World Sustainable Development Forum
DSDS 2015

teri | BCSD
Business Council for Sustainable Development

DSDS 2015: CURTAIN RAISER

HIGH LEVEL CORPORATE DIALOGUE

Delhi to Paris: Corporate Vision on Climate Change

February 4, 2015 | New Delhi, India

CONTENTS

Message from the Hon'ble Prime Minister of India on the occasion of the 15th DSDS

Mr Narendra Modi
Prime Minister of India

प्रधान मंत्री

Prime Minister

MESSAGE

I am happy to learn that The Energy and Resources Institute – TERI – is organizing the Delhi Sustainable Development Summit (DSDS) – 2015 on the theme "Sustainable Development Goals and Dealing with Climate Change."

In order to be effective, our efforts at poverty eradication and sustainable development must take into account the challenges posed by climate change. I am of the firm opinion that India should view the current global focus on climate change as an opportunity to decisively change the quality of life of its citizens.

We should also work towards a shift on emphasis from "carbon credit" to "green credit", which takes into account initiatives towards clean energy generation, energy conservation and energy efficiency.

I hope the deliberations of the DSDS will lead to fruitful and productive outcomes. I wish the organizers and participants all success

(Narendra Modi)

03 February, 2015
New Delhi

Acknowledgements

Tackling climate change should be an all-inclusive, multi-stakeholder process, in which the active participation of the corporate sector is essential. It is necessary to enhance existing, as well as new initiatives; to maximize the impact, and contribute significantly towards the process. India's participation in climate negotiations assumes greater significance as it is the world's largest democracy. The frequency and intensity of climatic events are increasingly affecting the country's economy.

The High Level Corporate Dialogue (HLCD) 2015 convened as the curtain raiser to the Delhi Sustainable Development Study brought together over 100 top CEOs to brainstorm types of capital relevant within the concept of corporate sustainability namely economic, natural, and social capital. The discussions included ten major themes wherein actions on part of the corporates can help address challenges posed by climate change. The format of the Dialogue facilitated an open and interactive discussion. The thematic breakaway groups deliberated on the challenges and opportunities faced by corporates with respect to each of the theme and identified short-term & long-term goals for Corporate India to action.

The ultimate goal of these deliberations being to define an Indian Corporate Vision Plan which can be submitted to COP 21 as a framework to be emulated globally.

We were privileged to have in our midst Mr Suresh Prabhu, Hon'ble Minister of Railways, India; Mr Jayant Sinha, Hon'ble Minister of State for Finance, India; and Dr Bibek Debroy, Member, NITI Aayog. Deep gratitude to Mr Paul Polman, CEO, Unilever & Chairman, WBCSD; and Dr Hendrik O Madsen, Group President and CEO, DNV-GL for sharing their valuable inputs on the occasion.

HLCD 2015 was made possible by the magnanimous support of all our partners – YES BANK, We Mean Business, Ingersoll Rand, Hitachi, BMW, GNFC, GEDA, WASMO and DNV. Their encouragement and commitment was critical in ensuring the success of the Dialogue. A special thank you to YES BANK for championing this endeavour. We would also like to acknowledge and appreciate the enormous support and encouragement shown by our media partners CNN IBN, Hindustan Times, MINT, and SciDev.Net. We are most grateful to Mr R Mukundan, Managing Director, Tata Chemicals Limited & Chairman, Executive Committee, TERI BCSD and Mr Venkatesh Valluri, Former Chairman, Ingersoll Rand (India) Ltd for making time and guiding the Theme Leads at every step in the preparation for the Dialogue.

We appreciate the enthusiasm of the Chairs, Theme Leads, and all participants in contributing to the engaging discussions and making the Dialogue a success.

Finally, the High Level Corporate Dialogue would have not been a smooth show without the guidance of Sir Jonathon Porritt, Founder, Forum for the Future, who Chaired the Dialogue with elan.

The BCSD (Business Council for Sustainable Development) and the DSDS Secretariats as well as colleagues from across the Institute deserve credit for their untiring efforts, cooperation & support.

AGENDA

High Level Corporate Dialogue 'Delhi to Paris: Corporate Vision on Climate Change' February 4, 2015 | New Delhi	
0930 – 1015	**Inaugural Session** **Welcome Address** • **Dr R K Pachauri**, Director-General, TERI & President, TERI-BCSD **Special Addresses** • **Mr R Mukundan**, Managing Director, Tata Chemicals Limited & Chairman, Executive Committee, TERI-BCSD • **Mr Rana Kapoor**, Managing Director & Chief Executive Officer, YES BANK Limited & Patron Member, TERI-BCSD **Keynote Addresses** • **Dr Henrik O Madsen**, Group President and Chief Executive Officer, DNV-GL • **Mr Paul Polman**, Chief Executive Officer, Unilever & Chairman, WBCSD **Release of TERI-BCSD–YES BANK Knowledge Papers** **Inaugural Address** • **Mr Jayant Sinha**, Hon'ble Minister of State for Finance, India **Vote of Thanks** • **Dr Annapurna Vancheswaran**, Director, Sustainable Development Outreach Division, TERI
1015 – 1130	**Thematic Breakaway Sessions** **Brief from the Chair: Sir Jonathon Porritt**, Founder Director, Forum for the Future **Themes** • Adapting to the Impacts of Climate Change • Efficient Waste Management • Ensuring and Expanding Access to Energy • Ensuring Water Availability in a Changing Climate • Expanding the Use of Renewable Energy • Financing the Energy Transition and Sustainable Development • Improving the Efficiency of Energy Use • Low Carbon Technologies in SMEs • Sustainable Buildings • Towards Sustainable Mobility

1130 – 1315	**Concluding Session: Reporting of Thematic Breakaway Discussions** **Chair: Sir Jonathon Porritt**, Founder Director, Forum for the Future **Panellists** • **Mr Susheel Kumar,** IAS, Additional Secretary, Ministry of Environment, Forests & Climate Change, India • **Dr Bindu N Lohani**, Vice-President of the Asian Development Bank (ADB) for Knowledge Management and Sustainable Development • **Dr Henrik O Madsen**, Group President and CEO, DNV-GL • **Dr Ajay Mathur**, Director-General, Bureau of Energy Efficiency, India • **Dr R K Pachauri**, Director-General, TERI & President, TERI-BCSD • **Mr Onno Rühl**, Country Director, The World Bank, India Release of TERI Environmental Survey–**Corporate Environmental Practices 2014**
1315 – 1430	**Special Luncheon Session** **Moderator: Mr Karma Paljor**, Business Editor, CNN-IBN **Guest of Honour: Mr Suresh Prabhu**, Hon'ble Minister of Railways, India
1830 onwards	**Reception** **Moderator: Ms Shereen Bhan**, Managing Editor, CNBC-TV 18 **Guests of Honour** • **Dr Bibek Debroy**, Member, NITI Aayog • **Mr Paul Polman**, Chief Executive Officer, Unilever & Chairman, WBCSD **Pre-launch of *Global Sustainability Development Report 2015 – Climate Change and Sustainable Development: Assessing Progress of Regions and Countries***

INAUGURAL SESSION

Introduction to the
High Level Corporate Dialogue

The High Level Corporate Dialogue (HLCD) was organized by TERI Business Council for Sustainable Development (BCSD) as a curtain raiser to the 15th Delhi Sustainable Development Summit (DSDS). In order to address issues related to sustainable development and to promote leadership in environmental management, social responsibility, and economic performance, TERI-BCSD has been organizing the corporate dialogue to bring together business leaders from India and around the world to deliberate upon these subjects on a common platform, since businesses and corporates play a key role in achieving the goals of sustainable development. The High Level Corporate Dialogue (HLCD) 2015 with the theme, 'Delhi to Paris: Corporate Vision on Climate Change' provided a platform to industry captains to brainstorm ideas for conducting business while protecting the environment.

The Dialogue featured Thematic Breakaway Sessions, addressing ten environmental issues concerning the corporate sector. Chaired by Sir Jonathon Porritt, Founder Director, Forum for the Future, the breakaway sessions drew a wide range of priorities and conclusions that were observed across the groups.

Welcome Address

Dr R K Pachauri
Director-General, TERI

"I believe that we have arrived at a juncture where it is not merely governments, civil society, research institutions, and academia that are going to bring about change. I think, the vanguard of the change will be the corporate sector."

Hon'ble Minister of State for Finance, Shri Jayant Sinhaji, Mr Paul Polman, Dr Madsen, Dr Rana Kapoor, Mr Mukundan, my colleague Dr Annapurna Vancheswaran, distinguished ladies and gentlemen, it is a great privilege and a very deep pleasure for me to welcome all of you. The very fact that we are holding this meeting on a theme that is clearly going to have a profound impact on the future of human activities and the state of this planet, says a lot. I believe that we have arrived at a juncture where it is not merely governments, civil society, research institutions, and academia that are going to bring about change. I think, the vanguard of the change will be the corporate sector. I had said earlier that if the corporate sector leads, then clearly governments and civil society cannot be far behind. This indeed is a very heartening development. I take personal satisfaction and pleasure in watching where we are going and looking at the entire history of this journey, it was really in 1989, that TERI got into the business of climate change. As a matter of fact, in 1988, I was the President of the International Association for Energy Economics which is a professional body and at that stage it had over 3,000 members including the chief economists of all the major oil companies, the chief executives of electric utilities and in the annual address, I addressed this gathering and told them that energy economists need to now focus on the issue of climate change. Of course, the whole audience thought that I had gone mad because I was supposed to be the President of an organization that believed essentially in status quo. Then, we launched a major activity in TERI on the study and research of climate change and I must say, we were very fortunate that at that stage, Ambassador Dasgupta, who is now a Distinguished Fellow at TERI was then with the Government of India and was a very active member of the Inter-Governmental negotiating team that was developing the UN Framework Convention on Climate Change. We provided continuous inputs to him. I was really enthused and delighted at the fact that climate change was getting attention and it culminated into the UN Framework Convention on Climate Change in 1992. After I got involved with the IPCC, I was a lead in two working groups of the Second Assessment Report. For the Third Assessment Report, I was the Vice Chair of the IPCC and then took over as Chairman of the IPCC in 2002.

