revolution on India, which was a fossil fuel driven chemical revolution engineered between 1965-66 in the backdrop of the drought.

1965 was the beginning of the imposition of fossil fuel agriculture in India in the name of Green Revolution, which was neither green nor revolutionary. 1991 saw the beginning of the fossilization of trade. With the globalisation of food production and consumption, today we are consuming food that is contributing more and more to species extinction, destruction of farmers livelihood and climate change. Industrial agriculture production based on fossil fuels and chemicals derived from fossil fuels contribute to 11-15% of the environmental degradation. Land use change is not usually shown linked to agriculture, but why else is the Amazon rainforest disappearing? For growing GM soy. What is the Indonesian rainforest disappearing for? For growing palm oil.

There is another kind of an energy transition which is a colonial energy transition that is more mechanistic and industrial in nature. For instance, Reliance made 50

million investment to Bill Gates' breakthrough energy ventures. Breakthrough energy ventures are actually financing lab produced breast milk, as if a mother feeding her baby with her breast milk is a climate change problem. Or the farmers of Punjab, growing wheat and rice to feed this country, are a threat to the climate. Farming without farmers is in fact our new problem. The big corporates want a world where there is no farmers and there is no naturally produced food so that all the lab-produced food decorate our tables. Agricultural produce becomes production of raw material like protein and carbohydrates, and they become the feedstock of food factories.

The problem with the system is that energy is not assessed, it is still an invisible energy footprint. People think digitalisation of agriculture will reduce the energy footprint. Digital agriculture is hailed as precision agriculture. Having 500,000 data points on a farmers' field or mining the data of a farmer is not knowledge of how ecosystems work; it isn't knowledge of agriculture. Nevertheless, data points is the new raw material although they do not make a living system. It is quite interesting to look at the vocabulary that is being manufactured currently to understand and explain energy scenarios and challenges. The vocabulary of 'net zero' implies that when a company or country says it will be net zero it means it will not produce any green house gases but if it can't stop producing them, it will instead engage in transactions leading to basically pollution trade. The unjust transition is to let the farmers earn zero for the food they grow and to pay them a little if they trade with the polluter. This is injustice and is turning our annadaatas, our farmers, into carbon slaves for the billionaires and corporations. While we already have in place fossil fuel based agriculture that is creating nutritionally empty food, the new imperialist model wants to give more business to the biggest conglomerates to fortify and establish the fossil fuel colonialism.

REDUCING THE POVERTY FOOTPRINT WHILE TRANSITIONING BY EAS SARMA

Video Link: <https://bit.ly/eassarma>

Rather than looking at minimising carbon footprint what is more interesting is to look at the poverty footprint of the energy system. India's energy problem is the last mile problem. The energy planners in this country have had inadequacies in addressing the energy deficiency in low income households and the focus has always been more on energy sufficiency for higher income groups. India is talking about 100% household electrification, but according to official records about 24 million households are still energy deprived in the country. These are the people who have not had the benefits of energy. The most important reason

for this is the cost barrier. The end use devices used in low income households are highly inefficient like the stoves or lamps. The result is that the per capita useful energy of these households remains very low. The per unit cost of useful energy in India is very high because of lack of end use energy efficiency. Poor get energy at much higher costs because of their inefficient end use energy devices and hence it is precisely this area that requires a financial stimulus in this country.

Farmers today are opposing the privatisation of electricity, of DISCOMS, as this will dilute their ability to cross subsidise to low income sections of the society, remote areas, and other tribal areas of this country. Herein one must also ponder over who are the bidders of these DISCOMS (distribution companies); they are the huge corporates who have already taken large loans with many of them falling under the category of NPA even if they are not declared as such. And hence such entities taking over the DISCOMS will only create more NPAs thereby straining the system and letting down the consumers.

Further, there is also very little focus on energy demand management and efficiency improvements as the conversations are always more about supply, increased capacity, increased coal based capacity, increased gas imports or increased gas production. Supply orientation is also very distressing. The country has embarked on auctioning 38 coal blocks, running contrary to India's commitments at the global level. 8 are in high dense forests, in no-go forest areas. Most of these coal blocks are in river basements and hence the probability of pollution eating up the root of the country's river system is at an all time high. Irrespective of many of these areas being declared as scheduled areas, where Tribals have special rights and falls under the purview of the PESA act and the Forest rights act, the fact remains that the local gram sabhas have never been consulted.

For instance, in Kowada we have 6-7 nuclear reactors coming up, all supplied by American companies that essentially only facilitates employment generation in the West. In India the nuclear regulator further is not independent enough too. In 2012, after the Fukushima incident, the Department of Atomic Energy had introduced a new bill for a new regulator and the parliament then did make some far reaching recommendations to make it more independent. In 2-3 years since, however, the new nuclear authority bill still remains an enigma while in the meantime we continue to expand and augment our nuclear capacity by importing reactors and fuel. With no independent governing of these resources, we are in reality exposing poor people to potential risks of a nuclear accident.

While Solar was expected to be more decentralized, contributing to more rooftop based electricity generation and manifesting as solar agriculture irrigation pumpsets, it ended being captured by the corporates paving way towards non-democratic centralised huge solar power plants. They are bidding cut throat tariffs, with the added mess of loans and NPAs. There is also the photo voltaic waste from solar which we have not learned to recycle or deal with. The entire energy transition system is in short driven by corporate interests. All policies, be it DISCOM privatisation, coal block auctions or solar are dominated by corporate interests. Banks are going to be further burdened with NPAs. We will end up with system which would promote end use inefficiencies and will be as always pitted against the low income users when it comes to cost and per capita availability. These issues are long term in nature and are going to fundamentally determine the energy trajectory of India and the ways in which the country's economy is going to take shape.

THE GLOBAL VS THE LOCAL AND THE UNSOLVABLE BY SAGAR DHARA

Video Link: <https://bit.ly/sagardhara>

What does energy do? It is the mover and shaker of processes; no energy and everything comes to a standstill. If you look at energy flows you can explain a lot of what you see in our society. For example, human migration has followed the route of finding energy, the rise and fall of civilizations and empires has followed the energy path. The transition from hunter gatherer to primitive agriculturalist employed animate energy and biomass. What in fact differentiates us from other species is the knowledge of energy conversion. Our evolution has relied on maximizing the energy we draw from nature. Today we draw well over 50,000 times the energy we drew as primitive humans, say about 10,000 years back.

That is where the problem is at, growth. We have convinced ourselves that we have rights which other species don't have, what we call anthropocentrism and so we are stealing energy from other species. This stealing has a lot of violence in it. When we calculated how much energy we have used to deforest 1/3rd of our forests over 8000 years, we discovered that every year of those 8000 years we have used energy equivalent to 20,000 Hiroshima sized atomic weapons. The next conundrum has been about privatising of nature. If I spend about 1 joule I can get 20-40 joules back in fossil fuels. What is that 1 joule being used for? It is to prospect, to dig, to excavate and extract fossil fuels and maybe do a little bit of transport and processing. The question really is who made the hole in the first place for the oil and how much energy did it cost? How do I say that by

investing 1 joule if I get 20 joules then that the remaining 19 are mine? When you engage with this question you realise that the whole concept of privatisation of nature on the whole has no basis, neither in law nor in philosophy. Both these have contributed to extracting more and more energy and the whole concept of energy as a utilitarian feature comes from Anthropocentrism.

As a consequence we have 3 problems that are serious in nature because any one of these can tip society over. 1st one is that the fossil fuels contribute to over 80% of our commercial energy. Oil will be over in 40 years, gas will be over a little after that and coal in less than 100 years. The problem is that we have no replacement, not renewables, not nuclear, none of these can replace fossil fuels fully. Uranium ores will last us for just above 100 year if we count existing projects and just about 150 years if we count upcoming new projects. Other renewables have all kinds of problems which have not yet been sorted out. Even basic materials like copper will exhaust in about 40-50 years. Even steel will go out in 70-80 years if we do not recycle it. Materials used in permanent magnets for wind generation for example, which are also used in computers hard drives, are also going to be exhausted in a short while.

Second is, we have used about 40% of fossil fuels in just about 300 years; what took mother nature about 300 million years to make. Everyone agrees that even if the NDCs under the Paris Agreement are fully implemented the temperature rise will be approximately 3.2 to 3.4 degrees above what it was before the Industrial Revolution.

The 3rd problem is how do we distribute this energy? What we have done is we have distributed it inequitably, between countries and within countries. Within countries this divide is much larger, especially in countries like Brazil and India. There is massive difference in terms of per capita energy consumption. The global average is about 2 tonnes of oil equivalent; in India its 0.7, Afghanistan it is 0.1, high income countries it is 4.6, low and middle income countries it is 1.3. This leads to conflict and war. Hence in order to fix the problem, we need to ask ourselves 3 critical questions. How much energy can we take from and call ourselves sustainable? Second question is, where will our future energy come from? And the third is how do we distribute this energy?

As a global programme we need to reduce our energy consumption by about half of what we are using right now, we have to distribute energy more equitably and not just equally. What is central to these issues is that we have to change our understanding of the nature of relationship with nature. Is nature something

we use, or is it something we are a part of and use it to the extent we need it. Global average per capita commercial energy consumption is 1.9 toe pa and our calculations for sustainable per capita energy consumption is approximately half that, about 0.8-1 toe pa, on the current population. This is adequate for a family to live a reasonably middle class life without owning a car or a scooter. If everyone has to come down to 1 toe pa it would mean that US would have to reduce by 90% while Europe, Australia and Japan by 75%. So that India can move up by 15-20%. Under the present dispensation no one will come on to the same page politically to do this. No country can solve the problem of these 3 tipping points on their own. All countries will have to be on the same page to achieve that.

People will get on the same page to commit to solutions only by doing things locally and thereby gain the credibility to push for a global solution. A single village doing it doesn't work. The power of privatisation of nature is so strong that the neighbouring village won't replicate what is being done. At a national level we need to campaign for the North nations to be net carbon neutral by 2030 and the Southern ones by 2040, to taper the expansion of carbon and hydro carbon industries, encourage the use of sustainability index, make C&E audits mandatory, reduce energy inequity through appropriate policy measures and bank on biomass.

Some of the challenges going forward are going to be technological challenges of shifting to renewables by completely doing away with fossil fuels, defining sustainability within the restoration vs restitution paradigm, thermodynamic and economic equations being out of sync- best example being agriculture in India and increasing energy density with increase in complexities.

The Chair Prof Rajan winded up the discussions with an overall summation of how all the speakers brought up the collective quest for alternatives to herald a just energy transition in the country and beyond, by focusing on improving energy efficiency, using less intensive practices and changing the current energy paradigm through a revamping of the ways of life and not just the instruments we deploy as energy services to make possible a democratic transition from coal to renewables.

ENERGY FINANCE CONFERENCE INDIA 2020

THEME: THE POLITICAL ECONOMY OF ENERGY TRANSITION

THEMATIC SESSION 1: WHAT COULD ENERGY TRANSITION ENTAIL IN THE INDIAN CONTEXT? LESSONS TO BE LEARNED FROM THE GLOBAL EXPERIENCES



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THOMAS SPENCER
The Energy and
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DECEMBER 9, 2020 3-6 PM (INDIA TIME)
Zoom Meeting ID: 964 1278 3292 Passcode: 333444
For more details & registration: www.cenfa.org/efci



WHAT COULD ENERGY TRANSITION ENTAIL IN THE INDIAN CONTEXT? LESSONS TO BE LEARNED FROM THE GLOBAL EXPERIENCES

Chair: **Aarti Khosla**, *Director, Climate Trends*

Speakers:

[The Macro, The Development Question And Transition](#)

Thomas Spencer, *Fellow, The Energy and Resources Institute (TERI)*

[The Questions Of Distribution As We Transition](#)

Sreekumar Nhalur, *Prayas Energy Group*

[Transitioning With A Paradigm Shift](#)

Soumya Dutta, *Advisory Board member - UN Climate Technology Centre & Network*

[The Questions Of Decarbonizing](#)

Rahul Tongia, *Senior Fellow, Centre for Social and Economic Progress*

SESSION NOTES

The session was chaired by Aarti Khosla who began by stressing on the need for bringing discussions of climate change into energy discourses to steer discussions of energy financing towards sustainable development. She emphasized on the importance of quantifying and defining precisely what sustainable energy management entails along with also reflecting on parameters like energy inequity, energy access as a right of the privileged few, reaffirming access to energy as a fundamental right, advances in renewables deployment and how the energy policy can be weaved into an economic recovery package which does not hamper economy and environment in the country. As India's per capita energy consumption is set to grow 4 times by 2050 she stressed on the importance of having discussions on how India will produce and consume energy in the coming years.

THE MACRO, THE DEVELOPMENT QUESTION AND TRANSITION BY THOMAS SPENCER

Video Link: <https://bit.ly/thomasspencer>

As a developing nation, India is faced with many macroeconomic transitions, pertaining to urbanization, industrialization, formalization, as well as demographic transition. Urbanization and industrialization are on the rise and it is indeed a key indicator of economic growth. Further, along with demographic shifts, the young population are looking for more jobs within the informal sectors, as it currently spawns most of the income generating employment opportunities. Endogenous or autonomous energy transitions are taking place regardless of policy. As incomes increase, there is a shift to modern energy carriers, with people preferring to consume LPG or electricity as opposed to biomass. This is a natural efficiency improvement which is technological, and market driven. Exogenous or policy driven transitions are where we try to achieve broader social objectives. This involves internalizing externalities like CO₂ emissions, market actors not considering long term impacts, positive cost options and desirable options that have non-cost barriers. How these issues play out will determine the scale and nature of transition in India since each of them influence the other.

A large-scale transition that India is faced with is in traditional agriculture. This is important because economically, agriculture is not particularly productive. There is not much profit since the increasing utility from consuming more food is not very high. Therefore, there will be a need to find employment for the 40% who work in agriculture. This 40% of the population produces only 14% of the GDP. Nothing can be done to change this ratio. Only people can be transitioned out of agriculture. Incidentally, this is the highest number of individuals who will have to be suitably employed in an energy transition, as opposed to other sectors. The structure of India's economic growth is driven by the service sector as against the industrial sector. It is driven by high productivity and low impact, with a low footprint. This is however bad for job creation but a major driver as to why the Indian sector is low in energy intensity.

Energy demands are always correlated with GDP growth. Hence, we need to think about the larger development pathway when we think of energy pathway at a macro scale. One challenge for the energy transition in India, from traditional fuels to modern energy carriers like electricity, LPG et al is that biomass is largely combusted in the residential sector, mainly for cooking. This is extremely inefficient and costly in its externalities. The continued dominance of

biomass drives the emissions intensity of total consumption. However, there is no reason for India to follow these trends because, in terms of leap frogging in energy systems, there have been large transitions over the last couple of centuries. In countries transitioning away from coal, many of these transitions don't seem to have been socially or politically disruptive in their earlier phases. In the UK, the share of employment in mining and quarrying is around 7%. In India, this figure is around 1% or maybe slightly lower. Therefore, in proportion to UK, the total number of people who will need to be transitioned is much lower. But, in the UK, the transition was also easy because it fell right within the overall transition from agriculture to industry to services. Coal workers shifted into low skilled jobs within the manufacturing and other sectors, not renewables. This level of transition can be achieved if the rest of the economy is working well. There is much anxiety among us about transition right now because the economy is no longer working for the working class.