I am mentioning this because clearly at that point in time, there was a great deal of pessimism that the world would not change and climate change would become progressively more serious, as indeed we have found in the most recent, Fifth Assessment Report, of the IPCC. Just to give you a few facts, if we don't do anything about climate change, and if we don't add any efforts to mitigate emissions of greenhouse gases, we could get temperature increase by the end of this century of up to 4.8°C. The difference in average temperatures between the ice age and the inter-glacial periods was no more than 4°C or so. So, clearly we are going to bring about a major disruption of everything that sustains life and has promoted life on this planet, if we allow this level of climate change to take place. Sea level rise, if we do nothing about this problem, will be up to 0.98m by the end of this century, which is close to a metre and that means we are going to alter the geography of this planet. One point I want to emphasize is that, climate change is not merely a smooth and steady increase in temperature but a disruption of the climate system and we have found in the IPCC that extreme events, particularly heat waves and extreme precipitation events are significantly on the increase. The intensity and frequency will increase much further by the end of the century unless we do something about it.

It is not merely economic losses, which incidentally have been estimated between the period 1980 and 2008 as varying from a few billion dollars a year to $200 billion a year, which took place in 2005, the year of Hurricane Katrina. But you cannot monetize all the losses—what about the loss of cultural heritage, what about the loss of lives, what about the fear that people live under. Our Prime Minister recently went to Fiji and mentioned that he met the leaders of the small island states in that location and found all of them living in a state of fear. Therefore, I think that these are issues that really cannot be monetized. Therefore, not only is there rationale for the corporate sector to worry about the impacts of climate change, all of which is going to certainly affect economic activities but also the fact that society itself will have to bear the burden of the impacts of climate change and therefore it is going to affect corporate activity.

What is even more important is the fact that if the world is going to move towards a low carbon future and mitigate the emissions of greenhouse gases, there is a huge amount of opportunity that the corporate sector will be able to reap the benefits of. Having said so, I am really very happy that we have this kind of response and I just want to end by telling you something from the New York Times, where they talk about the risky business project which incidentally has some of the leading lights of the corporate sector that are part of this. He mentions Mr Greg Page who is the Executive Chairman of Cargill; Hank Paulson who was Treasury Secretary, from Goldman Sachs earlier; Mr Ruben and a whole galaxy of these iconic leaders of the corporate sector who are now focused on climate change. So, I would only like to end by welcoming you and appealing to the leaders of business present, that India, and of course, all the countries that are represented here have to take the lead because this is not only going to be a major challenge but an enormous opportunity to bring about a safer, cleaner, and a more sustainable form of life on this planet.

Special Address

Mr R Mukundan
Managing Director, Tata Chemicals Limited

> *I think our lifestyle has gone beyond the supporting status of this planet and whatever we can do to make that shift in change will lead to a sustainable planet in the future.*

I am really delighted at the massive gathering we have. When we started this exercise, one of the things we were wondering about was the response from the corporate sector. Dr Pachauri clearly highlighted that one of the key participants in the great move forward in this dialogue and discussion and actual delivery of the climate change initiative is going to be the corporate sector, we need to lead this from the front and have been putting in efforts to try to galvanize the corporate sector to come to the centre stage. For me this is the first time at the World Sustainability Forum which is held every year and this is the year I take over as the Chairman of the BCSD and I am really delighted that we have chosen the right platform and the right forum. One of the challenges we are going to face of course is how we can keep this engagement, which has started with such a good response on an ongoing basis, so that when we lead this up to Paris, it has a very tangible impact on the discussions and on the ground.

Broadly, the involvement of corporate sector in sustainability has been a long standing effort within India and in fact TERI itself, as an institution, was long supported by Tatas and used to be called as Tata Energy Research Institute. For me, it is doubly delightful because my predecessor Dr Darbari Seth was one of the ardent supporters and proponents to make sure this institution became one of the leading think tanks of India and I am really delighted by the position TERI has achieved today under the leadership of Dr Pachauri. BCSD itself was set up by TERI in 2001 and this was to place the corporate sector right at the centre of sustainability. I just wanted to highlight that presently in India, we have got over 100 corporate members and they represent varied sections of the Indian industry. BCSD provides a very independent and credible platform to corporate leaders to address issues related to sustainability and sustainable development. We also want to promote other two aspects which is social responsibility combined with economic performance. Nowhere are we saying that economic performance needs to be subservient. Actually, the centrality of economic performance would be achieved through sustainability and social engagement. We engage with international bodies, government ministries, departments, and other associations and actually intend to impact the entire supply chain at the various points of fulcrum of the supply chain.

TERI-BCSD is a global network. We have partnership with WBCSD based in Geneva and in some of the areas we work are co-creating business solutions, sustainability advisory services, training and capacity building, business responsibility and transparency, and policy advocacy. Over the years, we have had many leading corporates including 14 Tata companies, which have been members, and the first challenge we have here today, is the first of the series which leads up to tabling 'Delhi to Paris: The Corporate Vision for Climate Change' document at COP21 in Paris. We hopefully will deliver it on time. Beyond that, I would certainly say that there is a need for the corporate sector to do two things which are central. Firstly, we need to play a leadership role in this change and secondly, we need to engage with the community to have a change of lifestyle. I am a firm proponent that whatever we do on the larger scale cannot have a major impact unless we change our lifestyle. I think our lifestyle has gone beyond the supporting status of this planet and whatever we can do to make that shift in change will lead to a sustainable planet in the future.

Special Address

Mr Rana Kapoor
Managing Director & Chief Executive Officer, Yes Bank Limited

> *A bank can play a tremendous influencing role in organizing corporate actions in coming out with risk principles which can help achieve our common goals.*

This High Level Corporate Dialogue is undoubtedly the most significant platform that brings to the forefront, some of the most important developmental challenges that India faces. I am certain the discussions will be highly meaningful in coming out with some tangible outcomes, some action steps which can progress our way to Paris by December this year. To me a session like this is almost like the start point of a marathon where we all get together with our diversity, with our competitive instincts, and then we run in a sort of a mania with a common objective to get towards a common goal in spite of being competitors. To me this needs tremendous perseverance, tremendous dedication, a die-hard spirit, and the kind of stamina that Dr Pachauri has demonstrated over many decades. We need such a sustainable mania which can steadily take us towards our goals.

This conference in a way has become the bastion of positive thinking, positive outcomes, towards coming out with common goals in our aspiration in achieving sustainable objectives.

I represent, still the youngest bank in the country, which is just about 10 years old and am very pleased to report to you that as a bank from the very inception in 2004, we, by choice, decided to incorporate the principles of sustainability in our business model, not just as a marketing strategy but truly in terms of the genetics of the bank. We coined a term called responsible banking. It has taken us 10 years through the global crisis, through the Eurozone crisis, India's own crisis over the last three odd years which is improving now, and we have been able to demonstrate the tenacity of mitigation, adaptability, and resilience over the last one decade as a relatively young bank. Needless to say, there are programmes that we have come out with, which will be difficult for me to elaborate in the course of the proceedings but just community engagement in itself has been a key differentiator for our rather young bank. I would like to believe that as public trust institutions, banks, and financial institutions are baskets of the economy, and a bank can play a tremendous influencing role in organizing corporate actions in coming out with risk principles which can help achieve our common goals.

I would like to address the corporate vision on climate change from a banking standpoint. First and foremost, I believe that there are few key issues that banks can work towards in terms of our accountability and discussions in Paris. First, we need to recalibrate our risk management to integrate climate considerations in the way banks access and approve risks at Board Committees in our risk management architecture. I have reason to believe that pricing of such loans should also reflect the underlying risks of climate change manifested in some of the corporate businesses that we lend to. Some of the banking products that we sell may have insurance underlying it, but the potential impact of climate change on an event also needs to be factored. I have reason to believe that just as we rebalance portfolio in view of potential risks from climate change, for example, financing agriculture crops can change with falling productivity of a few crops; predictions on sunshine can change the cash flow of solar farms, similarly, this needs to be reflected in the way banks make decisions.

The second point is that driving financial innovation in itself and as we seek new opportunities, too requires and warrants how we are going to create new financial models particularly as we see new opportunities surface. Coincidentally, the Ministry of Renewable Energy has hardwired renewable energy objectives by stating that they wish to achieve 100,000 MW of solar energy by 2020; 60,000 MW of wind energy; 5,000 MW of small hydro; and 10,000 MW of bio-energy. To me, this in itself is an opportunity for the banks.

Financing disruptive technologies is an opportunity in terms of how we can achieve our climate change goals. If, for instance you see the kind of financial inclusion benefits M-PESA has been able to generate in Kenya, and compare Yes Money to it, for instance, you will see that a relatively nascent programme has been able to achieve tremendous penetration in the urban and rural markets for instance.

India has not seen the advent of Green Bonds, but our bank in the course of this month, will be launching the Green Bonds in India. I also like to believe that the opportunities related to the National Clean Energy Fund of the Government of India can be reoriented towards achieving some of our climate goals.

The next point I want to make is transparency in reporting. The reporting in our annual reports and governance should maintain accountability and should also reflect the manner in which banks and institutions actually handle such exposures.

My final point is about designing the future rather than worrying about the past. This in itself means creating management frameworks, risk architecture, looking at leadership structures, as well as employee incentives to reflect the advent of such risks.

Finally, I would like to believe that there is tremendous opportunity in adversity and as was stated earlier by Dr Pachauri, there are two or three points on which I would like to conclude. Building a balanced world is challenging but no one has all the answers. As the economies develop and continue to focus, financial institutions play an important role in meeting the growing global demand for capital. Meeting the challenge of taking action on climate change requires prudent financial innovations, skilled people, technical prowess, and responsible stewardship. Through this platform, I request all of us to look at how banks need to play this role of responsibility and accountability, particularly in India, where some of these risks are growing quite rapidly and I am sure that with our inputs, the Indian banking sector in itself can make a significant difference.

Keynote Address

Dr Henrik O Madsen
Group President and Chief Executive Officer, DNV-GL

"Growth and sustainability need not be in conflict. In fact, we have seen that sustainability drives growth through opportunities for innovation, cost efficiency, and risk management."

We are able to understand the complex and systemic risks that are surrounding us. This means that we know where we are headed if we do not change our course. We know the effects that climate change will bring. We know that we use more of the earth's resources than it can regenerate. We may know less of the effect of the loss of biodiversity, but we can only assume that this is serious. And the cost of inaction will be higher than the cost of action. However, if we succeed in looking at these global risks through the lenses of opportunities, these can also be truly exciting times. I firmly believe that the greatest risk that we as a society face right now is not seeing the opportunities that are inherent in the transition to a safe and sustainable future. Limiting ourselves by looking only at the risks to the lifestyles and business that we know of today, will definitely cloud our vision.

This year marks two important events—the Sustainable Development Goals will be published and hopefully embraced from all corners of the world and the COP21 in Paris in December will hopefully lead to commitments to reduce emissions of greenhouse gases to stay within the 2°C limit. We believe that business must be part of creating the solutions together with government, academia, and civil society and business is increasingly being accepted as a vital part of creating solutions. Also, many companies and business leaders all over the world are embracing the concept of sustainable development and growing their business in line, herewith.

Growth and sustainability need not be in conflict. In fact, we have seen that sustainability drives growth through opportunities for innovation, cost efficiency, and risk management. Companies must be purpose driven and should openly state the role their company plays in serving the communities and citizens in which it operates and makes profits. Only when this purpose is aligned with the long term interest of the community, will the company have a long and prosperous future. In order to get there, we need to break the link between the pursuit of human ambition and the depletion of natural environment. We need to reinvent growth and create a growth model that is fit for the 21st century. But, I believe that first, we need to shift to a new strategic mindset, a mindset that can transform the risk that we know of into opportunities, which is why, we, together with the UN Global Compact and the Monday Morning Global Institute have initiated the Global Opportunity Report. The very first edition of the report was launched in Zurich in January 2015. With this report, we and our partners wish to replace the concern instilled by risk with the confidence inspired by opportunities. The Global Opportunity Report offers an ambitious contribution to this. It is an urgently needed guide to global opportunities for building a safe and sustainable future, a navigation system for global change makers enabling us to move faster and safer towards solutions in complex, fragile, and uncertain environments. For us at DNV-GL, the Global Opportunity Report demonstrates our vision of having a global impact for a safe and sustainable future and it certainly adds inspiration for our own people, our customers, and stakeholders.

Winston Churchill once said, a pessimist sees difficulty in every opportunity and an optimist sees opportunity in every difficulty. So, let us be optimistic and join forces on a journey towards new strategic mindset opportunities, open innovation, and co-creation.

Keynote Address

Mr Paul Polman
Chief Executive Officer, Unilever & Chairman, WBCSD

> *Business has to play a crucial role and certainly has to step up to the plate to address these twin challenges of climate and development.*

What TERI has built in the last 15 years is remarkable, but it is only possible by personally acknowledging Dr Pachauri for his leadership, both here at TERI and also in all of the things that we are working on at the global level. The work that the IPCC has done is obviously enormous, therefore, I think that we owe him an enormous debt of gratitude. I have personally seen an enormous change in the discussions, a change in the level of knowledge that CEOs have around this topic, be it at the UN Climate Summit in New York, or at the World Economic Forum just two weeks ago, or many of the other things that we are doing that leads up to the COP21. I think that the level of education, the level of confidence to do the right thing is only possible because of the enormous education that has happened via him at the IPCC and the courage that they have shown by putting in a lot of science into the public debate, sometimes at personal risk. It is also a great pleasure to be here in India, where the perspective of the people is always very refreshing. The mood of India has changed for its betterment and it has also started thinking about the implementation of actions required for development.

In India, sustainable development has never been seen as a challenge but as an opportunity for the right investments in the future. The year 2015 is a critical year and we are very fortunate in fact that in the same year, we have to deal with the development goals post-2015, which are the followers to the Millennium Development Goals. Not surprisingly, now people are talking about calling it Sustainable Development Goals. People understand that if we don't attack the issues of sustainability, there won't be any growth. Planetary boundaries in many countries of this world are restricting the growth and at the same time the opportunity in December to conclude, hopefully, an ambitious agreement which is called the COP21 on climate change.

Business has to play a crucial role and certainly has to step up to the plate to address these twin challenges of climate and development. They are actually different sides of the same coin. Now, the role that the Indian business plays is absolutely crucial. Soon, you are going to be one of the fastest growing economies, you are the second biggest economy and there is no reason why in the near future you cannot become the biggest economy. If India does not play a key role in addressing these challenges, we won't be able to solve it at the global level. Globally, contrary to what you might read in the papers, where the minority is vocal and the majority is still too silent, the majority of businesses want our governments to act. They want to be a constructive part of the solution and increasingly so. Everywhere I go, I see that businesses are stepping up to the plate and actually driving their corporate strategies increasingly to a more sustainable strategy for prosperity and economic growth.

Not surprisingly with the data revolution that we have seen, the evidence is also overwhelming. A recent study by the Oxford and the Smith School of Enterprise and Environment found that companies which really internalize the socially responsible standards are actually companies that have a lower cost of capital. You are talking here about risk mitigation, cost reductions, and about being a responsible company. A lower cost of capital translates into higher profitability—everything being equal and obviously offering a better share price. This is increasingly appealing to even the hard nose capitalists who might not believe in some of the things that we are talking about. At least we have the facts here to support it financially. It is therefore, not surprising that when we were in New York at the climate summit, we got over a 1,000 companies to sign the World Bank statement for a price on carbon. In fact, 175 CEOs had attended the climate summit. Never before have there been so many CEOs, obviously outnumbering the Heads of State, that were there sending a clear signal that now is the time to take action. Many of these companies actually are reporting on carbon. About 80 per cent of the top 4,000 companies are actually reporting on carbon and 200 already have plans to reduce well beyond the 6 per cent a year standard to stay below the 2°C limit. Actually 50 of these top 200 companies have targets to mitigate totally, the effects of carbon well before 2050.

Not only are companies and CEOs stepping up to the plate, the financial community is waking up as well. If you would have read what happened in New York in September 2014, you would have seen that 24 trillion of capital, the big firms that we are talking about are calling for a price on carbon as well, increasingly putting their investment portfolios where their mouth is. Larry Fink has been very vocal on having more transparency, looking at the longer term, putting prices on carbon. The financial community is stepping up with their investments as well. Mr Rana Kapoor talked about the role that the financial market plays in catalysing the move to sustainable energy. We see these investments now, 2/3rd of the investments are actually coming from the private sector, 50 per cent of the capacity increase in the energy sector, globally, is already in green or sustainable energy. Not surprisingly 40 countries in the world already have a lower price for sustainable energy than they have for carbon based energy and that is rapidly becoming true in India as well.

Now, it is not only the CEOs and the financial community but even consumers that are stepping up. We have seen 300,000 people in the streets in New York and in many other places in the world demanding action. Dr Pachauri already rightfully mentioned the *New York Times* article. What is actually remarkable about this article is that this is happening in the US, which you would not have thought about five years ago. These articles would not have appeared in any of these newspapers. Now, according to the same article, 83 per cent of American consumers—so it is

not a question of the left or right or Republicans or Democrats—believe that if nothing is done to reduce emissions, global warming will be a more serious problem in the future. That is risky business indeed and it will affect the elections increasingly so. From the US to China to Europe, we see major countries making commitments to get to this net zero emission by the end of the decade or I would submit that we need it earlier, since the momentum is building at a higher pace than at any time in history.

We have embarked on the road to Paris and frankly, time is ticking. A lot of the hard work has already been done but we need to keep the pressure up. Nations are hard at work preparing their submissions. They are actually Intended Nationally Determined Contributions (INDCs), individual targets. The question is if all these individual targets are going to add up to get to this goal of net zero emission and the answer is that it is most likely not going to. I don't know where we will come out, we will see that in June 2015, but chances are that we will not add up to stay within the 2°C limit. This is really what I want to talk about: if the sum of all these targets does not add up to net zero emission by June 2015, what do we need to do as a business community to be sure that we get these ambitious agreements in December 2015? That requires hard work and it requires the involvement of all of us, including the business community here in India. I would even submit that without the business community in India, I would not have the confidence that we would get an ambitious agreement in December. This platform will allow you to really see if you can share with each other your ambitions, your commitments that you make in your companies but more importantly if you can add up these commitments and these actions to something bigger than what we each are individually able to achieve. If there is a large voice from India and some clear signs that you also want to go well beyond what is currently committed to stay below the 2°C limit and also if the business community speaks up at the same time, I believe we have a fair chance to get a decent agreement in Paris for the benefit of ourselves and the future generations. In fact, we are putting businesses together around the world, across all of the sectors, sectors that are familiar to you like the basic building industry or infrastructure, transportation, food systems, banking, etc. We will see what initiatives are already happening at the global level in each of these sectors and how we can drive to scale faster than would otherwise be possible.