The two ways in which the transition is bound to play out will unfold irrespective of the climate policy because India's macroeconomy will evolve and its energy systems will adapt accordingly. Policy driven transition nevertheless will not shape up without adequate interventions and employing positive costs. There have been huge technological advancements in the last 10 years and newer mitigation options have been developed with no positive costs attached. If it is accepted that India's power generation systems will decarbonize over the next 3-4 decades, then the sources of emissions and growth that would require urgent addressing would be outside of the power sector.

Further, if we want to understand India's energy transition, then we need to understand India's development pathway and its impact on the energy systems and emissions pathway. If we have an unequal system, then we will have a smaller energy system, because many households will be excluded from modern energy services. The distinction between 'autonomous/endogenous transition', whether for technological or market reasons, and 'exogenous/policy drive' transition is not static. With changes in technology, the distinction parameters too undergo changes. As India engages with global recognition, it is important to recognize this aspect. There is a need to move from 'we have to maximize India's carbon budget' to 'we have to maximize solution space for India'. Non cost barriers are just as significant as 'positive costs.' This is largely about domestic policy design and effectiveness, about regulation, enforcement, and incentives as these factors will determine the transition trajectory, even if not

what it costs. Hence the larger question would be how to open up the 'policy solution space' to tap the 'technological solution space'.

THE QUESTIONS OF DISTRIBUTION AS WE TRANSITION BY SREEKUMAR NHALUR

Video Link: <https://bit.ly/sreekumarn>

Energy equity is not just about supply options but is also about distribution options. What is electricity transition and what constitutes fair transition? The general understanding of fair transition captures the need for electricity to catalyze development along with a focus on small consumers, environment and livelihood. Since we are dependent on the state to provide many services, it should prevent undue burden on state and taxpayers.

There are multiple perspectives to the transition; long-term perspective which as presented in the inaugural session are about the next generation's perspective; medium-term perspectives, which are 5-10 years based and short-term perspectives, which are about addressing the immediate issues like pollution and grievances. We can also take a global/national/state/community perspective.

Plan Load Factor is the indicator of the utilization of the coal fleet. In 2010, it was 75% and the shortage was nearly 10%. In 2020 it reduced drastically. This capacity addition in coal has resulted in base power surplus, and the low PLF of coal will not go away as it is now a prominent feature and not an aberration.

There are some coal retirement plans of maybe a couple of gigawatts per year. Some states like Gujarat, Maharashtra, Chhattisgarh and companies like Tata and NTPC have announced 'no more coal'. On the distribution part of the story, it is impacted by growth of renewable, by high surplus and by changing business models.

Transition in the distribution sector is equally noteworthy. In a sector filled with very high financial losses, with annual losses to the tune of 60,000 crores, accumulated losses of 4.8 crores and dues of nearly 1.38 lakh crores, distribution companies have to give electricity when required and at the cost we wanted. These bad losses are because of bad power procurement planning, high costing surplus power being purchased along with slow increase in efficiency and because of a skewed tariff structure where some consumers pay very high tariffs, and some pay very less. The DISCOMs buy power for Rs.7 and the commercial and industrial consumers pay Rs. 8-9, while alternate power sources are available at Rs. 5-6 per unit. As a result of this, and since solar PV systems are very cost

effective today, 15-20% of the consumers of DISCOMs have moved to open access markets and captive options by setting up their own power plants. Storage costs have gone down by 80-90%. Our estimate is, solar can be stored at Rs. 3-5 kWh. Hence, DISCOMs are facing an inevitable transition. It will very soon move from supplying to all customers to only a small group of consumers, and the cross subsidy-based model will no longer support the DISCOMs.

In such a case the transition cannot be guaranteed to be fair, where only a small number of consumers can afford to buy quality supply with good responsive service. To ensure affordability, cost of supply will have to be reduced first. PPAs have to be optimized and long term PPAs must be avoided. Renewable energy is cost effective but only when scaled up slowly with appropriate SIA and EIAs. Concessions should be slowly withdrawn on renewables. Since energy efficiency matters to a lot to small consumers, the state must work on transforming the market towards efficient appliances. The current model is a disincentive for efficiency. We should move away from this cost-plus regulation to a quality or performance benchmark incentive. Tariff increase should be linked to inflation; subsidy regime should be much better implemented. State government subsidy is more than Rs. 1 lakh crores per year. This along with the cross subsidy adds up to about 21% of the DISCOMs revenue. The cross-subsidy quantum is reducing at 4% per annum meaning ultimately the state will have to bear the costs of supplying to all the consumers. Hence the subsidy should be reasonable and only given to those who deserve it.

A study done by PRAYAS showed that in Maharashtra, 50% renewable energy generation is feasible with some minimum storage support. Innovations are needed especially at the end use site. There is also the need for small, distributed renewables systems that are grid connected, to increase the reliability and economy of the services. While renewables are important, their usage should be increased in a phased manner along with managing the challenges of intermittency, centralization and distribution. Hybrid renewable systems should be encouraged since their capacity utilization factor is higher, along with gradual reduction of coal and making coal fleet flexible, all using models and tools for better planning.

On the distribution side the big consumers should have an option of letting go taking with them the risk factor as this will make DISCOMs cater to small consumers. Equally pertinent are factors like state subsidy, financial health of DISCOMs and reducing cost of supply and for all this to happen, it is important that ordinary consumers participate in all the regulatory and policy processes.

TRANSITIONING WITH A PARADIGM SHIFT BY SOUMYA DUTTA

Video Link: <https://bit.ly/soumyadutta>

There have been two complete energy transitions before. The first one being 11,000 years ago which increased human population but not human quality of life and the second being the fossil fuels' transition, which released a large part of the world from Malthusian economy and increased personal wealth. None of these though had humanity facing a crisis. They have been mainly about economic, social and development opportunity. The current considerations are rooted in mainstream capitalistic thinking. The consequences of not acting fast enough are devastating. Human race can adapt by employing cultural and technological solutions. No other species can do this. For all other organisms, this is a completely altered ecosystem, or a disaster. The economy-centered approach completely ignores the ecosystem concerns leading to an ecosystem devastation. These are considerations which are not talked about while talking about energy transition.

The dominant paradigm for discussion till 2009 was dictated by science. From the 2009 Copenhagen summit, we have gone from a science dictated 'need to do this' paradigm to a 'pledge and review' paradigm of response to climate change. Today's paradigm is 'what I want to do, what I will do, this is my pledge'. If I have to pay 100 rupees, I will pay 1 rupee and you have to review whether I paid all of the 100 rupees. The other factor of global climate negotiations is the masking of the severity and extent of the crisis by the governments, who are largely controlled by corporate interests back home. They have invented a language that makes the climate catastrophe look like a normal process of change.

Even if all pledges, not agreements, of the Paris agreement are followed by all countries, by the year 2100, on very conservative estimates, there will still be a temperature rise of up to 5 degrees or a little more. The global scientific consensus is that 2 degrees is a point where many tipping factors will be tested. The pace is extremely slower than what is needed right now. One of the reasons given is economic, the parity of cost of coal and renewable derived power. If you look at the studies done on the aggregate damage done, keeping 3-degree consideration which is preindustrial age, then it is 1% of the GDP. The cost of adapting is only one time, no matter what it is. But the cost of mitigation is annual, it is recurring. 1% GDP is a little less than 1 trillion dollars. This is much higher than the entire investment in the power sector and not just renewables.

By not acting fast enough the cost is being deferred from our generation to the next generation. Had action been taken upon this in 1990, the total cost would have been 15% of the GDP. But that same would cost 18-20% of the GDP in 2020.

Paris agreement came into being because the corporate sector realized that they could profit by providing these solutions as a result of the shift in paradigm from a science dictated 'need to do' to 'pledge and review'. From 2015, 2016 and 2017, an estimated 1.8 trillion dollars have been invested globally in climate negotiations. In 2018, the investments fell globally, to about 1.7-1.78 trillion dollars. In 2020, it was 1.5 trillion dollars keeping in mind the extraordinary situation the year passed through. In 2018, the drop was in coal investments, in 2019 it was in oil. But the earlier investment rise in solar PV and wind is flattening out. Investment in solar PV has fallen by 1% and in wind, it has remained flat, though the capacity has increased because the cost of solar has fallen.

In the total investment of 1.8 trillion dollars in all energy sectors, power sector got 775 billion dollars and the renewable energy sector got about 273 billion dollars. It is less than 20%. If the investment is still so low, even at this crisis junction, it is not a promising scenario and will not help in a transition that can help in the climate crisis.

It entails two different things for India. There are plans that can ensure universal access, as mentioned in the SDGs, but even they fail to take into consideration further ecological damage. In 2019 the total global ecological footprint was already 1.7 times the total available bio-capacity of the earth. It is not only about carbon, but about the entire ecological footprint and the entire bio-capacity of the earth that has been pushed to its limits. If we had gone for much more decentralized energy production, we could have put the rural consumer and economy at the front end. Farmers could have used energy to make decisions for their crops and not depend on very unreliable energy supply. There cannot be a decentralized coal energy system, nevertheless a decentralized renewable energy system was easily possible. That would have not only heralded an energy transition but an economic transition too.

THE QUESTIONS OF DECARBONIZING BY DR. RAHUL TONGIA

Video Link: <https://bit.ly/rahultongia>

The answer to any policy question is- 'it depends'. There is a need to figure out what it depends on and get the details right. India is different because it is huge. It is the second most populous country in the world. There are multiple transitions and transformations underway. Not just decarbonization, but also changes in transportation, moving away from liquid fossil fuels and a push towards natural gas and even hydrogen. The grid of the future is a big shift, it will be more decentralized and digital.

Coal is huge, a lot of our oil is imported. Electricity dominates the energy economy as most of our fuel gets converted into electricity. Decarbonizing electricity is far easier in comparison to other systems. Fossil fuels aren't as subsidized because they pay very high tax rates. For example, you pay more in taxes than you pay for the actual petrol. The total consumption of coal in India is the second highest in the world but the per capita consumption is very low, and while the calorific value of Indian coal is low, the energy content is roughly half of the world average. Share of primary energy from coal is about half, so coal still is a very big deal in the country. Getting rid of coal would mean a bigger shock to the economy. The big question hence is not if we can grow renewable energy but rather how do we handle it from a grid perspective. The general view is that coal is becoming more expensive and RE is becoming cheaper.

Commercial electricity will always be more expensive because it is paying for end line infrastructure, resilience, backup, etc., as opposed to rooftop RE.

The problem of coal flows for power usage is structural, from a political economy perspective. Railways, for instance, is one of the key areas to figure out a solution for. All freight is explicitly over charged, coal being the largest freight. A lot of our focus, rightly so, has been on electricity, because it is easier and solar is dirt cheap. But deep decarbonizing is a much more pressing issue because it means looking away from the low hanging fruits in electricity and looking outside the electricity sector to focus on industry, heating and transport. People talk about EVs (electric vehicles) but EVs again are much harder for freight, for air.

The Chair, Aarti Khosla, concluded the session by pointing out that whenever people talk about air quality and such other parameters, they talk about health considerations, but as a consumer and outsider, no decision by the government is based on co-benefits unless they are cost-competitive or strategic. She

reiterated the need for such conversations to have in place a concrete planning for energy transition. The big thing about renewables lies in storage being the key and how will it be the driver of how and when the change will happen. It almost seems that in two years there will be a breakthrough innovation in terms of battery storage. She also added that as we are inching towards a massive transition of 450 GW of RE by 2030, a political and strategic shaking up is required to crystalize the way we are going ahead and not follow the approach that has been in practice all this while. A just and equitable transition needs to be planned to make sure it isn't just fancy jargon being used in international negotiations and that it actually informs policy decisions.

Energy Finance Conference India 2020
Theme: The Political Economy of Energy Transition

Re-alignments and Progressions in National & International Policies and Governance Practices; Are Justice and Equity the Real Drivers of the Current Energy Shifts in India?

December 11, 2020 | 3 PM to 6 PM (IST)



**SRINIVAS
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Zoom call details:
Meeting ID: 964 1278 3292
Password: 333444



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RE-ALIGNMENTS AND PROGRESSIONS IN NATIONAL AND INTERNATIONAL POLICIES AND GOVERNANCE PRACTICES: ARE JUSTICE AND EQUITY THE REAL DRIVERS OF THE CURRENT ENERGY SHIFTS IN INDIA?

Chair: **Srinivas Krishnaswamy**, CEO, Vasudha Foundation India

Speakers:

[Power sharing in India's electricity sector](#)

Ashwini K Swain, Fellow, Centre for Policy Research

[Retirement of expensive coal plants](#)

Gireesh Shrimali, Sustainable Finance Initiative, Stanford University

['Equity' in energy and climate change: Where are we in meeting it?](#)

Tejal Kanitkar, Associate Professor, National Institute of Advanced Studies

[What is the way forward for the transition?](#)

Sreedhar Ramamurthi, Environics Trust

SESSION NOTES

The session was introduced by the Chair, Srinivas Krishnaswamy, as one that would broadly give a snapshot of the current landscape of electricity and energy value change in the country while also looking at how the energy policies have time and again influenced issues concerning what is happening at the UN and other international climate arenas. The session was to also touch upon the questions of whether the policies were amply guided by the principles of justice and equity.

POWER SHARING IN INDIA'S ELECTRICITY SECTOR BY ASHWINI K SWAIN

Video Link: <https://bit.ly/ashwinkswain>

While drafting the Constitution, the constitution-makers of India chose to put electricity into the Concurrent List, which meant both the Center and the State governments enjoying a shared jurisdiction over the sector. Electricity, at the time of independence, was a nascent sector confined to a few provinces. So, it became important to have some national-level coordination for an equitable electrical development across the state. Electricity duty was viewed as a source of public finance. The duty/tax collected by the sale of electricity by this nascent

sector, even when combined to few provinces, was a sizable portion of public finance. This made those provinces demand some degree of state control. As a result, there was an arrangement where the States had more responsibilities in terms of electrical development, and managed the electricity demands of the citizens, while the Centre took control of the planning oversight.

Eventually, the arrangement led to certain structures in the power-sharing, which is seen as a see-saw relationship of control. At the state level, as electricity became an electrical commodity particularly through the '70s and '80s, the priority shifted towards managing electricity demand. 'Who gets access at what cost' dominated the state-level priority rather than focusing on electrical development. The development was not able to keep pace with the electricity demands. So, there was a natural shift from electricity being a growth enabler to electricity as a means of welfare. And the state electricity board became the agent of redistribution.

Cross-subsidy as it exists now originated in the '70s and '80s and consolidated over the decades. In the process, because electricity became vital to electoral politics, the approach to electrical development remained narrow and states tried to create a state-specific electricity island. The grid was expanded within the states without any aspirations to integrate across the state. Similarly at the central level, as the electrical development could not keep pace with demands, the Centre came with a lending hand in the '70s by getting into the process of generation itself. Another major thing that happened in the 1970s was coal nationalization. The central government already had control over fuel sources that powered electricity sector and eventually maximized its command over the sector through public capital that was required for electrical development. Not only did the budgetary allocation for power sectors get a larger share simultaneously, the Centre also ventured into creating financial institutions for financial power sector development like Power Finance Corporation (PFC). The nationalization of banks too provided the Centre control over capital investments in the sector.

As a solution to the price rise within the power sector, the Centre in the early 1990s came up with centrally designed structural reforms for the states. This reform structure was driven by the global trend of encouraging private participation in the power sector. The focus was on remaking governance and special emphasis was placed on delimiting state-level politics from electricity-related decisions and facilitating remote private sector participation for competition and choice for the consumers. Even though we had the unbundling

of new institutional structures, the DISCOMs inherited the obligations of welfarism resulting in technological gigantism getting bigger. The outcome, despite all these years of interventions, has been a low-level equilibrium which, however, is stable so far.

There is an emerging consensus that states have failed to perform and achieve reform objectives due to the lack of political will and lack of capacity. As a solution to this, there is a greater emphasis on transferring the responsibilities to the Centre. And we see in the last few years an increasing tendency towards centralization in the decision-making process. The ongoing energy transition is happening under this skepticism, and under the assumption that states have limited capacity, and so the Centre has to play a bigger role.

The transition itself poses challenges to the current institutional arrangements in the power sector. It is going to cause disruption in the present institutional and political arrangement. Irrespective of the timeline and the pace of the transition, the dependency on the power sector is going to reduce and this in turn reduces the Centre's control over a vital resource. There will be some degree of delinking from the public capital in the sector. The investments for clean energy technologies are largely coming from external financial sources than from public sector banking. Eventually the dependency on public capital will go down. Further, the current model of DISCOMs is bound to be unviable in the coming future as RE makes it convenient for consumers to shift to standalone system and migrate away from the grid.

Unfortunately, the priority at the Centre seems to be preserving public power. By public power I mean government control over the sector transition. As seen even in the RE promotion, there is a greater emphasis on gigantism. The focus is on having large scale RE as opposed to small scale or decentralized RE. There is a simultaneous emphasis on institutional stability, maintaining the current structure of institutions and institutional control which is evident in various measures taken.

The next aspect is predictable planning. While we are heading towards an uncertain future where both the demand and supply side of the electricity sector is becoming much more unpredictable, we don't factor in those risks and uncertainty in our planning process. The last aspect is that, even though there is a reduced reliance on public capital, much of the private capital is coming with state guarantees. It is a state backed capital where the state is still trying to retain some control.

Over the last two decades, particularly the last decade we have seen that States are the laboratories of policy innovations. For example, solarization of irrigation, which started as a state level experiment and eventually became a national scheme. States have provided their takes from various business models, contracting models for RE promotion. This is a valuable aspect of having multilevel governance in the sector. It provides multiple entry points in the policy innovations, which is the positive side. The other side of the story is the uneven transition across states. It reflects regional economic diversity and state capacity. States which are going for more RE are often rich, of higher economic capacity and also backed by other political economy factors like access to coal and access to transmission facilities.

There is greater Central imposition of the transition. At the beginning Center played a more signaling role by providing incentives to actors and players in the transition, but eventually that role was consolidated through hand holding. But that has eventually led to a phase where there is some big way of imposition from the Centre. Targets, regulations, and standards are all more centrally designed and imposed on the states. The fear is that such forms of coercion provoke resistance from the states or as has been seen in case of reforms, it could lead to compromised compliance.

More federalism is needed, and more federalism doesn't mean reduced goals for the Centre, rather realigning responsibilities. In energy transition Centre has to play a greater but different role. Because of the variability nature of clean energy/ RE, we need larger deep integration and more transition capacities which only the Centre can provide, since it falls under central jurisdiction. Finally, in a role which has recently picked up, but in a very different context, Centre needs to promote technology innovation and manufacturing. At the state level the focus should be on working in tandem with the states, rather than imposing a centrally planned trajectory on the state.

RETIREMENT OF EXPENSIVE COAL PLANTS BY GIREESH SHRIMALI

Video Link: <https://bit.ly/gireeshshrimali>

Given the ambitious policies of the Government of India, as well as the reduction and costs of solar panels, solar capacity in India is increasing exponentially. This is all in the context of the 175 GW renewable energy capacity to be realized by 2022 or even the more recent target of aspiration of 450 GW renewable capacity by 2030. In the context of the price or solar tariff

declining very quickly over time, this big fall largely is due to policy, because we moved from a feed in tariff to a reverse auction mechanism. And then overtime we have also seen the capital expenditure or the cost of the solar panels going down. What we start to see is that overtime as solar energy was getting cheaper, it first became cheaper than foreign/imported coal. After that as solar energy cost kept going down, solar even became less expensive than domestic coal. Now new solar is cheaper than the variable cost of coal generation in existing coal plants. If there is a pit head coal plant which is close to the coal mine that coal power will be cheap, whereas the coal power plants that are far away from the coal mines are going to be more expensive. There are also significant savings from replacing coal by solar. Along with saving more money, if these coal capacities are retired, the original investor, private or public, can be paid off through a bond. These bonds could be raised by the state government or the DISCOMs to pay off the original developers, especially private developers.

The CRC orders can be looked at for the cost of capital assumed under the coal grant and accordingly bonds could be raised to pay off the existing investor. Even though the DISCOMs might be under a contract, which is typically a capacity contract to pay for the stock capacity to the developer, the cost of paying the developer suddenly goes down because there is a need to raise a bond. This bond can be paid again by what we call late payer surcharges. The coal plant was always under a capacity contract and the retail consumers or the payers were on the hook for paying at capacity but under the new arrangement they have to only pay less; say that this is a surcharge, a special purpose vehicle that is being used to pay a bond. In short, if a coal plant is retired in 5 years, about 5.37% can be saved on the debt payment, which is obligated to the capacity contractor, the DISCOM.

With regards to implementation, coal cannot be replaced in all aspects, but what needs to be looked at is whether at a system level, supply can reliably meet demand. Numerous ongoing analysis shows that a lot of the coal capacity that exists today, may not be needed even for balancing purposes. Can the contracts of the existing coal plants be renegotiated because we need to pay off the existing investors? The answer is it is possible. The Tata Mundra project was negotiated so. On the question of DISCOMs liability, where there is liability for paying the capacity contract, can they be converted to bonds for DISCOMs or for the states. The answer again is yes and it has been done. On the question of how the bond can be paid, one could have a surcharge. The final question of importance pertains to jobs. There is a serious need to consider job losses, but

those job losses can be dealt with by repurposing the coal plant for new solar and still employing the people who have had to face unemployment owing to coal blackouts.

‘EQUITY’ IN ENERGY AND CLIMATE CHANGE: WHERE ARE WE IN MEETING IT? BY TEJAL KANITKAR

Video Link: <https://bit.ly/tejalkanitkar>

In the entire narrative of just transitions, there is a tendency to move away from the perspective of distributive justice to a rights-based framework even in energy. It becomes more about securing a certain number of rights to people and then moving on. Equity has been an integral part of the climate change negotiation positions’ of developing countries including India. There have been many debates within the country also as to whether we have taken the question of equity seriously or has simply been using the entire aspect of equity internationally to not take on commitments and to not undertake energy transition. The argument for equity, internationally, is somehow to hide domestic inaction. But this argument has been undermined quite significantly, not just internationally, but even at home.

Now there is much emphasis on equity between generations, especially in Youth for Climate Change movements in the Youth Assembly of the United Nations. For example, the argument is that you are a generation of people who have actually created the problem and it is the ‘we’, the youth, who will actually undo the problem too. This is in Greta Thunberg’s speeches and in fact runs through the entire movement as well. In some the argument of sustainability, i.e., generational equity seems to trump the argument of intergenerational equity. There were calls for a high ambition alliance, calls for carbon neutrality by 2050, i.e., net zero emission by 2050 without any differentiation. No differentiations between developed and developing countries meant that a large majority of nations were to undertake this path of rapid transition through low fossil fuel energy consumption. The indications are quite clear, that these calls for high ambition alliance is an attempt to reset the clock to 2020. We do not talk about what happened before 2020, we look forward. As part of the Paris agreement, countries are also supposed to submit long term strategies. Twenty countries have made the submission so far. China has not submitted, but has declared that it will reach carbon neutrality by 2060.

The domestic challenges, the domestic transition and the equity aspect of the transition is in the background of all that is happening internationally at the negotiations. India should have a long-term strategy secured over the remaining carbon budget. Currently the atmosphere is basically free; the fastest emitters are grabbing space and the longer we take to use atmospheric space, the lesser carbon space we have, and the faster we need to get into transition.

One also need to reflect on the Inter versus Intra generational equity. This is a per capita GDP graph for different sets of countries. At the top are the developed countries and at the bottom are countries like China, Brazil, India, Fiji. There is a huge difference and the difference has already increased. There could be arguments on whether GDP is even a good indicator and hence there exists the per capita GDP, where the difference is even wider. India is at 9000 USD per person whereas US is at 314,000 USD per person. So when we talk about just transition in these countries or about coal sector workers in these countries, we are talking about a completely different set of peoples' problems and circumstances as compared to talking about them in India. Further, there will be a reproduction of inequity across generations if inequity within generations is not addressed. We have seen this on multiple fronts in this country. The entire idea of affirmative action was in fact meant to address this. Securing a claim over the carbon space is a developmental imperative for the present and the future.

Only few of the non EIT countries have met the KP targets. Germany, the poster child of climate change mitigation has not met its targets. None of them are on track to meeting their Cancun targets. Except Japan, most of the developed world have also exceeded their carbon budget in the 2-degree Celsius budget. US has no plans for phasing out coal. There is a decrease in coal consumption, which is but compensated by gas consumption. Germany plans to phase out coal by 2038, but with no plans for natural gas or oil. Australia rejected IPCC's coal phase out even by 2050. The UK plans to phase out by 2025, but does not declare carbon neutrality, because of how a lot of their electricity generation comes from natural gas.

When we look at renewable energy addition, much more was done in 2018. India added 12 GW of solar and wind, while Germany added 6 GW of the same at a fraction when India's GDP is a fraction of that of Germany. This high amount of installation of RE has not necessarily been very easy. Everybody knows about the controversies in Andhra. The the cost for RE in four states of Southern India constitute 50% of India's RE capacity. And the additional financial burden that

has been generated just because they have to absorb all the RE projects is huge. In AP it was 350 million USD just in 2018 alone. If the coal cess too is added, that is indeed a lot of cost.

Also while talking about new solar and existing coal, we need to also reflect on the old solar plants which are very expensive. In Tamil Nadu, the average cost of solar is Rs. 6, not Rs. 2. Hence, are we also talking about getting rid of old solar? This cost is paid by states which have a large share of agricultural producers, cultivators, residential consumers, as well as small and medium industries who are paying high costs for electricity. When it comes to domestic coal, the high cost is also related to freight charges.

On the RE front, although the costs have reduced, there still exist the challenge of system costs and storage costs.

To secure fair share carbon budget shows our commitment to climate science, to not polluting, allowing for some flexibility in policy and implementations and allowing developmental infrastructure, which in turn builds resilience against climate change. Climate change is less of a pollution problem than a development problem. Discussion on climate change goes back and forth from polluting the environment to climate change as a problem. What is needed is to use existing resources, in the best possible manner, to aid the transition. But transition takes time, it requires institutional change. It also takes material change in people's lives. There is the hubris that the market will solve all problems, with little evidence that it has happened. An overall overhaul of the political economy of the power sector is the need of the hour to meet the intended targets sustainably, especially given the pandemic at hand that has triggered a deeper crisis in the energy sector.

WHAT IS THE WAY FORWARD FOR THE TRANSITION? BY SREEDHAR RAMAMURTHI

Video Link: <https://bit.ly/sreedharramamurthi>

"The rot is not coming from climate negotiations, or from air pollution, it is coming from the PM's office. In the name of development, ease of doing business, there are 1090 disruptive projects today that will take away people's lands. Out of these, 342 projects relates to coal, 390 to power projects".

The e-Suvidha being given to corporates is in tune of Rs. 2,63,229 crores. According to Union ministers and State governments eco-sensitive zone clearance will be facilitated which is as illegal as getting certification under FRA.

Further, PMO doing the job of DFO says a lot about the political economy of energy transition.

The pandemic has shown how this kind of economy cannot survive two quarters. Stranded assets and lenders have put banks into the brink and the route towards a just transition framework must address the intertwined crises around climate change, economy, work and capital. The key objectives of India's energy policy will not be fulfilled, given the plans of this government. We need to come up with solutions ourselves along with engaging in the three R's-resist, reflect and recreate.

At a global level 2030 is a deadline. All those countries who have plundered in the past and have been faking carbon neutrality, will have to reduce dramatically. We should continue to keep up that pressure strongly. We have to think about large renewables, especially the form of subsidies they are provided with. For example, according to Rajasthan government's website, in every district a lot of grazing land has been acquired already, to set up solar plants. These forms of gross inequities in the renewable sector are also evolving and hence the political economy needs to undergo a fundamental change in its nature and operation, lest the same kind of exploitation goes on. The state as a political entity is no longer being effective in most of the policy transitions. Everything is dependent on programmes brought in by the Centre.

We need to dramatically shift gears, remutate almost all institutional systems that have collapsed. What really worked in solving problems like getting migrant workers back home or restoring electricity back was personal connections. We need to look at different forms of organizing, different forms of ownership. How do we engage state governments? More comprehensively, not just in terms of their energy policy or what their energy regulator is doing but on a more fundamental level, what are the states thinking about development? Does Chattisgarh think that for the next 50 years it wants to depend on coal, or does it want to change its tact? Where is the capacity for state planning? Where does it end? Does it end at 1000 projects? These are the questions we need to ponder over.

The session ended with the Chair, Srinivas Krishnaswamy, stressing on the need for a good transition plan to be backed by relevant and current data and information; the biggest challenge in India being difficulty in accessing data and information. Despite changes for the good in the past few years, there is a lot of information that is still not available in public domain. And the huge challenge of

all this information being provided in silos gets reflected in its various impacts on several other sectors, such as water, land, etc. Hence, the chair emphasized on a common meeting ground where one can marry all the information and have it in one source.