The consumer sector for example, which is one of the sectors I represent, and you are all familiar with HUL (Hindustan Unilever Limited) here in India, but at the global level, we are very concerned about deforestation. About 50 per cent of the demand for food that is because of the population growth and changing dietary habits and 50 per cent of the deforestation actually comes from the demand of food. Deforestation itself accounts for about 15 per cent of global warming. If we don't stop deforestation, then we will never get to these goals. So, it is not surprising that the global consumer goods industry which is about 3–4 trillion dollars globally has made a commitment by 2020 to not sell anything anymore that comes from what I call illegal deforestation. Our company has already achieved that target in 2014, but I think we will be able to move the whole industry. Climate smart agriculture—which can also be stepped up in India— and attacking the food waste can reverse 20–30 per cent of global warming alone and actually result in lower costs. Think about the higher productivity you can get off the land, think about the ecosystems you preserve with the forests that are increasingly important to our livelihoods and understood to be so—there are enormous opportunities there alone. Can we get these commitments from each of these sectors to add up to the overall target that we are after.

We also need to get more and clearer signals from the governments. The first thing which business needs is clarity. If we don't have clarity, we don't invest. I hear that everywhere across every sector. So, this policy certainty of saying we want to achieve net zero emission anywhere between 2050 and the end of this decade is the absolute key to unlock a lot of the technologies and investments that are going to accelerate the change.

The other thing is the price on carbon, don't be shy on that. Things in business that are not measured are not treasured either. Overwhelmingly, people understand that there is a price on carbon, and it is not very practical to expect a global price right now, but let us start with normal pricing systems at a local or regional level. Again many countries or many regions have experimented with that already and are seeing positive effects, including the US, where you have some states that have a price on carbon. We need to insist on that.

Then we need to work on financing. There is no doubt that we can catalyse financing. There is a very important meeting coming up in July 2015 in Addis Ababa. We need to be sure that again we have the financing right. It is right financing to catalyse extra funds from business and business will continue to provide 70–90 per cent of the funding. By the way, business globally is about 60 per cent of the global economy; about 80 per cent of the global financial flow, and 90 per cent of the job creation. We need to work hand in hand with governments to solve these issues. But, think about the money that has been committed by governments in the Red Plus Fund, Green Climate Fund, all talking about $100 billion or more and think about how much more money will catalyse. Now, also think of the opportunity that we have with lower oil prices right now to take these perverse subsidies that are still lingering across the world in fuel subsidies, out of the system. In fact, some people estimate that between 800 billion and 1 trillion of perverse subsidies are still there, driving towards a carbon economy at a time that we can afford it least.

Finally, we need courage from governments to look at all of these challenges that we have and encourage these public-private partnerships that we are talking about in order to galvanize this change.

During the last 12 months, I have had the privilege to serve the Global Commission on the Economy and Climate. It is chaired by Felipe Calderón and also includes the Indian Council for Research on International Economic Relations which is located in Delhi. The Global Commission will launch its latest report on India, entitled *Pathways to Sustaining Rapid Development in a New Climate Economy* soon. The report's authors argue that through good choices in simply three sectors—energy systems, cities, and land use—India can boost its economic development, ensure inclusive growth, and reduce the risk of dangerous climate change. In fact, 6–7 per cent of the total GDP and one per cent additional growth a year can be unlocked by attacking just these three areas holistically. Yes, all at the same time, no misplaced trade-offs in any of these. That is good for business if you ask me. The report's recommendations recognize that this visionary task

has already started. Yesterday, I had the opportunity to meet the Prime Minister Narendra Modi and actually listening to all the plans of smarter cities, Make in India, Clean India campaign, obviously directly linked to the development agenda but an opportunity to do that smartly and attack at the same time, the issues of climate change that we are talking about. Development is needed, more than ever. Over 300 million people in India still lack the access to modern energy and are waiting for it. Fifty per cent of India's energy is still provided by wood burning and one million people lose their lives unnecessarily on things we can change, if we decide to do that and make the same commitments as the government has taken with clean toilets and other things in the areas of sanitation. It can be done. In view of today's oil prices, as I said before, it is an ideal time to move even further on your fuel reforms and move to a greener economy. You can do that while still having positive revenues, cashing in on the enormous fuel savings that you make with the low oil prices that we have.

It is also the case in India that we find half the world's polluted cities. You take the 30 of the top polluted cities and 15 of the top 30 are in India. Delhi certainly hits the charts and people will not accept that much longer. Even in my business, we have issues in actually growing in this. Urbanization has moved from 200 million to 400 million in the last 15–20 years and will move to 600 million in India. Even right now in places like Mumbai, the ability for us to sell products is already limited by the availability of water and other things that are directly affected by climate change. Our growth is already being stifled. I think this is the case for other companies as well. So, I encourage you to read this new climate economy report and see if there are things that you and your businesses can actually pick up on and drive to scale as well.

The last area is agriculture. Fortunately, you are in a good position to feed yourselves but agriculture is not the most efficient profession that you have right now. So, we need to move rapidly to climate smart agriculture as well which has an enormous climate component to it. There is no shortage of opportunities here as has been mentioned before and there is no better time for Indian business to seize this moment in a way that meets its needs as businesses grow but also meets the needs of the people, especially the ones at the bottom of the pyramid that have been desperately waiting for it. It is clear that the agenda on which we are now embarking is an exciting one, but is certainly a transformational one for companies and more importantly for individuals, families, whole communities, and indeed for the future of India. Infrastructure, cleaner energies, healthier consumers, happier employees, all result in faster growing economies. I have often said that you cannot have a healthy business in an unhealthy world. If you ever had been persuaded before that delivering sustainable development and tackling climate change are in some ways a constraint to growth, I hope that you now recognize that actually the opposite is true. If we don't tackle climate change, we won't get growth. This is only the beginning. I think of this pathway that we need to get on. I hope you are embracing that as much as we do for the benefit of everybody, but above all for the benefit of the people that cannot be here. Whatever we do today, whatever we talk for our companies, let us keep in mind why we are here.

Release of TERI-BCSD–YES BANK Knowledge Papers

Two knowledge papers were released at the Corporate Dialogue: YES Bank–TERI BCSD Knowledge Paper titled, "Enabling Finance for Scaling up Energy Efficiency in MSMEs" and YES Bank-TERI BCSD-ASSOCHAM Paper titled "Respected Ganga: An Inclusive Multi-Stakeholder Approach".

The paper on "Enabling Finance for Scaling up Energy Efficiency in MSMEs" seeks to highlight the key challenges faced by the sector and provide possible financing solutions for the MSMEs. It looks into the current technological ability of the MSMEs and bottlenecks preventing from energy efficiency in operations. It also provides a critique on the uptake of various government schemes for financing energy efficiency.

The paper on "Ganga: An Inclusive Multi-Stakeholder Approach" highlights the multifaceted aspects and provides insights pertaining to river basin management, especially from a financial institution perspective. It covers short discussion pieces on a few critical elements of river management such as climate change aspects, risks in ecosystem management, multi-disciplinarity and complexities in decision making and Public Private Partnerships (PPPs).

Inaugural Address

Mr Jayant Sinha
Hon'ble Minister of State for Finance, India

"Technology and sustainable growth are not in an adversarial relationship. They can be effectively used to complement one another."

I want to start my speech with a personal story. This is from 30 years ago. Back then, I was a student of chemical engineering at IIT Delhi and for my final year project, I decided to work on a problem that was very close to my heart because I come from one of India's poorest states, which is Jharkhand, and I wanted to work on a smokeless *chulha* which is a smokeless wood stove. I worked on that and as a result got very interested in issues of sustainability and appropriate technology. I wanted to pursue graduate studies in this area and found a wonderful program at the University of Pennsylvania where I could actually do this programme. Unfortunately, I was just a humble student of India and could not afford to go for this Masters programme. But what I did was, I looked up the Advisory Board for this programme and found the name of an individual there who was in India and I told myself that I should reach out to this gentleman and his name was Dr R K Pachauri. So, I went to speak to him and told him of my interest in issues of sustainability and appropriate technology and that I would like to get a letter of recommendation from him for this Masters Programme. He was very gracious, and heard me out and then wrote a letter of recommendation which led to a scholarship at the University of Pennsylvania and launched me in my career. So, I am, of course, very grateful to Dr Pachauri for having done that and when he asked me to speak at this conference, you can well understand why I could not say no to him. Of course, Dr Pachauri in all these years has helped countless others as well. So, thank you for all that you do for us and for India and the world.

As you can also tell from this story, I have a long association not just with appropriate technology and sustainability but also around the notion of innovation and how to use technology to create products and services which can help make our lives easier. You might understand that if you have a smoky wood stove, it creates a lot of problems. Not only do we have the deforestation problem that Mr Paul Polman was speaking about but also a lot of smoke and pulmonary problems are created in the kinds of huts that people have where they are using these wood stoves. So, these kinds of innovations, these kinds of technologies, can make our lives much easier but they can also help conserve our environment. Thus, innovation for sustainability is the true need of the hour and the solution to many of the complex problems that we are facing today.

So, here I am today from the Ministry of Finance talking about climate and the environment and one might wonder how I or the ministry are connected to this. I often tell different stakeholders that we want to put India on a sustainable non-inflation growth trajectory of 7–8 per cent growth. This is not just a political necessity but also a moral responsibility because we need to have this growth if we are going to be able to find employment for the 10–12 million young people that join our workforce every year. Such a high growth path would double the size of our economy in the next decade or so and India will then emerge as a powerful economic force. For this we undoubtedly need to build our productive capacity and we need a veritable supply-side revolution in India. But, we also need to ensure that our growth is sustainable. None of us have any doubts that the entire world is facing a real and credible challenge on the environmental front. At conferences and fora we can squabble over who has been responsible for global climate change; we can negotiate over who should compensate whom and by how much, but what we all must agree to is that, this is a real and significant challenge which every country of the world is facing. With erratic weather patterns, glacial melting, scarcity of water, the threat is staring us in our face here in India as well. When I see the pollution due to particulate matter here in Delhi—which is the most polluted city on the planet—and I see the pollution from coal in my own constituency of Hazaribagh in Jharkhand, it is pretty obvious that we need to follow a low carbon trajectory and work towards a low carbon future.