Energy Finance Conference India 2020
Theme: The Political Economy of Energy Transition

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The Socio-Ecological and Cultural Costs of Energy Transitions; Are Sustainability and Sustenance at Crossroads in the Indian Energy Story?



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THE SOCIO-ECOLOGICAL AND CULTURAL COSTS OF ENERGY TRANSITIONS: ARE SUSTAINABILITY AND SUSTENANCE AT CROSSROADS IN THE INDIAN ENERGY STORY?

Chair: **Ashish Kothari**, *Kalpavriksh Environmental Action Group*

Speakers:

[Transitioning without legacies of disaster](#)

Shripad Dharmadhikary, *Manthan Adhyayan Kendra*

[Transitioning out of the gender disparities](#)

Bhargavi Rao, *Centre for Financial Accountability*

[Transition as an opportunity for a structural transformation](#)

Gautam Mody, *General Secretary, New Trade Union Initiative*

[Elements of a holistic transition](#)

Manshi Asher, *Himdhara, Environment Research and Action Collective*

[What would a 'just' transition look like?](#)

Samantha Smith, *Lawyer, Activist & Director of the Just Transition Centre*

SESSION NOTES

The session began with Chair Ashish Kothari raising the big question on the criteria for defining what is 'clean' and what is 'renewable', in the transition from coal to cleaner energy sources; the widely hailed RE technology. He also drew attention towards how for instance in India and many other countries sometimes big hydro projects are considered clean and renewable and even nuclear is considered to be clean and renewable. Hence, how do we even decide what is clean and renewable energy?

Who decides what sources are to be used for what purpose, in what amount, what quantity, where, how, for whose benefit and whose cost? Do the marginalized have a voice? Do they have adequate energy or are they dependent on very unsafe, insecure sources of energy? An even more complex question is, 'Does the rest of nature have a voice?' If we think it should have a voice, then how would it have a voice? Or is it just a human entered way of looking at it?

What would be the mechanics of the transition; the decision-making processes, the economics of it, the resourcing required and the investments needed? The discussions on the Green New Deal emerging in the US, UK, South Korea, and other places, focuses on energy transition, away from fossil fuels towards RE. But there lies the fundamental question of whether the transition process is in tandem with the lopsided, unequal global north-south relationships and also the whole issue of demand.

TRANSITIONING WITHOUT LEGACIES OF DISASTER BY SHRIPAD DHARMADHIKARY
Video Link: <https://bit.ly/shripaddharmadhikary>

The main pathway of energy transition lies in the increasing role of electricity in areas where it has conventionally not played a big role, like transport and cooking. There has been an increase in per capita use and consumption of electricity over any other source. There is a shift away from coal including reduction of the role, extent, and significance of coal in the supply side. But coal will remain relevant for at least 10 more years to come, if not more. There will be an increasing role of supply options like solar, maybe wind, combined with storage options like battery and pumped hydrogen. There are also many other related changes in institutional, governance and regulatory structures as well as in the physical structure of transmission and distribution systems. For example, if we have decentralized solar then we have consumers who are partly generators. There are also bound to be changes in jobs, cross sectoral impacts like the impact of declining coal in railways, and environmental impacts. The direction, nature, and extent of these are not fully known as they will depend on technological, economic, and financial factors, along with also on policy choices.

There are real fears that the transition will leave us with, especially the local communities saddled with the legacy of social, environmental and health disasters. Transition may be made an excuse to evade responsibility on all this. What are hence the cost and pitfalls of energy transition? How are transitions and the legacy of social, environmental and health disasters connected? Ensuring accountability for the social and environmental health impacts of coal and hydro is difficult even when projects are operational, and the sector is thriving. Transition will be used as an excuse to abdicate responsibility and evade action on social and environmental impacts. In 2015 the Ministry of Environment (MoE) notified new norms for emissions and water use for thermal power plants. These were to be complied within 2 years. It has

been 5 years and there has hardly been any compliance. The excuses such as 'costs of coal is very high, if we load on this cost too it then it will be too much of a burden and people won't be able to afford the cost,' 'we already have so many NPAs, banks are not ready to finance the installation of pollution control equipment and even if we manage to install them we won't be able to pay it back,' 'sector PLFs are already down so we cannot put this burden on to the sector,' are some of the most frequently made apologies. This is already seen in implementation of emission and water use norms for thermal power plants.

After coal is burnt a huge amount of ash is generated. Typically, ash ponds are seen near thermal plants, which is fly ash dumped with water. Ash generated by coal plants is three times the municipal solid waste. Last year, more than 200 million tonnes of fly ash were generated. Law required 100% utilization of this ash, but there is widespread noncompliance. As a result, there are thousands of hectares, millions of tonnes of ash strewn around. There is no plan, no funds to handle this ash legacy when individual plants are phased out. What will happen when some of the plants are being decommissioned or they become stranded assets and are no longer functional? With these kinds of piles there is bound to be leeching of the contaminants, dust pollution, and spontaneous combustion, as even these rejects can contain bits of coal.

Another issue is that of land grabs. Land acquired for the plants is now stranded. Whenever a new power plant is declared, the first thing that happens is land acquisition for the same. No assessment or clearances is required to acquire the land. But what happens when the land is acquired and the plant never comes up? Reliance power was supposed to build the 4000 MW Krishnapattanam UMPPA (Coastal Andhra Pradesh Power limited). More than 2000 acres of land was acquired for the same in 2008 but the satellite imagery from 2020 shows the land as unused. What then happens to the people who loose their land to such abandoned projects. Further, what happens when a functioning plant shuts down? The legacy of social, environmental and health disasters is abandoned ash ponds and dumps, polluted streams, rivers and groundwater, ash ponds pollution that cannot be easily removed and depleted groundwater aquifers due to mines. There are also the cratered landscapes, acidified mine waters, washery reject piles, and communities with serious health disorders.

The whole issue of addressing social, environmental and health impacts is difficult to address because these are neglected, deliberately pushed out as externalities, even as the sector is doing well. It may be a difficult struggle to hold on to some kind of technology or supply generating solutions on the way

out, and even more difficult to hold them accountable for the social, environmental and health disasters they are leaving as a legacy. Equally important is the documentation in detail of what these issues are going to be, both at the macro as well as specific project levels. This kind of mapping is very important for all the kind of likely legacy issues- land waste, pollution and so on along with the project and company-wise accountability, particularly required for the long-lasting health impacts and long-lasting contamination.

Based on all this plans, the most critical is to have financial provisions to meet reparation and remediation needs. This is the most difficult one because the existing financial provisions like District Mediation Funds (DMF) and coal cess, which was supposed to address some of these problems in the sector, are being diverted for other purposes and so such fund diversions have to be stopped urgently. Reparations for health, social, environmental impacts and for addressing legacy issues need to have the first financial claim on any residual value. Alongside, the EIA process needs to be strengthened to incorporate life cycle costs and there is a need to look into not just project based EIAs but also sectoral and strategic EIAs. Mechanisms of participation in decision-making around energy generation and distribution projects and energy use, needs to be strengthened. Appropriate funding obligations on ongoing energy sources, to address all environmental and health impacts, needs to be created. And these fund needs to be set aside while the projects are still functioning, operational and delivering.

TRANSITIONING OUT OF THE GENDER DISPARITIES BY BHARGAVI RAO

Video Link: <https://bit.ly/bhargavirao>

The village of Bandalli in Karnataka is considered so unlucky that no CM of Karnataka visits this village believing a myth that they will lose their position of power if they do. Bandalli has a population of over 9000. Recently, two solar parks of 25 MW and 30 MW power each, spread over 130 and 105 acres, have come up in the area. It lies at the foothills of the eco-sensitive zone of the Cauvery wildlife sanctuary. The MoEF (now MoE) considered that the solar plants don't cause any harm, so obtaining NOCs was easy and they didn't require any environmental clearances, EIA, etc. However, the fact that it is in an Eco sensitive zone should have ideally mandated a committee and further discussions before the commissioning of the project but none of that happened.

The local community were threatened into parting with their land. Due to speculative purchasing, their ability to negotiate a good deal diminished. They were told by the power companies that if they did not sell the land at the prices being offered, the government would acquire their land forcefully and they then would have to accept the state-offered lower prices. They were also assured a job, although none of them have gotten any jobs yet. On the contrary, the solar park has completely destroyed the local community's access to traditional grazing pastures. They have to now take longer routes due to which a lot of animal grazers have had to sell their animals. The local community has in fact slipped into deep poverty because they were unable to purchase agricultural land elsewhere and food security has vanished because they cannot grow anything on their own, and so everything has to be bought.

Further if one looks at the gender demography within the solar parks, the fact remains that each Park only employs men, about 20 in each park. While the women remained clueless about employment or land deals, the brokers hung out near the bars of the village and lured the men in to the parks with promise of jobs. The men did not even consult with the women. There were no community level discussions either. As of now most of these men have exhausted their money and are looking for jobs, mostly seasonal and far away. This has brought about an immense burden of managing the household situation on women.

The situation is further complicated with the non-recognition of women as farmers. They then have low access to loans and credits and are mostly managing on small savings from SHGs. The jobs are all for men. There are no skill building programmes for women and most women-centric training across India are for beauty parlours or teaching- everything that is gender stereotyped. There are very few instances of women learning carpentry or training to become electricians, plumbers and drivers. Nevertheless, women continue to take care of everything. There have been instances of alternate energy being provided, like smokeless chulah, solar lamps, fans, etc. Many women however do not use it because it is not suitable for their large vessels, or their way of cooking.

Men are the ones who are controlling the usage of energy. They have different bargaining powers and control the household finances, so for them repairing a smokeless chulah or getting a second LPG cylinder is not a priority. A better priority may be buying a better mobile phone. Even when energy has made its way to their homes, the three bulbs and the one fan will be in the hall or the room where the men sit. None will be in the kitchen and the women rarely have the voice to even demand. In a survey done by NSS comparing percentage

share of total time in different activities in a day, showing how much men and women do, it was shown that women spend about 16-17 hours just doing domestic work. No innovative ways to ease this have been thought of, to make that time available for herself, for leisure, to learn new things or to take care of her health.

When searching all the policies for any mention of gender or women, the word women comes across in only two policies- National Rural Electrification bill and National Draft Energy policy. Women are relegated to a box mentioning clean energy for cooking in the National Draft Energy Policy, while finding no mention in the 15 chapters of the policy. Men continue to dominate energy ministry, ministry of power, central electricity authority. Women are mentioned in the context of setting up of sexual harassment procedures, and as extracurricular activities for the setting up of the canteen management committees. Men dominate the Central Energy Regulatory Commission. Solar Energy Corporation of India, for instance, has 14 women employees out of a total workforce strength of 73. MNRE has been requested to appoint a woman Director as per the Companies Act, but it remains pending.

It has been 25 years since we have come a long way from the Beijing Declaration and more recently SDGs, the Paris Agreement also mentions gender just transitions, but very little has altered at the ground levels. Rojava ensures 50% women representation in any policy decision. Rwanda has 60% women representation. This should be built across our systems, to ensure women's participation in science-technology, engineering and math and given extra support and scholarship.

Over the last 30, 40 years several movements have come up across the country. Women's movements play a crucial role today. Challenges right now are far graver than what it was in the past. These movements need to be strengthened and collaborated to ensure that women can collectivize everywhere, can raise their voice and question authority. We also need to be very conscious about the intersection of problems of caste, class, race, religion, language and access to education and technology. Wherever we talk, we need to make sure that we have representation from everyone around us. In terms of governance, it is important to ensure women representation. There is women representation today in many cities, but it is mostly controlled by their partners. It is the men who do much of the talking. As of 2020, there are only about 25% of seats for women in all national parliaments and only 7% of women amongst the world

leaders. A gender just transition hence is going to be an uphill task, but not impossible.

TRANSITION AS AN OPPORTUNITY FOR A STRUCTURAL TRANSFORMATION BY GAUTAM MODY

Video Link: <https://bit.ly/gautammody>

There are two pathways to transition. Jobs, and addressing livelihoods. How can a socially acceptable journey towards energy transition be arrived at? We have the technological solutions, a reasonable set of answers. What we don't have is political acceptability for making the transition. Comprehensive democratic dialogues addressing people's needs of sustainability must be entered into. What has been learnt through the climate emergency is that human needs are reconcilable with nature's needs. And it is the violation of the planet's needs that is forcing the human society to the very edge of its own annihilation. Covid-19 was climate change in fast forward. How can the crisis be dealt in an acceptable, just and sustainable manner? That requires 2 things- Planning and dialogue to achieve acceptability within all sections of the society which is also the critical pathway being missed most of the time.

If coal is demobilized, there is the question of about a million mine workers who are loosing out on their livelihoods; 2,00,000 of them being regular employees of Coal India Ltd and the rest being contract workers. With private players entering the coal sector, an additional 1.5 million people are employed in thermal plants. Then there are indirect employees, townships around coal mines, power plants and the equipment of the power plant. Demobilization is thus looking to affect a significant number of workers. A just transition will have to look in to every one of these and counting every one of them.

How do we transform and transform production systems? We know through the past century that production systems are broken down into being cost effective, which is directly at the cost of the people involved, particularly the workers. The pathway has to be a dialogue and at the very starting point itself, we need to look at how we do it just. 2,00,000 public sector workers cannot be written off just because of their inflated salaries and pensions intake. Politically they form an important section of the society. The reality is there is a whole host of livelihoods that survive on the back of every public sector employee.

We need to look at how our energy needs are growing. We need to look at technology more comprehensively. What are the costs in demobilizing existing

technology?; like replacing petrol guzzling cars with electric vehicles without calculating the discharge of the lithium battery of a car? It is an inability as a society and capital's ability politically to actually not talk about jobs and livelihoods. This allows for transitions that are costlier not just in terms of what it means for the people, but also for the society and climate.

The transition cannot be dealt with just by looking at the past in question. It requires the most robust set of norms, laws and rights that could protect both livelihood and jobs. Otherwise, we end up with not just broken homes, but divided societies and communities at war with each other. This is the history of any structural demobilization that takes place. The second is about who bears the cost of the transition. It requires a fiscal system that places social justice at the heart of the transition. It is not something that can be left to the private sector. The internal combustion engine which provides for a lot of our jobs cannot be replaced with an electric car. Selling diesel guzzling Mercedes for a top of the line Tesla is not an acceptable trade-off. The transition thus represents a fundamental transformation in society, not just within the financial laws or even the labour laws, but it is fundamentally about how we consume, how we look at society, how we look at our lives and how we spend our time.

ELEMENTS OF A HOLISTIC TRANSITION BY MANSI ASHER

Video Link: <https://bit.ly/mansiasher>

The language of energy transition is that of saving the planet. Although it may sound neutral, there is the positive vocabulary connected to it; the net zero emissions, the urgency in responding to climate change and the climate emergency. Then there is also the vocabulary of it sounding like a natural shift that is being driven by circumstances, which is just a technology shift. It is saying energy, but meaning electricity. It is part of the shift to the green economy that the UN has been talking about since Rio, with the language of climate change taking on newer dimensions. What it actually is and what it hides is a way to keep the neoliberal order alive at the global level. It is technocratic and it is also about control. It is about monetization and financialization of what is left or hasn't been monetized. It is about externalization of costs, and it is fraught with geo-political implications. What we are made to believe in turn is that energy transition is for saving of the planet, when it is not just the military industrial complex that is working towards it but the nonprofit industrial complex too.

In the words of Clive Splash in Green Economy Red Herring, "In the green economy the poor are promised environmental riches, recycled materials and renewable energy can be exploited without environmental impact and technology always finds a substitute for what runs out. All things can be made compatible by ignoring the basic contradiction between every expanding human activity and a finite world. The illusion grows thinner every day, but in Rio expect to see other people wearing green tinted spectacles and waving smoked fish at each other".

What we need hence is a systems transformation and not an energy transition. The transformation has to be structural; it has to address the entire economic system, the entire system of ownership and distribution of wealth, income and resources. It is about acknowledging and addressing issues of caste, class, gender, ethnicity, regional divides, and disparities. It is about culture and knowledge systems, which includes both technology and education. On the ecological front we are talking about preserving and reviving harmonious relationships between humans and the landscape. Most importantly we are talking about a political transformation too; decentralized decision making and governance based on equity, justice, freedom and autonomy, which are based on several cultural references.

What is just transition and what are its potentials and what are the lessons to be learned and the possible pathways? People's resistance to ecologically and socially destructive development and the entire economic model and people's movements for a more inclusive, just democratic society are all part of this system's transition. The farmer's movement that is happening today is a good example of a pathway towards a transformation which could open possibilities for discussion. The fact that environmental and women's movements have lent support to the farmers' struggle and how it's not just about the farmers and MSPs as it has been projected by media and some segments, but is rather about where a country stands where 86% of farmers are small farmers with small landholdings, is reassuring and inspiring. It is about land-dependent communities, it is about food security and therefore it is about consumers including each and every one of us. The discussion on energy transition is a specialized discussion, whereas its implications are social, economic political, and hence we should not discuss it just as a technical issue?

A robust environmental governance system is needed in order to implement this energy transition, to protect our resources and nature, to ensure intergenerational equity and to ensure the protection of livelihoods of forest-

dependent and farm dependent communities. Even where energy is concerned, along with talks of decentralization and sovereignty, social justice needs to be at the centre of this process. Energy sovereignty should be the key principle when talking about energy. We will have to look at equitable distribution and ownership and decentralization of production and ownership of resources.

WHAT WOULD A 'JUST' TRANSITION LOOK LIKE? BY SAMANTHA SMITH

Video Link: <https://bit.ly/samanthasmith1>

The Just Transition Centre of ITUC was set up in 2016 after the agreements of ILO on UN Standards of Just Transition and the negotiations at the Paris Agreement. The Centre was established to help unions get good plans for just transition; a good plan for just transition that brings down CO2 emissions, methane emissions and most importantly improves the material conditions for workers.

The first point is that energy transition is happening in a lot of different countries; the main reason being the cost-competitiveness of solar power and how it costs less than coal. This in turn is changing the structures within the energy system. International Energy Agency published a report saying solar power in India is the cheapest electrical source in the world. The question about energy transition becomes 'how to do it' and 'why shouldn't we do it' as opposed to 'whether we can do it and why.'

There has to be a social dialogue with employers and governments so that the new jobs are good jobs and everyone who today works in the value chain of coal has social protection and has a pathway to dignified retirement and a good new job. This is also a self-sustaining process. The more people get good jobs in the renewable energy sector or other parts of the energy transition like building grids, community owned solar and so on, the more people will support this transition because they will see something good in it for themselves like access to having abundant clean energy and will in turn also seek jobs within the sector. So, a political constituency for energy transition is being created by helping workers get a good job as it goes along.

There is no just transition without social dialogue. There is no social dialogue without unions and no unions without labour rights. Further, while preparing for a just transition, it is equally important to not leave job creation, within the newly formed alternative energy sectors, at the mercy of the private markets as this might lead to massive dislocation of workers within communities, with the big

industries either closing down or transforming. People who are left behind then becomes an angry, unemployed constituency opposed to the energy transition. Another big pitfall lies in inaugurating energy transition without adequate social protection measures because any gigantic change in the power sector would necessitate income support for people including reskilling, healthcare and pensions.

The best example of just transition is when planning is not ahead of time and the new jobs are in places. It is important to understand generally, both in rich and developing economies that the poor and working-class households should not be left to bear the cost of transition. Energy must be kept affordable, lest there won't be access to a basic right of energy. There is also the issue around privatization and new renewable energy companies that are anti-union. In some countries, the road to decarbonizing has gone through privatizing state-owned utilities and distribution and so on. So, what is seen is government introducing privatization, citing climate crisis. At the end, not only will people lose their jobs, but also lose the ability to have effective labour rights within the privately owned companies and the ability to make sure that these are good jobs.

The potential just transition in India would look different from the way it looks in Germany or South Africa or Canada. Having said that it is at least happening and that in itself gives hope. Just transition is not an incremental vision, it not just tinkering around the edges. The idea is itself progressive and often radical. And it's the idea that every person is entitled to decent work, good job with fair wages, pension, health and safety at work along with skills and training. Also, that point of the world at work is at least in part to eradicate poverty.

Just transition also rests on the foundation of fair tax and reducing inequality and making sure poor and working-class people are supported by income support systems. Unions in South Africa have taken their pension funds and invested in the state-owned utility, Eskom, which provides 95 per cent of South Africa's power. As Eskom has had financial difficulties, unions have converted that debt investment into ownership. So now they are the part owners of the state-owned company. Eskom is slowly trying to transform itself from a public entity that only produces coal power to starting to look at how it can drive just transition by starting to produce renewable energy. Eskom has established an office of just transition within the state-owned entity and is putting together just closure plans for plants that are going to shut down; these include measures for communities and workers and coal fire powered companies slowly transforming

its assets into renewable energy assets. All of it looks promising because it is primarily worker-driven.

The session ended with the Chair, Ashish Kothari, stressing on the need to not look at energy transition in isolation but as part of a much more holistic and comprehensive transformation. The direction of energy transition has to be steered towards more producer and community-based ownership and much more localization of not just energy sources but overall democratic decision making too. Very fundamental questions need to be asked about how a just energy transition is crucially and critically linked to the current dominant challenges and issues we are faced with, like patriarchy and casteism.

ENERGY FINANCE CONFERENCE INDIA 2020

FINANCING THE GREAT INDIAN ENERGY TRANSITION: MARKET REGULATIONS, STATE POLICIES AND INTERNATIONAL FINANCIAL INSTITUTIONS DETERMINING ACCESS TO CAPITAL

DECEMBER 16, 2020 | WEDNESDAY | 3 PM TO 6 PM



Arjun Dutt,
CEEW Centre
for Energy
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Amit Jain
World Bank



**Ashok
Sreenivas,**
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Group



Vibhuti Garg,
Institute for
Energy
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Joe Athialy,
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Financial
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Justin Guay,
Global Climate
Strategy
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FINANCING THE GREAT INDIAN ENERGY TRANSITION: MARKET REGULATIONS, STATE POLICIES AND INTERNATIONAL FINANCIAL INSTITUTIONS DETERMINING ACCESS TO CAPITAL.

Chair: **Arjun Dutt**, Senior Analyst, CEEW Centre for Energy Finance

Speakers:

[Energy transition and Indian banks](#)

Joe Athialy, Centre for Financial Accountability

[A World Bank proposal for change](#)

Amit Jain, Senior Energy Specialist, World Bank

[Financing the great Indian energy transition](#)

Vibhuti Garg, Energy Finance Analyst, Institute for Energy Economics & Financial Analysis

[Implications of government tax revenues in the context of transition](#)

Ashok Sreenivas, Prayas Energy Group

[The growing case for disinvestment in fossil fuels](#)

Justin Guay, Director, Global Climate Strategy Sunrise Project

SESSION NOTES

The session began with the Chair, Arjun Dutt, talking about India's grid interactive installed RE capacity that currently stands at around 90 GW and mostly in the form of utility scale solar and wind. The Chair stressed on the fact that in order to meet the 450 GW by 2030, the annual rate of project sanctioning already needs to be doubled along with overcoming barriers like constraints on the capacity of existing sources of capital and existing and emerging sectoral risks so as to enhance the flow of capital to the requisite level.

While India has made considerable strides in utility scale renewables, in terms of the capacity deployment achieved so far, distributed renewables still remains largely untapped economic opportunity. The job creation potential, for

example, of rooftop solar is seven times that of utility scales solar per unit capacity. In rural India, the productive use of distributed renewable power is a 50-billion-dollar market opportunity by itself. However, the small size of these projects, the limited technology track record of some of these applications or the low credit worthiness of small businesses and residential consumers, means that private capital does not automatically flow into underserved market segments.

In addition, capital also does not automatically flow into nascent, but critical segments such as energy storage which are essential for integration of the massive amount of renewable capacity envisioned by India's clean energy ambitions. Ultimately the realization of India's clean energy ambitions is contingent upon how effectively policy and regulation can mitigate risk facing investors as well as address the constraints of the existing sources of finance. Policy designs and market mechanisms, either complemented or enabled by targeted fiscal support in terms of taxation and subsidies will help facilitate the flow of capital. Further policy and regulation can also augment capital flows to clean energy by disincentivising flows towards fossil fuel based generation and channeling these capital flows towards clean energy.

ENERGY TRANSITION AND INDIAN BANKS BY JOE ATHIALY

Video Link: <https://bit.ly/joeathialy>

Here the term 'bank' is used a bit generally to include commercial banks, both public and private, as well as non-banking financial companies. Investments in coal are dropping considerably. The data for the past three years shows that it fell from .35 billion dollars in 2017 to 119 million in 2019. The investments in RE are more or less steady, from 3.5 billion in 2017 to 3.2 billion in 2019. This is only those sourced from Indian banks. To put it in the perspective of capacity, in 2017, 17 GW of coal capacity was invested, while in 2019 it fell to 3 GW. The RE capacity went up from 4.5 GW to 5.6 GW in 2019.

While this looks promising, the question is how it happened. Has there been a radical change in Indian bank's outlook? Is this a reflection of their commitment to energy transition? Is this their effort to do their bit to contribute to check climate emergencies? Or a realization that RE investments are good economics and good for the environment? Or is it the recognition of mounting bad assets in coal? Or that fossil fuel-based energy systems are unsustainable and financially bad for nature and people? Unfortunately, the answer to all the above

questions is no. This is true not just for banks but also the corporations which are promoting RE projects. The biggest private coal miner is the biggest RE champion as well. State Bank of India, one of the biggest investors in RE projects, is also investing heavily in coal, including a billion-dollar loan for Adani's coal mining in Australia which has been in the news in recent times.

So why do we need investments when we talk about energy transitions? We need investments in technology both for generation and storage, grid modernization distribution and transition in industries and major sectors. But except in generation, that too in utility-scale solar parks and windmills, taking up thousands of hectares of land, one does not see large investments in other areas. The hybrid renewable energy park inaugurated by the Prime Minister in Kutch with a capacity of 30 GW, for instance, is taking over 1,08,000 acres of desert land in Kutch. That is the size of Singapore. The Prime Minister said that wasteland is used to generate this power but it is unfortunate that nobody recognizes the importance of desert in the ecosystem.

The transition in energy cannot be seen in isolation. The planning and development pathways we choose has a big bearing on how energy transition would be unfolding and hence investment will follow the pathway. Thanks to people's struggles across the globe for the past many decades, today institutions like the World Bank and Asian Development Bank have a comprehensive set of social and environmental safeguard policies. But there are policies which people affected by those projects can refer to, in order to point out the violations and try to hold them accountable. Thanks to people's struggle in Narmada, today there are mechanisms like instruction panel and compliance panel which are the accountability mechanisms within these institutions, where people can register complaints about violations. However, when it comes to Indian banks there are still no mandatory social or environmental policies to guide their investments or for people to hold them accountable.

Taking cues from their big brothers abroad, Indian banks have started using progressive sounding Greenwashing language for their investments to project them as champions of Green investments. The green bond market has gained traction since its inception in 2008. The economic services in India have become the second largest market globally for green bonds, after China, with 10 billion transactions in the first half of 2019. The objective of Green finance is to move towards a low carbon and carbon resilient economy. There is the 2 GW Pavagada solar park in Karnataka or the one in Chamarajanagar, or the WB funded REVA ultra-mega solar power project or the 30 GW project in Kutch,

built by taking away large tracts of land from farmers, causing depletion of groundwater, jeopardizing the food security of people and creating ecological damages. How can then these be termed as Green project?

Any project needs a market to be profitable and power is not an exception. India is a power surplus country. We generate double of what we consume. In addition, we make big announcements of 175 GW and 450 GW of RE on international platforms and receive applause from industry and other countries. But where are the money markets? We can't think of selling it to Pakistan for obvious reasons and we are hoping to import hydropower from Nepal. Bhutan is self-reliant with their hydropower, and it is technically very expensive to export power to Sri Lanka. While the demand of Bangladesh is only 21 GW, power plants are already being built, like Rampal in the Sundarbans and Adani's Godda project in Jharkhand, to export power to Bangladesh.

Energy transition is thus not a technofix, consumption patterns need to change. It requires a paradigm shift in the way we plan our economy. Just a fall in our tariff will not automatically shift the paradigm; it needs planning and more importantly a political will. Energy transition is basically about politics and a commitment to change. Further, change in the investment behaviour of banks cannot be limited to the energy sector, it has to be fundamental and has to keep people and climate at the centre of the investment decisions and be transparent and accountable to people.

A WORLD BANK PROPOSAL FOR CHANGE BY AMIT JAIN

Video Link: <https://bit.ly/amitjain1>

India is on a growth trajectory in the short term. Even if the pandemic is forgotten for the time being, the growth rate will come down in the next 1 or 2 years. India has a growth trajectory of 8% since the last decade or so. At the same time the per capita consumption of the typical Indian is 1000 kWh. The world global average is about 4000-5000 kWh. China is about 4000-5000, while Europe and the US is 6000 plus. If India continues to grow, the per capita consumption will increase to 1500 kWh in the next decade or so. We are looking at a huge demand in the energy sector. Energy is thus slated to grow and the more we grow, the more energy will be required.

Also, we will need more sustainable and sensible energy from renewables as committed in the Paris treaty and Prime Minister's announcement in December 2020 that we are on the path of not only meeting but also exceeding India's

goals for the Paris treaty indicates precisely the country's focus on renewable energy production. However, for all of it to take shape, financing is the key. We may have the best policy in regulations but unless we have both domestic and international financing all these targets and goals may or may not be achieved.