As Indians, we need to protect our environment not only because we are a responsible country but also for our own sake. The high growth trajectory which we envision and the massive creation of jobs towards which we are working will undoubtedly pose challenges to sustainability and I see three major challenges from an environmental perspective which can prevent us from sustainable growth. It is water scarcity, pollution, and climate change. All of these issues will become more serious as we keep growing faster and all of them impact our lives in very direct ways. For the past several years, I don't think we have done enough to promote sustainable growth. So, to continue on our growth trajectory, we need to grow sustainably and we need to ensure it right now because the clock is ticking. So, the question becomes how do we get to this sustainable growth trajectory; how do we ensure that we are growing fast and at the same time, our growth is sustainable? In my view, there is really only one answer to that problem and that answer is innovation. We should not only 'Make in India', but should also innovate in India for India. It is this innovation which can help us solve our environmental problems and let us grow sustainably. We need to develop a vibrant entrepreneurial ecosystem which incubates, nurtures, and promotes entrepreneurs who can develop innovative products and find solutions to our problems. If entrepreneurs massively step up innovating in India, I can assure you that the government will back them and provide support.

So, what do I mean when I say innovate for India? The demands and problems in India are different from what developed countries in the West face. In San Francisco, in the heart of the innovation capital of the world, one might come up with a mobile app

which can tell you where your friends are watching the basketball game this evening. But, what we need in India is technology and innovation which can solve the problems not of the top 1 billion people of this planet but the next 5 billion. We might need to innovate to develop technology for our farmers that can provide cheap electricity off-grid, that can result in mini waste disposal systems in every village. This is the less explored territory and that is where investors and entrepreneurs should look and that is how we must innovate in India.

So, today, when India is undergoing a huge transformation, if we can unleash our best entrepreneurs and innovators, we will be able to transform several important areas, such as power, buildings, and transportation. By having distributed rooftops in homes and offices and using wind power to operate irrigation pumps, we can solve the problems of energy scarcity and carbon emissions at the same time. We can have buildings that are energy efficient and also uses LED lighting systems and properly designs heating and cooling systems. We can totally transform our transportation sector with the use of electric scooters and cars. If we can improve our public transport systems with good trains, metros, and car pools we can significantly get down our carbon footprint.

As a venture capitalist, I have invested in several companies which are trying to solve such problems at the base of the pyramid and which are examples of sustainable growth. D-Light a company which I invested in, makes and distributes solar lanterns and solar home systems. Imagine people in disconnected villages getting cheap electricity without the need for a grid and in a way which is entirely friendly to the environment.

When it comes to innovating for sustainability I really want to recognize the work that TERI has done. For instance, they have done some very interesting work around mini-grids, something that the government and entrepreneurs are now starting to pay a lot of attention to. Their smart mini-grids which enable you to balance electricity use are exemplary. Another innovation of TERI that is well worth propagating and scaling up is the biodegradable plastics, which are based on biopolymers. That is precisely the kind of innovation that we need in India and it is a great example for the rest of us to innovate that which is really focused in India, for India.

Often we are expected to take sides in the debate between growth and conserving the environment. People ask, which is more important? It is a false trade-off and I see that is the wrong way to look at it. Technology and sustainable growth are not in an adversarial relationship. They can be effectively used to complement one another. With clever and innovative technology we can develop products which promote sustainable growth and only with sustainable growth can we keep developing better technology. We need a true partnership between business and innovators, in terms of environmental conservation, which is why I want to close by saying we truly need to innovate for sustainability.

Closing Remarks

Dr Annapurna Vancheswaran
Director, Sustainable Development Outreach Division, TERI

"Is Indian business ready to commit to the sustainability agenda? Given the high attendance of people present here, the answer is an emphatic 'yes'."

I, on behalf of TERI would like to extend our gratitude to dignitaries on the dais and to the entire–let me call it–fraternity of conscious corporate leaders to have assembled here for the High Level Corporate Dialogue. Since 2004, this corporate dialogue has become an integral part of the Delhi Sustainable Development Summit bringing together over 1,500 international and Indian CEOs, senior government officials and luminaries from across the globe.

A big thank you Hon'ble Minister Shri Jayant Sinha, for having shared your thoughts on how innovation can become part of the value proposition for business. The corporate dialogue this year, themed 'Delhi to Paris: Corporate Vision on Climate Change' is an effort to formulate an action plan to be carried out in the months leading to the Conference of Parties which is scheduled for later this year. The format of the HLCD this year is unique. We are fortunate to have two global corporate leaders amongst us to help kick-start our proceedings. I must mention our deep sense of appreciation to Mr Paul Polman and Dr Madsen for leading the sustainability path through their sheer commitment, which is unmatched.

Is Indian business ready to commit to the sustainability agenda? Given the high attendance of people present here, the answer is an emphatic 'yes'. We are grateful to Mr Mukundan to have stepped in as the Chairman of the TERI Business Council Executive Committee, a consortium of nearly 100 member companies from diverse sectors across the country. I need to express my sincere thanks to Mr Rana Kapoor and to YES BANK for being an ardent supporter of the TERI Business Council and its mission. YES BANK along with the research team has helped in bringing out several knowledge papers like the ones that were released today. As Patron Member of the TERI Business Council, it did not take much time for Mr Rana Kapoor and his team to pledge their complete support to this dialogue. The champions deserve a round of applause.

I would like to thank Ingersoll Rand, Hitachi, DNV, ADB, and three organizations from Gujarat, the Gujarat Energy Development Agency, Gujarat National Fertiliser Company, and Wasmo to have also taken up this challenge. May I take this opportunity of thanking them for being part of our mission and reposing their faith in us.

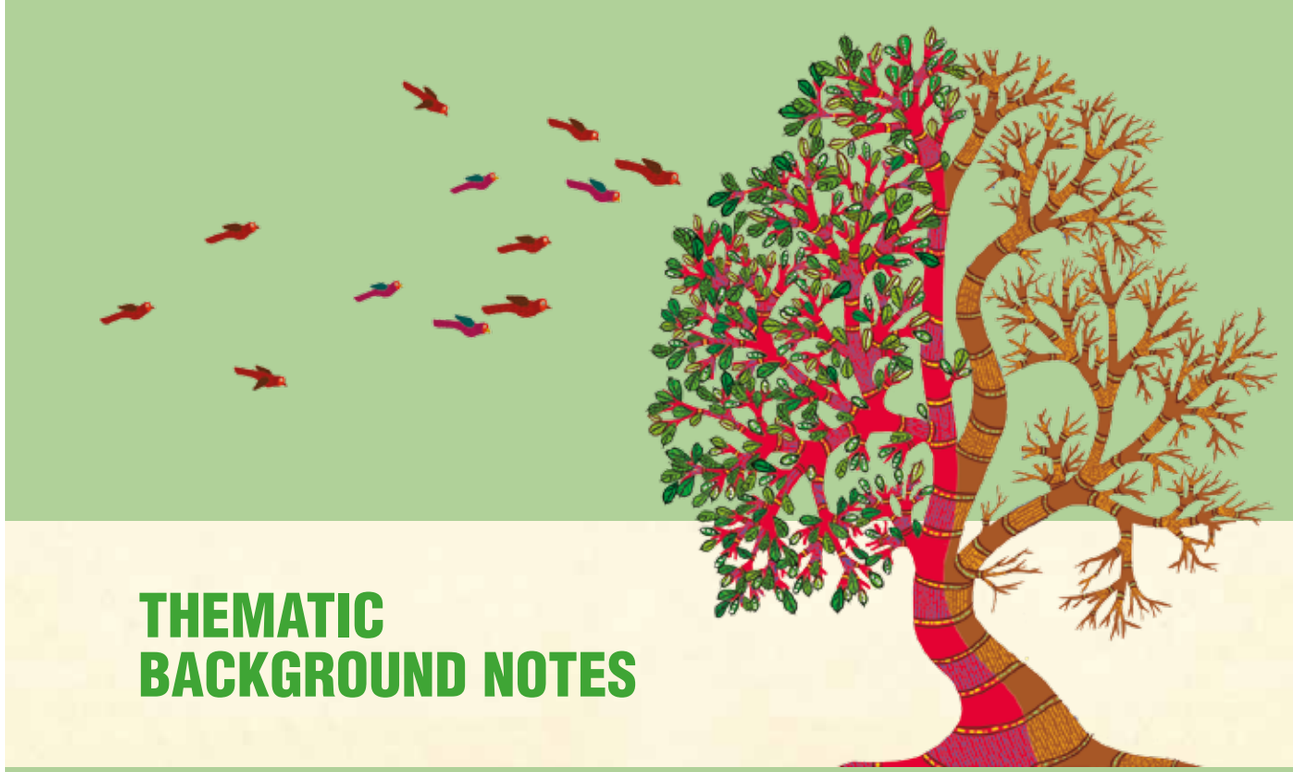
Our special partners We Mean Business and the partnership alliance they bring is both important and significant to our endeavour. My sincere thanks to We Mean Business for your backing and support.

I need to mention that without the enormous cooperation of all my colleagues at TERI, it would not have been possible to organize this event. They deserve a round of applause.

I can't end my vote of thanks before thanking Sir Jonathon Porritt, Founder Director, Forum for the Future, who had kindly consented to chair the rest of the days proceedings with business leaders. The discussion will be on the 10 core identified themes including-Adapting to the Impacts of Climate Change, Improving the Efficiency of Energy Use, Expanding the Use of Renewable Energy, Ensuring Water Availability in a Changing Climate, Sustainable Buildings, Efficient Waste Management, Ensuring and Expanding Access to Energy , Low carbon technologies in SMEs, Financing the Energy Transition and Sustainable Development and Towards Sustainable Mobility.

Finally, as we heard earlier there is a coalition of business and policy leaders in the United States who strongly believe that climate change will impact business and hence suggests that business have no option but to adapt.

This lends me to end with this apt quote ", 'what we do, makes a difference and we have to decide what kind of difference we want to make'. With this may I welcome you all to the Curtain Raiser of the Delhi Sustainable Development Summit the High Level Corporate Dialogue.



THEMATIC BACKGROUND NOTES

Adapting to the Impacts of Climate Change

CO-CHAIRS

Mr Uday Khemka
Vice-Chairman, SUN (Europe) Limited

Mr Mahendra Singhi
Group CEO & Whole Time Director-Cement

THEME LEAD

Ms Suruchi Bhadwal
Associate Director, Earth Science and Climate Change, TERI

Introduction

The 20th century has observed changes in the climate including an increase in overall global mean temperatures, change in humidity levels, and varying precipitation patterns. These changes in the climate are attributed to human induced change in the concentrations of greenhouse gases in the atmosphere since the pre-industrial era. Along with the gradual changes happening in the climate, the number of abrupt and extreme events has intensified and increased almost exponentially. Of the total 890 events in 2013 and early 2014, majority of the loss events are of a hydro-meteorological and climatological nature. The losses from these events as fatalities and overall losses are $125 billion compared to $135 billion when considering all types of events. Most of these events have been concentrated over the Asian, North American, Central American, Caribbean, and the European region. While the fatalities and overall losses are the highest in Asia amounting to 85 per cent and 50 per cent, respectively, the amount of insured losses are the least after Africa and Latin America. Given the rate at which greenhouse gas emissions have been continuing to increase, there are changes in the climate projected over the 21st century and beyond. Globally, the Intergovernmental Panel on Climate Change (IPCC) has been bringing out conclusive reports and findings since the 1990s updating the science and its understanding on this global issue. Recent scientific reports from the IPCC have concluded that the warming of the climate system is unequivocal and that the world is moving towards a warmer and extreme climate. Such trends hold true even for India where significant warming trend of 0.51°C/100 years has been observed for all Indian annual mean temperatures over the period 1901–2007. Many scientific publications and government reports have also conclusively established an increasing trend of extreme climate events and increasing heat and cold waves in India. Also of the 10 deadliest events recorded in 2013, three were reported in India including floods

Key Questions

- How do we raise awareness on climate risks and corresponding actions by the corporates?
- How can corporates account for the risks of a changing climate into their planning process? What kinds of assessments are needed to assist them in this process or sector-specific/regional assessments?
- What measures can be identified to counter the risks which would be specific to the geographical region and the type of the industry and its value chain dependency?
- How can corporate India assist in Climate Proofing of current infrastructure, policies, and plans? Do we need a mission mode and if yes, how should that be structured?

and flash floods in the states of Uttarakhand, Himachal Pradesh, Uttar Pradesh, and Jammu and Kashmir; heat waves in Andhra Pradesh, Odisha, Rajasthan, and Assam; and floods in Bihar. However, the insured losses are pretty negligible while the risks are portrayed to be high. The future projections of climate over India also indicate a warming trend. Significant rise of annual mean temperatures (~4°C for 2071–98 period relative to 1961–90) along with substantial rise in day and night temperatures with increase in frequency and intensity of temperature and rainfall extremes have been projected. While there are associated uncertainties in the various simulations, there is high degree of confidence in the nature of change expected in temperatures and precipitation patterns. These changes in the climate have direct and indirect impacts on a number of sectors, including implications on agriculture, water resources, forests and biodiversity, and health and infrastructure, both in inland and coastal areas. These changes have huge implications on businesses located in sensitive areas for instance, in case of close proximity to exposed coastlines, extreme events causing damage to infrastructure, agri-businesses, power generation including thermal and hydropower generating units, pose challenges to water demand and supply for competing needs of agriculture and industry (water intensive units).

Agriculture

Overall yields of crops are projected to be affected due to increase in temperatures. Changes in the onset and withdrawal of the monsoons, overall rainfall and its intensities, extreme events, and a host of other factors including humidity and soil moisture availability would also have an impact on the overall crop production. Infestation by pests and diseases due to conducive environment created due to a warm and humid climate may further have a negative influence on the yields. Industries dependent on raw material from the field are particularly sensitive to such fluctuations in productivities and overall production.

Water Resources

Changes in rainfall patterns would affect the overall water situation across various regions. There may be a surplus in some parts and a deficit in others, overall affecting the surface water availability and ground water recharge. All water-intensive industries are sensitive to such changes.

Forests and Biodiversity

Phenology may be affected; may affect industries dependent on Non Timber Forest Produces (NTFPs).

Health

Change in the climate may affect the spread of vector-borne diseases. Also, water related and water-borne diseases may get aggravated. Direct exposure to health from extremes may have an effect.

Infrastructure

Damage to infrastructure during floods, flash floods has been reported throughout the country. These incidents are likely to increase over future time periods. Infrastructure losses in these areas are huge and industries located in these areas are particularly sensitive.

Support/Leverage from Existing Government and Corporate Initiatives

Adapting to the impacts of climate change is a necessity given that the climate has been rapidly changing since the pre-industrial era. While all losses cannot be overcome, there is a possibility of reducing the losses and minimizing overall impacts. In 2008, India has set up the Prime Minister's Council on Climate Change to formulate national and sub-national actions on climate change. It released its National Action Plan on Climate Change (NAPCC) in June 2008, which outlines eight National Missions as priority areas of work on climate change with a focus on both mitigation and adaptation. The eight missions are to address the challenges of climate in the water sector, agriculture sector, the forestry sector, sustainable habitat, energy efficiency area, and solar energy. While detailed plans of implementation had been put in place for each of these missions with a lead Ministry responsible for its effective execution, State level sub-national plans had also been developed. The State Action Plans on Climate Change (SAPCCs) were developed to contextualize action on climate keeping in mind the local context. Besides, this there are several policies and plans of the Government of India that help leverage adaptation actions for instance in case of watershed development and management, crop diversification, subsidies on efficient irrigation systems, promotion of artificial recharge, and rainwater harvesting, declaration of protected zones and participatory forest management, coastal zone regulation, all Disaster Risk Reduction (DRR) initiatives, etc. However, while the country does have a wide span of policies and schemes and institutional systems in place to leverage action in these areas, effective implementation and delivery of results has been an issue. The role of the corporate sector thus becomes vital in leveraging action in areas of direct/indirect interest considering its entire value chain and otherwise as Corporate Social Responsibility (CSR) for pre- and post-relief operations during disasters. There have been examples of corporate sector contributions in the aftermath of the devastating Super Cyclone in Odisha in 1999, Bhuj earthquake in 2001, Indian Ocean Tsunami in 2004, and cloudburst in Uttarakhand in 2013. Corporates have been the major source of supplies including food supplies, medical aid, shelters and restoration involved in disaster management. So, there is tremendous scope for government and corporate engagement to promote proactive adaptation that while securing businesses may also benefit societies and promote well-being. To begin with, corporates can engage in undertaking regional assessments at the State level to better understand the risks to a changing climate and how it may get affected. This may further assist them in their policy, planning, and better management of available resources.

Efficient Waste Management

CHAIR
Mr Suketu Shah
Managing Director, Oxive Environmental Management Pvt. Ltd

THEME LEAD
Dr Suneel Pandey
Associate Director, Green Growth and Resource Efficiency, TERI

Introduction

With the increasing population, the management of Municipal Solid Waste (MSW) in the country has emerged as a severe problem not only because of the environmental and aesthetic concerns, but also because of the sheer quantities generated every day. According to the Central Pollution Control Board (CPCB), 27,486 TPD (Tonnes per day) of MSW was generated in India during 2011–12, with an average waste generation of 0.11 kg/capita/day. Of the total waste generated, approximately 89,334 TPD (70 per cent) of MSW was collected and of that only 15,881 TPD (12.45 per cent) was processed or treated (Annual Report, CPCB 2013). Segregation at source, collection, transportation, treatment, and scientific disposal of waste were largely insufficient leading to degradation of environment and poor quality of life. Based on current MSW generation estimates and current waste management practices, the estimated greenhouse gas (GHG) emissions from the solid waste sector would be around 1,142.5 Gg/year.

In addition to the MSW, waste streams like e-waste, packaging waste, and construction and demolition debris are also making life of urban local bodies difficult as they have the mandate to manage them. The e-waste is of particular concern as it is not only one of the fastest growing waste streams, but also its improper management is introducing different hazardous/toxic chemicals in ecosystem. As per the statistics of the CPCB, total national generation of e-waste is around 8 lakh tonnes per annum out of which, only around 2 lakh tonnes per annum are treated by authorized recycling facilities. Packaging waste comprises a wide range of materials that are derived from multiple items used as packaging material. Presently, packaging material waste is being managed along with MSW. Packaging material can be broadly classified as food and non-food packaging

Key Questions

- Can corporate sector ensure that they work with local governments in cities in which they operate to ensure that at least 50 per cent of organic waste generated is either composted or treated in biogas units?
- Can corporate sector look at smart manufacturing to reduce undesired packaging?
- Can private sector provide technology option for more efficient resource recovery (e.g., precious/semi-precious metals extraction) from e-waste?

materials. Non-food packaging makes up almost 80–90 per cent of packaging by weight and its quantity is rising day by day. Some amount of recyclable packaging waste—such as paper, plastic, glass, metal, and cartons—is not picked up, because it is soiled substantially, or is directly buried under a huge pile of waste, in the bin or at the disposal site. Quite often, rag pickers focus their search and recovery on a few varieties of recyclables that have good returns. Other materials are discarded. Hence, much potentially recyclable waste from streets and bins ends up at the disposal site, along with other domestic waste and street sweepings. Ragpickers, who search disposal sites as well as streets, nevertheless recover some of those materials; however, most of the packaging waste gets buried.