What is the role of multilateral banks? What is the role of the World Bank? Why do we acknowledge, for example, that India's renewable energy needs 2 billion dollars or more? A multilateral's role is not mainstream, it cannot provide such a large amount. However, with a small amount from multilaterals, for example in solar rooftop where the World Bank provided 500 million dollars, they can leverage 10 times more. The role of multilaterals like the World Bank is to be the risk taker in the market to convince the other banks to come and invest in renewable energy and help in energy transition.

India has committed to reduce its GDP emissions intensity by 33% to 35% and the Prime Minister too in his statements have mentioned an increase in this target and desirability to achieve around 40% of it by 2030. Today 21% emission intensity reduction has already been achieved and India is very much on track not only to achieve but also exceed its targets. While it is convinced that energy transition in India is a requisite, it is important that the energy generated is reliable, clean, moderate and affordable to every Indian in villages and cities. It is also important, especially during the pandemic that energy produced should be sustainable and should generate jobs. The Government of India has taken lots of steps in the manufacturing sector, and through the Atma Nirbhar campaign, and kick-started electric vehicles and e-mobility and power sector reforms, all steered towards green jobs and kick-starting the economy.

The last ten years have been revolutionary for India. Way back in 2009-10 when the national solar mission was launched, when the 20 GW target was set, it was said that this is not achievable. Three years later the target was increased to 100 GW and last year it was again brought up to 175 GW. While today solar and wind do not need convincing, some transformative steps are still needed towards energy transition. While solar parks have been a big success, decentralized energy has been challenging. Against a 40 GW target, only 5.5 GW has been achieved. In case of decentralized energy, for example in solar rooftop, the energy transition becomes simpler because it is generated and consumed. When we talk about energy transition we talk about convergence; how two or three years down the line you can have an electric vehicle charging station in your housing society where you can pass on the electrons generated by the solar rooftop into the charging facility and then charge your electric

vehicle. That is the convergence, the energy transition, we are looking for in the next 2 to 5 years.

When moving towards energy transition there must be a growth of electricity market in India. This has also been addressed in the recent amendment of Electricity Act. There will be a time when a common man, a household or industry will start generating solar and wind power and will start selling the power to the merchant and the market. That again is a part of the global transition we are heading into in the next 4 to 5 years. Lastly, 'One Sun One World One Grid' is based on a principle that the sun never sets. Sun which comes up in Japan in the morning, comes to southeast Asia, comes to India, goes to the Gulf, goes to Africa, goes to Europe and then to America. There will always be a sun and solar electrons passing from one country to another. Can there be interconnectors? Can there be intercontinental grades connecting, for example, India to Southeast Asia via Myanmar? Or India to Gulf via undersea cables? The World Bank is trying to make a road map and do a vision study, to explore three pilots, one, India and Gulf, second, India with Southeast Asia and third, India to Africa via Gulf, to explore how power can be exchanged with these countries via land or via undersea cables, once tonnes of gigawatts of solar and wind power generation is achieved in different countries.

FINANCING THE GREAT INDIAN ENERGY TRANSITION BY VIBHUTI GARG

Video Link: <https://bit.ly/vibhutigarg>

India's growth towards RE has been led by international and national commitment. India has committed up to 40% capacity of non-fossil fuel energy by 2030 and the country is blessed with some states that have vast RE potential. Till about 2015-16 coal was dominating the new capacity additions. From 2016 onwards, the RE sector has started dominating. With RE currently at 90 GW, its total share of installed capacity is at 24% and in generation it is at 9-10%. There has been a slowdown in the increase of capacity of the country's thermal power sector, particularly where they were dependent on imported coal or gas. The added RE supplied about India's 2/3 new capacity addition during the 2019-20 fiscal year. Ideally, we want it up to 90% in the coming couple of years and eventually 100% in order to achieve the Paris agreement targets or to restrict global temp rise to 1.5 Celsius. To achieve 250 GW by 2030, 35-36 GW is required annually, which will require capital flow from Indian and foreign investors.

Investment trends for 2019 show a total of 8.4 billion dollars. In 2020, April till November, investment pace slowed down due to the pandemic and even though it has picked up pace it still hasn't matched the 2018-19 and 2019-2020 pace of growth. In 2019 the biggest share were equity investments followed by green bonds, merger, and acquisitions and to some extent IPOs. Over 63% of these were in 5 RE companies- Green co energy holdings, Renew Power, Adani Green, Sterling and Wilson. The biggest investors who contributed 46% of the total were GIC, Abu Dhabi investment authority, Temasek, Total and Shapoorji Pallonji. In 2020 the deals were largely M&As, followed by green bonds and a very small portion were in debt and equity. The biggest investors this year were Global Infrastructure partners, Ayana Renewable and Adani Green and most of these investments were acquisition of other developers. In 2019 nearly half of the investments were for generalized RE, 40% to the solar sector and 10% to wind. Only 1% of the investments was for storage or pumps. Comparatively in 2020 more than half of the investment was in solar, 16% for wind and another 26% for diversified portfolio which includes both wind and solar.

Subsidies is a fiscal tool that can help drive positive changes. It can help consumers afford modern energy, bring down the cost of new technologies and encourage investors to take risk in the market. Subsidies are often expensive, they could achieve their objectives but inefficiently, taking up scarce resources which has large opportunity costs. They can also encourage wasteful use of energy, particularly subsidies for fossil fuels drive up consumption, air pollution and carbon emissions, while crowding out investments in RE and energy efficiency. 193 countries have committed to fossil fuel subsidy reforms as part of their SDG goals. In 2019, the quantum of subsidies amounted to Rs. 1.74 lakh crores. Electricity subsidies are the largest recipients, followed by oil and gas subsidies. Subsidies from 2014-2019 fell by about 75%, largely driven by low world oil prices and subsidy reforms for petrol, diesel, LPG and kerosene. There was a rise in 2019 due to higher world oil prices, and government's promotion of the use of subsidised LPG. But for the electricity sector, given the inability of DISCOMs to recover cost on account of Covid-19 difficulties, disbursement of subsidies will be much larger. Government has given a package of Rs. 1.2 lakh crores to DISCOMs for payment to generators. This is above the state subsidies on account of non-recovery of tariff. Coal subsidies have largely remained unchanged over the years. RE subsidies rose in 2014-17 and then dipped in 2017-19 because of how RE is now much cheaper. With the same amount of

money more RE can now be deployed as it does not require direct budgetary support. Electric Vehicle subsidies are also slowly gaining momentum.

Between 2014 and 2019 fossil fuel subsidies have fallen more than half, largely due to the falling oil prices and reforms in pricing. Subsidies in RE and EV have increased 3.5 times largely through policy reforms to meet capacity targets. But support for fossil fuels, in 2019, was still 7 times bigger than support to RE. More needs to be done in terms of government support for transition to clean energy. While subsidies are an important fiscal tool, they are regressive too as they benefit the rich more than the poor. The Government of India has increased consumption subsidies by underpricing electricity and subsidies to clean fuel like LPG. However, they are not well targeted. The government must work with social protection agencies, design, and test these mechanisms to target assistance without hampering the goal of energy access. These subsidies can be better targeted through direct benefit transfers to poor consumers while other consumers can be charged cost reflective price.

Globally and in India we are seeing a change in interest, with countries and corporates announcing net zero targets. The coal pipeline is dwindling with big companies like NTPC, Tatas, Reliance and states like Chhattisgarh, Gujarat, Maharashtra, all saying no to new coal. In fact, CIL has been mandated to become a net zero company and solar is part of CIL's diversification plan and has targeted to develop 3 GW of power by 2024. Indian railways is on the track to achieve net zero transmissions by 2030. Corporates like Infosys, Mahindra, Tata motors have committed to 100% electricity consumption targets by joining the Climate Group and the RE 100 Initiative. Additionally, solar prices have dropped to 2 KWPH on the account of access to low-cost global capital. India gets investments of about \$10-11bn for RE annually, when it needs upwards of \$30 billion to achieve the 36 GW annual capacity addition target. With the decrease in cost of debt, and solar module prices it is an opportune time for the Government of India to accelerate energy transition through better regulation and policy definition. Combined with investments in EVs, industrial energy efficiency, appliance efficiency (including sustainable cooling), and new applications of smart distributed energy, the demand for capital is today much higher.

IMPLICATIONS OF GOVERNMENT TAX REVENUES IN THE CONTEXT OF TRANSITION BY ASHOK SREENIVAS

Video Link: <https://bit.ly/ashoksreenivas>

The role of energy sector in general and fossil fuels in government revenues, particularly tax revenues, is not sufficiently studied. There is no clear idea as to how much money is being put into the energy sector or how much money is being taken out of the energy sector. If the government has to finance development programs it needs to raise revenue from some sources. What is the role that the energy sector is playing in this regard? This is an important issue, as pressure for direct subsidies, particularly in electricity is likely to only increase with decreasing room for cross-subsidy. Newly connected to electricity houses, agriculture will also need support. Hence, while energy transition will be gradual and play out over decades, taxation reform is a very complex process and hence good to start with early.

There are various kinds of taxes and levies on energy carriers. Only direct taxes are mostly being considered, that is taxes and levies directly applied on energy carriers. Indirect or other revenue sources, such as corporate taxes from energy companies, dividends from energy PSUs etc are not being considered. 'Other taxes' include various taxes such as entry tax, NCCD and additional excise duty etc.

Energy transition is expected to gather pace with changing economics, policy support etc. Transition will happen at different speeds. The biggest impact will be from transition in the transport sector since 83% taxation comes from here as compared to the petroleum sector, particularly the non-aviation sector. If we are looking at adding electric vehicles and other alternatives, then we must look at what happens to the taxation models. Taxation reform will be required to make up for loss of taxation (and other) revenue from the energy sector, which is mostly from the fossil fuel sector. This is a complex issue with challenges related to federalism too. Hence, though transition is likely to happen gradually, it is desirable to begin a conversation on this topic early, as it remains one of the many complex and multi-dimensional problems to be addressed as part of the energy transition.

How can one go about finding a solution and not the solution itself? Formation of an expert group on energy taxation can initially be set up under the 16th Finance Commission. This can be made a 'permanent expert group'. There should also be greater transparency on energy taxation and subsidies. There is a need for deeper analysis and studies; in particular, the state-level studies as the

picture may vary across states. Specific local situations indeed have a role to play in policy formulations depending on what state one is referring to and what kind of peak one is talking about. Those plans would also have a role to play in grid stability and balancing. One cannot also ignore the role of storage while going forward towards a phase when the share of renewables gets to a level where integration is effectively going to be a challenge. The chances are quite high that we will also be able to have good battery-based storage which can play a critical role in stability, frequency regulation and all other technical challenges that are likely to arise as RE increases.

THE GROWING CASE FOR DISINVESTMENT IN FOSSIL FUELS BY JUSTIN GUAY

Video Link: <https://bit.ly/justinguay>

Global finance is shifting away from coal. Recent data from the World Energy Investment report of the IEEFA shows a decline in coal investments over the last 5 years. The untold story about what is driving that decline is that, according to IEEFA, a fintech on global financial issues, over 142 globally significant financial institutions now have a coal exclusion policy. Those exclusion policies cover all forms of financial services, from insurance for new projects, to loans for companies building new projects, to support for the expansion on ongoing maintenance of coal facilities. This is not just relegated to western institutions; they have also tracked institutions across Asia making these commitments, and the rate at which they are being announced is growing rapidly. In 2020 despite a pandemic and a near global recession, these exclusions were announced at a rate of more than once a week, the fastest it has been in the past 3-5 years. This means that the financial industry thinks that coal is too toxic and financially risky to invest in.

That momentum is now expanding to oil and gas with financiers wanting less exposure to all forms of fossil fuels across the board. This is most evident in the new exclusion policies being announced by financial institutions. According to IEEFA, over the past 2 years, new policies covering oil and gas are growing rapidly in comparison to coal. This is an important development because while institutions are announcing new policies to exclude coal quite rapidly, they are not doing that simply as a checked box exercise. Most of the time they go back to existing policies and strengthen them over time. This is a reflection that this is not a mere PR stunt or a CSR exercise, but rather that they truly believe coal to be a toxic or risky asset.

It's not just about exclusion policies though, divestment pressure too is still growing. More than 14 trillion in assets are using the coal exit list to guide disinvestment. This is powerful not only for its impact on the cost of capital, but also because it removes the social license and the ability to operate for many fossil fuel companies who find it increasingly difficult to secure the services of the enabling industries, including the underwriters, ad agencies and others. While divestment is a broad movement, increasingly leading financial institutions are using criteria set by a tool called the Coal Exit List that sets important thresholds to define what a coal company is, and ratchet those thresholds down over time. This in turn means that active divestment is not necessarily a binary thing; companies can find themselves off this list when they get rid of coal assets in their portfolio. It also means that it is a one-way trajectory in terms of the stringency and power of these divestment decisions. Companies that avoid divestment scrutiny early on may find themselves on that list, if they do not continue to change the course of the investments in their portfolio.

But voluntary action isn't enough, there is a credible threat of regulation too. The need for outright regulation of financial flows is necessary. EU most recently passed the Sustainable taxonomy or the Green taxonomy regulation which seeks to plot the investments on a continuum of increasingly clean to increasingly dirty. In the US, with Joe Biden's victory, the topic of regulation and the power of the Dodd-Frank Act, which was passed to curb investment in speculative activities including speculative investments in fossil fuels given that we know fossil fuel infrastructure cannot survive another decade or two from now, has attracted renewed interest. There are stress tests being planned in Japan which will reveal the extent to which the Japanese public balance sheet is exposed to the risks of coal, oil and gas assets being stranded. And there are some progressive moves from Singapore too.

When investors flex, companies bend and this is most evident in the utility space, especially in the United States. The largest motivation for them has been shareholder pressure. The financial institutions that are running through the economy are increasingly becoming a political constituency that is growing in the right direction; trying to shift away from fossil fuels and into clean energy. The pressure will cause the cost of capital to rise for all fossil fuels. Coal is increasingly being singled out as the riskiest asset and therefore have the highest cost capital assigned to it. Similarly, all forms of energy face similar costs other than wind and solar. Increasingly investors are recognizing this risk and are starting to penalize for it.

But we are not yet winning. Fossil fuel finance is growing, largely due to oil and gas. Since the Paris agreement, 33 global banks have signed \$ 2 trillion for fossil fuel expansion. This is mostly for oil and gas, because the trend line for coal is down. But the silver lining is that 'while money matters to fossil fuels, to money, fossil fuels don't matter'. For instance, only 1.4% of the total loans of Chase, the largest fossil fuels financier, go to oil and gas, meaning there will not be business missed if they were to stop financing fossil fuels tomorrow. Their future is not wedded to fossil fuel projects or the profits from them. With increasing pressure from multiple places, it is most likely that they decide their future is best not wound up with the fossil fuel industry. And that is the need of the hour.