Support from Existing Government and Corporate Initiatives

Introduction of waste reduction measures is the first desired step but most neglected in the 3Rs (Reduce, Recycle, and Reuse). It is necessary to be able to decouple the waste generation process from the growth of economy and population. Various ways in which this can be achieved for reducing packaging waste and e-waste are as follows:

- Alternative packaging, i.e., use of fabric or jute packaging instead of traditionally used polythene bags which are difficult to collect and recycle
- Lesser packaging without sacrificing product quality
- Designing products for disassembly so that majority of their components can be recycled at the end-of-life
- Utilization of waste packaging as fuel in cement kilns
- Recycling of e-waste to recover useful precious and semi-precious metals

India reportedly salvages and recycles around 60 per cent of MSW, though most of it is collected and recycled by informal sector using rudimentary technologies. It is reported that in developing countries around 15–20 million people are engaged in waste recycling activities—in some cities 2 per cent of the population. More than 1 million people are engaged in waste recycling activities in India. It is also reported that informal sector (waste pickers) removes around 10–15 per cent of waste every day from city streets and is key to solid waste management system in any city. There is, therefore need for skill enhancement, modernization of recycling technologies, and institutionalization of informal sector.

The organic waste (around 50 per cent of total municipal waste with high moisture content) can be composted and compost can be co-marketed by fertilizer companies to ensure its effective utilization and support composting facilities financially.

Key Challenges

- Reducing undesired consumption of resources
- Source segregation of waste to ensure efficient dry waste recycling
- Cost recovery for waste management services
- Skill development in formal and informal sector
- Market for compost and recycled products
- Development of regional recycling infrastructure, e.g., regional recycling parks
- There is huge cost of inaction which we do not realize

Ensuring and Expanding Access to Energy

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Introduction

One-fifth of the world's population does not have access to electricity, rely on inefficient devices to convert energy from low-grade fuels such as kerosene to consumptive energy services such as lighting and space conditioning. Further, one in three persons uses archaic and traditional methods of cooking, using unprocessed biomass in devices that are inefficient and polluting. Most of these underserved live in the global South–South Asia and Sub-Saharan Africa. Approximately, 30 per cent of all underserved in cooking energy live in India. The impact on human health from household air pollution (HAP), a resultant of using these inefficient devices, results in almost 4 million premature deaths annually among children and adults from respiratory and cardiovascular diseases, and cancer (World Health Organization 2014). Similarly, data pertaining to electricity access shows that 24 per cent of all underserved are Indians (International Energy Agency 2014). India, the third largest economy[1] in the world still has 815 million people without access to modern energy sources for cooking and a sizeable 304 million people without access to reliable electricity. There is also an inherent regional disparity, with most of those without access to modern energy forms residing in rural areas (Census of India 2013), raising concerns regarding equity in human development. A concerted effort from diverse stakeholders is required to tackle this challenge through multi-dimensional solutions (Bazilian et al. 2012). This, however, would be impossible without substantial investment from the private sector (Sustainable Energy for All 2012).

[1] According to the International Monetary Fund (IMF), as of 2014, the Indian economy is the eleventh-largest economy by market exchange rates, and the third-largest by purchasing power parity, or PPP.

Key Questions

Up scaling energy access through High Impact Opportunities such as TERI's Lighting a Billion Lives Programme

- Can corporates come together to light up and provide cooking energy solutions to 50 million households by 2019?
- How can we come up with multi-stakeholder engagements partnering public and private sector?
- How to come up with social enterprise based business models to deliver energy services to the poor?
- What are the steps required for creation of enterprise based value chain to deliver energy services to the poor?

Initiatives in Lighting Energy

Over four decades after the establishment of Rural Electrification Corporation in 1969, a large number of government programmes targeted at rural electrification under the umbrella of the 'Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY)' have electrified over 100,000 villages since its initiation. However, based on census figures, almost 44 per cent of all households residing in rural India still do not have access to reliable electricity.

Grid-connected power is seen to have potential to provide electricity to only 30 per cent of rural areas, the rest of which will have to be fulfilled through off-grid and decentralized systems. Such approaches have the potential to go beyond infrastructure creation, and adopt a multi-pronged approach incorporating political, environmental, social, cultural, and economic contexts of the areas of implementation.

In the context of decentralized energy systems, several small-scale successes exist—Lighting a Billion Lives (LaBL, promoted by TERI), Lighting Asia (promoted by IFC), SPEED (promoted by Rockefeller foundation), Husk power (a social enterprise initiative), etc. However, in order to transform small-scale successes to a full-blown regime, several opportunities and challenges exist such as inclusive and participatory planning processes, better information flow, access to appropriate financial resources, and the need of a champion.

Cooking Energy

A large share of these households' energy expenditure, in case of the energy poor, is spent for cooking needs (Bhattacharyya 2006). Considering the poor penetration and low reliability of electricity in rural households, the narrow focus of Government of India on electrification alone has left large gaps in addressing the need for clean cooking.

Past programmes on providing cooking energy access, such as LPG provision, the National Project on Biogas Development, and the National Programme on Improved Chulhas have either targeted the middle- and higher-income households, or failed to promote a shift in the primary cooking technology used in rural households (Balachandra 2011).

The NBCI, 2011 (which aims to disseminate 2.4 million domestic stoves) has adopted a multi-pronged approach which focuses on technology development, development of proper testing protocols and, in the long-term, seeding the continuous use of improved cookstoves through a robust commercial value-chain, as opposed to past subsidy-driven dissemination models (MNRE 2013).

Today, a large portfolio of appropriate transition technology options exists for the end-users, e.g., multiple models of natural draft (ND) stoves and forced draft (FD) improved stoves (MNRE 2013) providing a significant gain against the traditional mud stove (Kar, et al., 2012). In spite of various non-governmental (TERI, SEWA, etc.) and private sector actors (NDMI, Biolite, Envirofit, etc.) in the cookstoves market, the penetration of these improved stoves is still extremely low.

Most efforts for expanding rural energy access have been government-centric and have had limited success, due to resource constraints to meet the large population of the underserved. Evidently, the private sector investment would need to grow, primarily by leveraging funding from government and donor agencies, to establish and sustain a robust commercial value-chain approach.

Role of Private Sector

There exist various opportunities through which the private sector can positively contribute to the overall growth of the sector, ensuring sustainable energy to millions— not only a need of the hour, but also a moral responsibility. These opportunities lie in addressing the challenges plaguing the sector. Incidentally, these challenges are best summarized by various dimensions associated with definition of access—physical availability, acceptability, affordability, reliability, and quality of supply. The private sector can proactively contribute to each of these dimensions. Some possible interventions are mentioned below:

- **Availability:** Facilitate development of appropriate market value chains for CET which is well aligned with the business strategies of individual corporates; provide appropriate impact investments to catalyse manufacturing of clean energy technologies and institutionalization of market value chains; facilitate scale up of interventions, taking cognizance of existing business models and related infrastructure available with the private sector.
- **Affordability:** Facilitate access to end-user finance through various channels including commercial banks and MFI; CSR and grant support to reduce costs of clean energy technologies; support requisite R&D of technology developers and manufacturers to reduce costs.
- **Reliability:** Support development of appropriate skill base at the grass roots for regular maintenance and post-dissemination service; provide research support to manufacturers in order to encourage customization and contextualization of the technology to the extent possible; provide knowledge support to manufacturers and service providers associated with development and dissemination of CET to ensure standardization and quality assurance.
- **Acceptability:** Support large-scale awareness generation campaigns; support demonstration of appropriate technologies in immediate areas/ regions of influence.
- **Environmentally benign:** Encourage development of new technologies and products through appropriate platforms, for example, technology design competitions, research support through existing R&D labs available with the private sector.

Ensuring Water Availability in a Changing Climate

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Introduction

The prospective water availability scenario is set to be the greatest challenge of the 21st century amongst all the users or sectors due to continual rising and competing demand, inefficient use, pollution, and added risks due to climate change. With its continuously declining per capita water availability (from about 5,177 m^3 in 1951 to 1,545 m^3 in 2011), India stands 'water stressed' and is close to being categorized 'water scarce'. Of the 20 major river basins in India, 14 are already water-stressed and are further expected to become water scarce by 2050. Water demand (mainly from the agriculture, industrial, and domestic sectors) in India is expected to grow annually by 2.8 per cent to reach 1,500 bcm (by 2030) while the current supply is only about half (viz., 744 bcm). The World Bank estimate suggests that the water demand for industrial uses and energy production will grow at an annual rate of 4.2 per cent, increasing from 67 bcm in 1999 to 228 bcm by 2025. The situation has been compounded by overexploitation of groundwater in several regions (e.g., the stage of groundwater development in Delhi, Punjab, Rajasthan, and Gurgaon is 170 per cent, 145 per cent, 125 per cent, and 311 per cent, respectively).

Despite an increasing and competing demand amongst various sectors, the water use in different sectors in India remains inefficient. Agriculture sector that consumes more than 80 per cent of India's water resources has a very low overall average water use efficiency (about 38 per cent). Likewise, water supply and distribution in cities in India are inefficient with high leakages/losses. Compared to international standards, Indian industries consume relatively higher amount of water for production. The ratio of water consumption and economic value creation is around $7.5, which is low, as compared to many countries such as Argentina ($30), Brazil ($23.4), Sweden ($92.2), and the UK ($443.7). Further, groundwater pollution, water pollution as well as pollution of surface water sources (rivers and lakes) due to discharge of untreated or partially treated sewage and industrial wastewater in many parts of India, continue to be prime areas of concern.

The multifarious and mounting stress on water resources is further expected to be exacerbated by the

impacts of climate change which is expected to affect the hydrological cycle across various regions as well as frequency and intensity of precipitation (rainfall). This is likely to have a direct effect on the runoff rates and influence the occurrence and intensity of floods and droughts which may indirectly affect the ground and surface water supply for irrigation, domestic, industrial supply, hydropower generation, etc.