The chair, Arjun Dutt, concluded the session by pointing out that the new lending regimes also seems to be directed towards assisting large corporate loans and NPAs and hence there is a need to gauge what exactly is required in the system in process to ensure that RE doesn't go down the same route as coal. In the context of distributed renewables there has been a laudable effort by a number of international lenders to provide lines of credit, but lending typically goes towards large developers or large off takers in the name of customers. The lending doesn't trickle down to the level of MSMEs, etc. Hence, there is a need to reflect on what is required to be done in terms of checks and balances along with pondering on what are the additional efforts required to channel the flow of capital towards these underserved segments.

DECEMBER 18, 2020 | FRIDAY | 3 PM TO 6 PM (IST)

ENERGY FINANCE CONFERENCE INDIA 2020

Transforming Transportation, Agriculture and Industry in the Transition Age: A Contextual Reading of the Inter-linked Trappings within Distinct Sectors of Indian Economy



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Zoom call details

Meeting ID: 964 1278 3292

Password: 333444



TRANSFORMING TRANSPORTATION, AGRICULTURE, AND INDUSTRY IN THE TRANSITION AGE: A CONTEXTUAL READING OF THE INTER-LINKED TRAPPINGS WITHIN DISTINCT SECTORS OF INDIAN ECONOMY.

Chair: **Sarah Alexander**, Senior Adviser, SELCO Foundation

Speakers:

[Challenges of scaling up Electric Vehicles](#)

Randheer Singh, Senior Specialist, NITI Aayog

[A reflective analysis of cities, transport, and equity](#)

Dinesh Mohan, Honorary Professor, Transportation Research & Injury Prevention Programme, Indian Institute of Technology, Delhi

[Urbanization in India – A snapshot of past two decades](#)

Mahesh Patankar, Senior Advisor and Consultant, Interim India Program, RAP

[Can solar irrigation pumps deliver water neutral mitigation solution?](#)

Aditi Mukherji, Principal Researcher, International Water Management Institute

[Industry as the final frontier in our energy transition](#)

Karthik Ganesan, Research Fellow, Council on Energy, Environment and Water

SESSION NOTES

The session began with the Chair, Sarah Alexander addressing the challenges within decarbonizing the industrial and transport sectors. With the 2nd highest population in the world, India has the unenviable challenge of meeting the energy needs of a large society across various strata. At one end we have programmes being developed to improve the lives of the underserved, with reliable electricity, affordable housing financing, schemes, etc. At the other end is the need to cater to the growing aspirations of the population, in terms of jobs, entrepreneurship opportunities, modern education, healthcare, transport, mechanization of small industries, etc. Most estimates suggest that India's energy consumption is the highest growing and will be the highest by 2040. So, the challenge will be to meet this demand, while reducing carbon emissions and

ensuring energy security for all strata, in a socially, environmentally, and financially sustainable manner. India's transition is characterized by ambitious targets- to reduce emissions intensity of its GDP to 35% by 2030 and increase the share of non-fossil fuels to 40% of the total electricity generation capacity to generate 125 GW by 2022 and use only RE while increasing its share to 450 GW by 2030. At present, the RE narrative is largely limited to power generation. So, there is a need to look at integrated approaches and sustainable development that is inclusive, as we reimagine transportation systems, agriculture diversification and critical development of industry.

The transportation sector consumes about 24% of all energy consumed across sectors, mainly attributed to Indian cities that are increasingly congested, leading to traffic safety issues. There can be several responses to this, including planned public transport systems, greater land use planning, options of appropriate vehicles and transport to reduce congestion and air pollution. Agriculture consumes 90% of the country's groundwater. With groundwater levels depleting at an alarming rate, agriculture power stands at 20% of India's power consumption, the 3rd highest after industry and household. This is in part due to the absence in incentives for efficiency owing to a highly subsidized power supply. But the solution is not to curtail power to the agriculture sector, as it employs a large part of the population and is a key cog in India's growth engine. We need to instead provide energy to the sector in a more sustained manner by continuously innovating, and through transforming energy nodal points identified in these value chains to bring efficiency and value addition to the efforts of the farmer.

Similarly Indian industry has made important advances in energy and emission reduction in the past, primarily through energy efficiency of key industrial processes. However, there are particular industries that are challenging to decarbonize. While debates focus on high industrial growth, there is a need to also focus on efforts to look beyond these large industries and be transformative about equipping small industries, in the manner that encourages the development and use of efficient technologies. Finally, none of this can be done through the lens of energy and technology alone but rather with a more systemic view that includes appropriate financing, policy planning, stimulation of local industry, indigenous innovation, skilling, etc.

CHALLENGES OF SCALING UP ELECTRIC VEHICLES BY RANDHEER SINGH

Video Link: <https://bit.ly/randheersingh>

Electric mobility is not a new concept, in fact it is the foundation of the modern automotive revolution. How can electrical technology/mobility facilitate the uptake of alternative energy resources? There has been increased investment in energy storage devices on account of the investments in the auto sector, which is key to storing alternative energy efficiently. In fact, the 'time of day and time of use' strategy can help in the uptake of use of RE, especially in countries like the UK. EV is not viable from an environment perspective until RE is not utilized for charging efficient charging mechanisms. Off the grid balancing, which has been ignored for alternative energy resources till now, is now at the forefront because of EV charging requirements. The Government of India has set a target of increasing RE capacity to 175 GW by 2022; 100 GW from solar, 60 from wind, 10 from biopower and 5 from small hydropower. This might even exceed considering 130 GW has already been achieved.

It would be a good case for EV that the total cost of ownership will be at par with the international combustion engines in the long run. We need to see how this economic cycle works. The first part is demand for efficient batteries from the EV sector, establishment of removed battery swiping, charging station, and charging points. Due to long term business prospects and unavailability of quality power, charging stations will have to switch to power generation by alternative resources, i.e., solar and wind. This will in turn lead to reduction in gasoline consumption and mixed power utilization (RE and non-RE), thereby triggering a cycle leading to increased production of RE.

Coming to the high demand of batteries, there is not enough cobalt to fulfill the high demand of EV, leading to a push in urban mining. Urban mining, or circular economy is important on account of non-availability of critical minerals. About 4 companies in India are involved in this exercise and are sourcing 95% of the minerals from batteries. Battery waste management rules will be effective soon. RE can be practiced without wastage and with greater stability issues. If we achieve 60-70% collection at the retail level, that would be a major achievement in itself. These new technologies and cell chemistry innovations will take years in scaling up commercially and in doing so the biggest challenge is the capital required. Push to EV has facilitated the flow of capital into the energy storage sector. Within a decade we have seen the prices of battery or energy storage devices fluctuate from \$1000 per KWH to \$150 per KWH, a reduction of 84% largely attributed to increase in EV in USA and China. It is estimated that it will

fall to \$100 per KWH in the next 3-5 years. Some reports suggest it might even come down to \$60. This will help in transforming the sector, making things more affordable. The decentralized nature or the off grid nature of electricity is suitable for EV adoption.

The developments in electric mobility further are not only concentrated to land but has been explored and in some cases even used in waterways transport too. It is under trials for air-based transport, for passengers and freight also. This would mean the technology has to be customized and 'one solution fits all' policy is not going to be applicable.

Indian railways have announced 4 GW worth capacity of solar installation along its tracks. This will help in avoiding transmission losses, which is estimated to be around 16-17% currently. This power can then be utilized by the electric mobility segment, impacting the net fuel consumption in the automotive segment. Currently the automotive sector accounts for 99.6% of the gasoline consumption and 67% of the total diesel demand. This will also bring about operational cost efficiencies. Indian market has different needs, out of sync with the West where much of the EV transformation is taking place. Indian market is dominated by the 2 and 3 wheelers market, which makes up for around 84% of the total vehicle sales currently. These are small charging vehicles with less than 3 KW power requirement. They are the torch bearers in the transition towards cleaner energy in India.

EV is not only about batteries, but is also about the development and innovations within non-conventional sources of energy. For example, Japan is betting on hydrogen powered vehicles. Currently most of the hydrogen is being obtained through fossil fuels, including coal. The idea is to utilize sustainable sources such as electrolysis of water. An alliance of 11 Japanese firms including automakers and energy firms have pledged to build around 80 filling stations of hydrogen cells by 2022. Hydrogen is currently very expensive at about Rs. 12.4 per KM compared to Rs. 1.6-1.7 per KM for lithium-ion batteries.

Also, charging facilities cannot be created in places like Delhi where real estate prices are very high. This needs a nationalization and standardization of the charging infrastructure. Guidelines for the charging stations were released last year and currently the process of standardizing the charging points are underway. This will then ensure inter-operability.

A REFLECTIVE ANALYSIS OF CITIES, TRANSPORT, AND EQUITY BY DINESH MOHAN

Video Link: <https://bit.ly/dineshmohan>

There are two very serious issues that needs to be addressed while talking about equity. First and foremost is that women are not safe on the street and face serious problems in accessing any kind of transport (walking/cycling/public transport). The only place they feel somewhat safe is inside a car. The second issue is that the status of democracy in a country can be gauged just by looking at the state of its road. Considering the state of our roads, it can be known that our roads are completely undemocratic and democracy in our country is only restricted to voting. Even public transport has been made unaffordable for most people. According to census, on an average in all cities, between 40-50% of people walk or cycle to work. But no arrangement is made in any city of India for people to walk or cycle safely. Unless this issue of comfortable and safe walking and cycling is tackled, there is no question of equity. We keep talking about electric mobility, and spend thousands of crores on metros, which are not even available to most of the population. The marginal cost of riding a motorcycle is Rs 1 per km. A bus costs more than that while the metro is 6-7 times more than the cost of riding a motorcycle. The only people who will shift to public transport are the 50% who use motorized transport. But if 40-50% are already walking/cycling in our cities, the main objective should be to keep it that way. So that as people get richer, they don't switch to motorcycle. This can only happen if we make our streets crime and accident free.

The only way to avoid road accidents in our cities is to not have fast roads. No vehicle should go above 40 kmph and there should be at least 2 meters of walking and cycling road in main and arterial roads. Whether or not there is electric mobility doesn't fundamentally make any difference to equity. Even in London only 13% people use the underground metros while 12% of those who come into London from outer parts use the rail. In India no one is coming into the city, because businesses are shifting out. There are cities within cities. For instance, Delhi feels like 20 cities with no central node. Therefore, the metro cannot serve that purpose. At present the metro takes care of probably 3-5% of our trips and 3 wheelers also make a similar proportion of trips in Delhi.

If equity is the objective, the focus should be on making cars slower in cities and giving more space to bicycles and pedestrians, thereby making their lives easier. Just building pavements and dedicated tracks is not enough. There are businesses alongside footpaths accessed by people. It must be ensured that all arterial roads have businesses, stores, restaurants and commercial

establishments on the ground floor. If not, then street vendors and hawkers should be on the roadside and this in turn will provide business to the subaltern groups and simultaneously make women feel safe. The city must be rethought to make it more available to people. CCTVs don't make streets safer.

As walking and cycling do not pollute or consume energy, both must be facilitated amply in all our streets continuously. There are too many gated communities, which includes government offices, government buildings and institutions like IIT within the city where large tracts of land are occupied, thus increasing the distance for bicyclists and walkers who have to then go around that to make way for themselves. Younger, sensitive town planners are hence needed to make walking and cycling easier and safer.

With carbon emissions on the rise, the burden of climate crisis will be shifted to the poor. It started with the industrial belt of Delhi shifting out, leading to 40,000-60,000 families leaving Delhi as they lost their jobs. If there are no industries and businesses in the cities, the purpose of cities is defeated. Students, artists, activists, politicians, theater people, and workers all meet each other serendipitously within cities and hence transport is not a technology issue, it is a political and social issue. Technology has hardly ever solved transportation issues in a hurry. Coming back to equity, our roads show how unequal we are and if we don't start today, then none of the technological solutions will bring equity, justice or even efficient transportation solutions within the cities.

URBANIZATION IN INDIA – A SNAPSHOT OF PAST TWO DECADES BY MAHESH PATANKAR

Video Link: <https://bit.ly/maheshpatankar>

Delhi has higher GHG emissions from domestic electric usage because of climate conditions, particularly from the use of ACs in summers and heaters in winters. In Mumbai, since the net disposable income is high, most households have many personal appliances. Municipal water use is a small but rising share of the total emission. For example, in Mumbai, potable water needs to be pumped into the city since the source is hundreds of kilometers away. This needs to be captured while calculating the city's energy consumption profile. The energy footprint of water supply needs to be compared with the provisioning of the water as well. Average water supply in urban local bodies is 69.25 litres per capita per day (LPCD). Service level benchmark for water supply is 135 LPCD for domestic water use in urban local bodies. Across the world there is a push to

bring down the LPCD to 50 litres. There is even a campaign called 50 litre homes. It is important to note not only how much water we are consuming but also the increased energy consumption because of this increased water usage in urban centres.

Cities are expected to account for 70% of India's GDP by 2030. Load research looks at appliance ownership, which keeps changing based on the aspirational income that people have like lights, fans, a TV, fridge, washing machine, AC etc. There are certain strategies required to be in place to push the curtailing of this energy consumption emanating from urban households. This also needs to be done for commercial and industrial sectors but more specifically for households that are moving towards spaces like centrally air-conditioned lobbies for apartment blocks. In India there is 800 KWH per capita consumption in cities. In Mumbai, the consumption per year in 2008 was about 800 KWH per capita from urban dwellings which dramatically increased over the years to 1500-1800 KWH.

We also need to be cognizant of the air quality and health impact. In a recent study by CSE on air quality in Mumbai, despite reduction in the commercial and industrial spaces within the city due to COVID, it was found that the local air quality has deteriorated drastically. It could be partly because of the increased construction post COVID. There are public infrastructure development/construction with metros, roads, etc., being constructed in the lockdown period. When people move from slums to multi-storey housing in places like Mumbai for example, dealing with the increased consumption becomes a central issue to ponder over.

Efficient urban mobility initiatives need to be focused on. The Bus Rapid Transit Systems, for example, is currently only available in 13 cities. We should take advantage of the existing railway infrastructure to provide low-cost access from peri-urban areas to cities. For electric vehicles, we do not have enough public charging points within our infrastructure. Electrification of transportation is important to not only move people but also freight. It is all part of the plan to create infracity, last mile and freight transport systems which are dependent on the electrification of mobility itself. There have been recent government announcements about setting up EV charging stations across 69,000 petrol pumps and reduce GST to 5%. We have seen this kind of announcements before too, but there has to be a sense of urgency. It is important to create technological innovations and advancements to make sure that additional and cheaper RE is available at our disposal. The two technological innovations that can make this happen are thermal energy storages and heat pumps used for

heating and cooling applications. Further, there are a lot of cold storages being built in the hinterland and outside of urban areas. We need to make sure to come out of the long shadow of having to cater to the ever peaking power demands, in order to be able to sustainably move away from the fossil based sources.

CAN SOLAR IRRIGATION PUMPS DELIVER WATER NEUTRAL MITIGATION SOLUTION? BY ADITI MUKHERJI

Video Link: <https://bit.ly/aditimukherji>

In the agriculture sector there is an emphasis on energy transition, but not as upfront as it is in other sectors, like electricity or perhaps urban transport. But India has been at the forefront of a lot of these renewable energy work in the form of solar irrigation pumps. What then is the agricultural challenge in terms of irrigation and its carbon intensity and whether solar irrigation pumps, which is again a renewable technology, is a solution or another can of worms are some of the questions that we need to deal with. Technology can be a part of the solution but not the solution per se unless we also look at other issues such as equity and justice.

Some of the central arguments around decarbonization of the irrigation sector and agriculture focus on various sources of emissions. Fertilizer is a huge source of emission and a lot of different water management practices have large emission footprint too, the largest being the irrigation sector. India's irrigation sector is highly energy-intensive because of its high dependence on groundwater. Hence the solar irrigation pumps can play an important role in reducing the carbon intensity of irrigation. But in the process, one of the fears is that it might exacerbate India's groundwater problem. One of the major determinants of farmer's pumping behaviour, as shown in several studies, is the cost of energy pricing and how farmers are paying for that energy. For every unit of diesel a farmer pumps, on an average he/she is paying a high marginal cost since the per-unit cost of diesel is high. Experience from the subcontinent shows farmers tend to use a diesel pump sparingly, mostly only for life-saving supplemental irrigation and of course, this means their crop yield potential is not met to the fullest.

One of the apprehensions with solar irrigation pumps is that after the upfront cost, which is subsidized in a lot of countries, the marginal cost for pumping is negligible. If farmers don't have any marginal cost, does it encourage over-

extraction of groundwater? In a context like India where water is already an issue, can some of this mitigation put us in a more difficult situation? For a historical background, India's groundwater irrigation expanded along with the green revolution and contrary to popular opinion, it was the groundwater that was a major source of irrigation. There has been a slowdown in the growth of groundwater post-2000 for various reasons but it still accounts for 60% of India's overall irrigation. India is the world's largest user of groundwater with almost 1/4th of the world's groundwater being extracted in India.

There have been various positive consequences of the Green Revolution; it wasn't negative all throughout. The green revolution played a significant role in reducing child malnutrition and improving child health and maternal care. The other outcomes were poverty reduction, prosperity, higher income and food grain security in especially Punjab and Haryana as compared to other states. But on the negative side, the food security came at the cost of the groundwater resources.

Rainfall recharges groundwater year after year. But if groundwater is extracted disproportionately, rainfall cannot replenish it on an annual basis which will then lower the groundwater levels with every passing year. This is exactly what happened in many parts of India like Punjab, Haryana, Rajasthan and most of the southern States. The exception, on the other hand, is Eastern India which has a lot more of groundwater reserves because of the exceptional rainfall and the alluvial nature of its aquifers with a higher water holding capacity. However, in Eastern India the paucity of electrification has left the farmers mostly at the mercy of the diesel pumps. There is thus a clear energy divide in the country. Farmers in northwestern and Southern India depend on electric pumps while farmers in Eastern India are dependent on diesel pumps.

According to various estimates, irrigation contributes to around 8-10% of India's carbon emission; especially diesel, which is quite rampant in Eastern India and the entire Indo Gangetic belt to a large extent. Irrigation contributes to high black carbon emissions. Black carbon negatively impacts agricultural products; wheat yield for instance go down by up to 1/3rd because of black carbon. Though solar irrigation pumps have been around from the 1990s, they were expensive, futuristic and nobody ever thought them to be practical. Around 2012, India's first solar subsidy started with Rajasthan launching the program. By 2016, more states launched solar irrigation pumps with heavy subsidies of 70% in most cases, where 30% subsidy came in from the Central fund. These were promoted by different departments, like renewable energy, DISCOMs and

agriculture department. In the beginning it was more about replacing diesel pumps, as the solar irrigation pumps had started competing with diesel pumps in terms of total life cycle analysis. Right now, there are over 50,000 functional solar irrigation pumps, majority of them unfortunately in the same overexploited states.

One of the early financing evidence is that these subsidies have not really helped the needy for various reasons. Subsidies are cornered by wealthy influential farmers. For the future, it will be important to generate rigorous evidence and use it to influence policy decisions and measure the impact and repeat the whole cycle.

INDUSTRY AS THE FINAL FRONTIER IN OUR ENERGY TRANSITION BY KARTHIK GANESAN

Video Link: <https://bit.ly/karthikganesan1>

If we look at the energy transition debate today, just transition has taken up the entire space by storm, primarily because it has become more about jobs in the conventional energy industry. Industry is where there are several jobs and what adds a lot of value to the economy; nevertheless what does it entail for the transitioning process. Manufacturing sector's share in the overall GVA has remained unchanged in the last 14 years. Indian industry contributes about 15-16% and has been plateauing. We are a service-driven economy. The sectors contributing to the growth are transport equipment, iron and steel, chemical fertilizers, etc and their relative contributions have been the same. Since the industry isn't doing things differently, what does an industry transition mean? Is it only limited to things like hydrogen, or should there be reflections on manufacturing differently? Indian industry hasn't shown any signs of transition. Formal sector enterprises contributed to a significant portion of energy use and emissions in FY15-16. It is largely the iron and steel plants and chemical plants that are contributing to energy consumption. Other than that, there has been no structural shift in the distribution of jobs across sectors in the said time-period. Textile, food processing, machinery are the ones where there are jobs. Gujarat displays the highest share of manufacturing led GVA. Gujarat is a state that shines bright when it comes to industry, and the top five states in terms of overall industrial GVA are Maharashtra, Gujarat, Tamil Nadu, Uttar Pradesh and Karnataka.

Sustenance of industry needs to be thought of, but in a way that encourages sustainable energy consumption and judicious environmental footprint. Iron and steel are the largest source of GHG emissions, and also contribute considerably to output and employment. Iron and steel are the biggest emitters of CO₂ as well as the criteria pollutants like PM_{2.5}. One of the reasons why iron and steel industry continues to function the way they have been is not because they are supporting VA but because they provide input to all the other sectors where the value addition actually takes place. For instance, when Tamil Nadu or Maharashtra claim to be a transport hub for manufacturing transport equipment, all that steel is coming from several other states and so the value add is happening elsewhere, ultimately contributing to the pollution cycle.

IEA's NPS estimates indicate a sharp increase in industrial emissions. Indian industry is not really a leader when it comes to overall emissions, but the IEA's NPS estimates reveal that if things remain the same, India might become the next big source of emissions. Even if iron and steel and petrochemical industries were to be run with the best-in-class technology today, the fact remains that the overall emissions would only go from 15% of the current global budget to a maximum of 13%. Only a very marginal improvement is possible if focus is purely on energy efficiency as most of the requisite ingredients at the end of the day are energy intensive. Hydrogen in 2040 is predicted to be 1.7 dollars a kg and hence for it to replace coal, it needs to come down to about 0.7 dollars per kg. Technological innovation is a steep process because current industries are designed to use fuel in a conventional way. Changing a blast furnace to use gas for instance would require innovation; however these innovations are not happening at a pace we would like to.

Indian industry, specifically steel, is miles away in terms of energy efficiency and overall emissions footprint. When you think of industry and transition, one of the primary aspects today is industrial pollution. Are our industries being held to account for their overall environmental footprint? Only a few pollution control boards across the country today are even disseminating information on what the industries are actually up to, providing the data online and ensuring that all of that data is complied. Madhya Pradesh Pollution Control Board is perhaps the best in the country with almost no parallels anywhere else in the country. Unless there is a strong Board, it will be difficult to estimate and assess the harmful impacts of industrial pollution on environment, not just with CO₂ emission but

also with regard to the criteria pollutants that are mostly damaging the local economies and environment.

Further, if EVs garner a 30% share of new vehicle sales in 2030, it would result in a slew of gains. EVs have a great effect on emissions but at its core, EV is essentially about industrial transition. It is possible that in the future, dependency on coal or gas would decrease and the use of green hydrogen or some kind of renewable energy like solar based green hydrogen would increase. However, the problem is with the uneven distribution of solar resources across the country; for instance, the dismal distribution of such resources in states like Chhattisgarh, Jharkhand, etc., where we have a lot of industry and where all the iron ore is. How can jobs then be sustained there? How can transition be ensured within different fuel, different industry mixes?

Our understanding of the Indian industry is limited to that of large industries. Everything else is a case study of a small cluster here and there. Of course, the beauty of it also lies in it not being a homogenous entity. However, our understanding of what their energy needs are and what they produce, is very poor. A lot of MSMEs support a lot of jobs. A lot of MSME consume electricity and are not burning coal and furnace oil. They contribute to economic VA. Energy efficiency is a challenge because convincing a motor change to make it more efficient is not the easiest task. Which is why going after MSME's energy efficiency has been the holy-grail. It probably may not be possible to change the way they consume energy very differently; it may be possible that the electricity they consume comes from cleaner sources and will eventually decarbonize their input. We will see that change by 2040, only if there is a massive technological surge in the next decade which is adopted equitably and fast. Cement, as a product, for instance has stayed the same with no innovation except for in mixing for the last 30 years. Unless it is thought about as to how these materials can be used differently, industrial decarbonization remains a steep task.

The session was concluded by the Chair, Sarah Alexander, by echoing several pointers on proliferation of solar pumps playing a critical role in pushing higher dependence on irrigation in regions which are mostly reliant on rain-fed farming, in turn giving an incentive for a shift in agricultural practices leading to more groundwater depletion, the push for megacities contributing to the spiraling of urban energy consumption and how we need to preserve local jobs by encouraging the local R&D, as well as the local communities to innovate.

ENERGY FINANCE CONFERENCE INDIA 2020

THEME: *The Political Economy of Energy Transition*

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and participants
from the industry,
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along with
researchers,
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भारत ऊर्जा वित्त सम्मेलन 2020

विषय: ऊर्जा परिवर्तन की राजनीतिक अर्थव्यवस्था

दिनांक: 7, 9, 11, 14, 16 व 18 दिसंबर 2020

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30 वक्ता एक साथ छह सत्रों में राष्ट्रीय और अंतर्राष्ट्रीय
अनुभवों पर करेंगे चर्चा

भारतीय संदर्भ में ऊर्जा परिवर्तन। वैश्विक अनुभव। प्रशासन व
नीतियाँ पर अमल। न्याय व समानता। सामाजिक-पारिस्थितिक
किमत। पर्यावरण। वित्त। सेक्टर में परिवर्तन।

मुख्य वक्ता

लीसा बादुम, संसद सदस्य, जर्मनी, माकोमा लेकालकला, दक्षिण अफ्रीकी कार्यकर्ता और 2018 गोल्डमैन पर्यावरण से पुरस्कृत, सागर धारा, पर्यावरण व जलवायु वैज्ञानिक, अजय शंकर प्रसिद्ध फैलो टेरी इंडिया, प्रो. सुधीर चेल्ला राजन, आईआईटी मद्रास, डॉ वंदना शिवा, पर्यावरणविद् व खाद्य संप्रभुता अधिवक्ता, ईएएस सरमा पूर्व सचिव, ऊर्जा मंत्रालय व वित्त मंत्रालय, भारत सरकार, आरती खोसला, क्लाइमेट ट्रेड्स, लिडी नेकपील, एशियाई एनर्जी नेटवर्क फिलीपींस, सौम्या दत्ता, सदस्य सलाहकार बोर्ड - संयुक्त राष्ट्र जलवायु प्रौद्योगिकी केंद्र और नेटवर्क, राहुल तोंगिया, सेन्टर फार सोशियल एण्ड इकोनॉमिक प्रोग्रेस, थॉमस स्पेंसर, द एनर्जी एण्ड रिसोर्स इंस्टीट्यूट, श्रीनिवास नालूर, प्रायास एनर्जी समूह, श्रीनिवास कृष्णस्वामी, वसुधा फाउंडेशन इंडिया, श्रीधर राममूर्ति, एनवारोनिक्स ट्रस्ट, गिरीश श्रीमाली, सस्टेनेबल फाइनेंस इनिशिएटिव, स्टैनफोर्ड यूनिवर्सिटी, तेजल कानिटकर, नेशनल इंस्टीट्यूट ऑफ एडवांस स्टडीज, अश्विनी स्वैन, सेंटर फॉर पॉलिसी रिसर्च, आशीष कोठारी, कल्पवृक्ष एनवायर्नमेंटल एक्शन ग्रुप, श्रीपाद धर्माधिकारी, मंधन अध्यायन केंद्र, गौतम मोदी, न्यू ट्रेड यूनिनियन इनिशिएटिव, सामंथा स्मिथ, जस्ट ट्रांजिशन सेंटर, एन इनिशिएटिव आफ आईटीयूसी, भार्गवी राव, सेन्टर फार फिनैन्शल अकाउन्टबिलिटी, मान्सी आशर, हिमधरा, पर्यावरण अनुसंधान और एक्शन कलेक्टिव, अर्जुन दत्त, सेंटर फॉर एनर्जी फाइनेंस, साइमन जे स्टोलप, विश्वबैंक लीड एनर्जी स्पेशलिस्ट एंड इंफ्रास्ट्रक्चर प्रोग्राम लीडर, अशोक श्रीनिवास, प्रायास एनर्जी ग्रुप, विभूति गर्ग, इंस्टीट्यूट फॉर एनर्जी इकोनॉमिक्स एंड फाइनेंशियल अनैलिसिस, जो अत्याली, सेन्टर फार फिनैन्शल अकाउन्टबिलिटी, जस्टिन गुय, ग्लोबल क्लाइमेट स्ट्रेटेजी सनराइज प्रोजेक्ट, सारा अलेक्जेंडर, सीनियर एडवाइजर, सेल्को फाउंडेशन, कार्तिक गणेशन, कौन्सिल आन एनर्जी इन्वाइरन्मेंट एण्ड वॉटर, महेश पाटनकर, वरिष्ठ सलाहकार और कन्सल्टन्ट, इन्टरीम इंडिया प्रोग्राम, आरएपी, रणधीर सिंह, वरिष्ठ विशेषज्ञ, निती आयोग, अदिती मुखर्जी, इन्टरनेशनल वाटर मेनेजमेंट इंस्टीट्यूट, दिनेश मोहन, एमेरिटस वोल्वो चेयर प्रोफेसर फॉर ट्रांसपोर्टेशन प्लानिंग एंड सेफ्टी, इंडियन इंस्टीट्यूट ऑफ टेक्नोलॉजी, दिल्ली

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आयोजन

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