Key Questions

While there are several opportunities, the crucial step towards this initiative could be contributions towards addressing the following challenges:

- Can corporate India achieve an overall 20 per cent reduction in water consumption? What immediate steps are required to reduce their water footprint (including its own premises and its value chain)? The value-chain approach includes adopting advanced technology, increasing water productivity, reducing pollution, conserving water, and setting benchmarks & standards.
- What are the significant actions needed to mainstream enhancement of water use efficiency in water-intensive industries?
- How can industries/corporate support their regional water management? This involves sustainably reducing the shared risk (physical, regulatory, and environmental) on water through participatory management involving local communities and other stakeholders under public private partnership (PPP) mode.
- How can corporate/industries contribute in nationwide programmes to conserve water and reduce losses (inefficiencies) in the irrigation (agriculture), domestic (water supply and distribution), and industrial sectors through promotion of cost-effective water-efficient technologies and practices?

Support/Leverages from Existing Government and Corporate Initiatives

It is essential that the current and future path of growth and development in India encompasses the strategies to address the water scarcity involving interventions like demand management, enhancing water use efficiency, water conservation, recycle and reuse, etc., through a participatory and integrated approach.

The Government of India launched its National Water Mission (NWM) under the National Action Plan on Climate Change (NAPCC, 2008) that emphasizes the need to develop a framework for increasing the water use efficiency by 20 per cent. It further emphasizes on integrated water resource management, focus on over-exploited areas, promotion of water conservation, wastewater minimization, recycle and reuse, etc.

In addition to the Government's efforts, there are few examples of private sector initiatives as well. ITC introduced a programme on adaptation to climate change impacts through diversification of farming systems including research and development (R&D), farmer's education, watershed development, water conservation, and leveraging digital technology and customized extension services to empower farmers, and raise rural incomes. PepsiCo India is involved in promoting water-saving strategies such as direct seeding of rice that helps growers avoid water-intensive steps in rice cultivation. PepsiCo also partnered with Punjab Agri Export Corporation (PAGREXCO) to

start a 'Citrus Development Initiative', to promote crop diversification and help farmers adapt in a water-constrained climate. There are several other corporate entities that are engaged as far as promotion of water conservation and climate change adaptation interventions are concerned.

The road to sustainable water use ensuring water availability has to be carved through integrated water management, participatory planning, and implementation involving all the stakeholders. Industries have a major role to play in not only transforming their own policies and operations to enhance water use efficiency, but also pivot their role in reducing the growing stress on the water resources in the regional context, as well as their value chain. In meeting this challenge, there is an opportunity to increase efficiency and productivity in a sustainable way. The key areas of interventions where corporates can play a major role includes conducting water audits, mapping water footprints and undertaking water conservation and efficiency improvement interventions within the industry and its entire value chain. These include an integrated industrial water management strategy which optimizes efficient use of water, improves water productivity, reduces losses, and promotes water conservation interventions (such as recycling and reuse of wastewater, zero discharge, rainwater harvesting, groundwater recharge, etc.). Besides, several of such water related interventions (e.g., micro-irrigation system, household rainwater harvesting, check dams, groundwater recharge, rejuvenation of water bodies, drinking water provision, etc.) can be undertaken with involvement of the local communities at the watershed and basin scale under the Corporate Social Responsibility (CSR) activities. Besides ensuring water availability this shall also foster community resilience to water stresses in the region.

Key Challenges

Corporates have an opportunity to be proactively responsive to the potential vulnerabilities of climate change and water scarcity by leading the initiatives on efficient water use and resource conservation, while also setting a benchmark for regulatory environment.

Expanding the Use of Renewable Energy

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Introduction

India is poised to take giant strides in economic development and use of energy in the near future.

Indian RE sector growth potential

India has tremendous renewable energy (RE) potential. The major renewable energy resources and their potential are tabulated below:

Renewable energy source	Potential for power generation	Achievement (Up to December 31, 2014)	Remarks
Solar energy	780 GW	3,062.68 MW	Other studies indicate potential up to 1,400 GW Government of India plans to install 100 GW of solar power plant by 2020
Wind energy (Potential at 80 m)	102.788 GW t	22,465.03 MW	12th Five-Year Plan target 15 GW
Small hydro	19.75 GW (6,474 sites)	3,990.65 MW (@1016 projects)	
Biomass power and gasification	23 GW	1,365.20 MW	
Bagasse cogeneration		2,800.35 MW	
Waste to Power	2,600 MW [MSW (Municipal Solid Waste based)] 1,300 MW (Industrial Waste)	107.58 MW	

Note: The above potential estimates are reported by the Ministry of New and Renewable Energy (MNRE). However, these are constantly revised upwards. Several other organizations have reported much higher potential of solar and wind energy.

Key Questions

Against this background, we would like industry leaders to address following point from the perspective of industry:

- What are the immediate steps required to improve the share of clean and renewable energy?
- How can industries support the 'Make in India' by investing in clean and renewable energy sector manufacturing?
- What role do corporates see for them in mainstreaming clean and renewable energy?
- How can the development and share of sustainable fuels be increased?

- Additionally, about 1,123.32 MWeq capacity systems are installed in off-grid/captive mode
- Apart from this 4.795 million biogas plants and 8.63 million m2 of solar water heating collectors are installed

The above data shows there is huge potential for expanding renewables for power generation and heating applications in industries.

Biofuels

While, the government programmes are focusing on developing wind and solar power plants there is also need to develop strategy for other renewables including alternate fuels for transport and stationary applications. The government announced National Biofuel Policy in December 2009. The major goals of the policy are development and utilization of indigenous non-food feed stocks raised on degraded or waste lands, thrust on research and development on cultivation, processing and production of biofuels, and a blending mandate of 20 per cent ethanol and bio-diesel by 2017. The implementation of this policy is hampered by variety of issues.

Wind energy

Wind energy industry in India is well developed over a period of more than three decades. The industry benefited mainly from stable policy regime, enactment of Electricity Act 2003, and installations grew steadily from 2003 to 2012. Sudden removal of accelerated depreciation and generation-based incentive slowed the market in 2012–13 and 2013–14 showing the policy dependency of the sector. Reintroduction of both Generation Based Incentive (GBI) and accelerated depreciation benefit in 2014 by the current government has revitalized the wind sector in India.

Solar energy

Use of solar power for large-scale grid power generation picked up after the announcement of the

National Solar Mission in 2008 as part of the larger national agenda of National Action Plan on Climate Change. The original target of 20 GW grid connected power by 2022 was proposed by the erstwhile UPA government. The present government has indicated that they would like to increase the same to 100 GW. This has created huge excitement as well as concerns in the market. The major concerns among them are as follows:

- Availability and acquisition of land
- Response of electricity utilities
- Readiness of the grid to absorb the variable power
- Availability of finance on attractive terms
- Mix of policies and schemes
- Lack of long-term policy regime

The government is also pushing for programmes such as 24 × 7 supply to every household, 'Make in India', 'Smart Cities' or 'Swachh Bharat' which can create huge markets for renewables and their manufacturing industries.

Renewable Energy Investment Scenario

New annual investments in renewable power and fuels are showing upward trends across the global markets. During the period 2004–13, annual investments grew from $39.5 billion to $214.4 billion. Annual investments peaked during 2011 when investments were $279 billion. Investments in the India market are showing similar trends. In 2013, total investments were $6.1 billion. Investments in India markets peaked during 2011 when they touched $12.6 billion.

Financing the Energy Transition and Sustainable Development

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Introduction

The realization of India's essential yet formidable sustainable development agenda hinges crucially on successfully mobilizing and channelling capital to where it is needed most-providing clean, affordable, reliable energy, building the infrastructure for smart cities, and creating enterprises that will generate livelihoods for an additional 10 million jobseekers each year.

Estimates in this regard are a clear pointer to that which needs to be addressed. According to the International Energy Agency, at least an additional $1 trillion per year is required into clean energy by 2050 if there can be any hope of limiting global warming to 2°C. Yet global investment in clean energy was just $254 billion in 2013.[1]

In India, the infrastructure investment required during the 12th Five-Year Plan period (2012–17) has been pegged at ₹65 lakh crore (roughly $1 trillion), of which only half, it is expected, can be met from public budgetary resources.[2] India has also voluntarily committed to reducing the emissions intensity of its Gross Domestic Product (GDP) by 20–25 per cent, over the 2005 levels, by 2020. A low emissions path will entail significant improvements in energy efficiency (EE) across sectors, increased use of renewable energy (RE) for power production, sustainable waste management, and conservation of forests. The expert group on Low Carbon Strategies for Inclusive Growth set up by the Planning Commission has estimated the cost of specific low carbon strategies between 2011 and 2030 at about $834 billion at 2011 prices. More recently, the government has set a target of 100 GW of solar power capacity by 2022.

[1] International Energy Agency (IEA), Energy Technology Perspectives 2012: Pathways to a Clean Energy System

[2] Planning Commission: Working Sub-Group on Infrastructure for the 12th Five-Year Plan (2012–17)

Key Questions

The mobilization of capital into a green and more sustainable economy will crucially depend on a coherent policy and regulatory framework and some innovative thinking at the national and international levels. Key challenges relevant to financing the sustainable energy transition in India may be seen through the following questions:

- What are the major policies and regulatory incentives required to reduce risks and provide competitive investment opportunities to upscale EE and RE technologies, both, grid and off-grid?
  - » Whether priority sector lending within the Reserve Bank of India (RBI) mandate could include credit extensions to RE/EE enterprises
  - » How can currency risks in foreign currency loans (FCL) be reduced and integrated with project financing
  - » Examining the possibility of lower payback interest rates, longer term tenure, re-financing, etc.
  - » Enabling commercial banks in extending credit to RE/EE projects
- How can we tap into the debt market for enhancing credit?
  - » What lessons can be learnt from international experience in green bonds for the overall expansion of capital markets to bring new liquidity into this space?
- How can India better access Green Funds from around the world? How can the BRICS bank enable financing for this sector?
- How can Venture Capital Funds and Private Equity entities be encouraged to play a bigger role in the domestic energy transition market?
- What regulatory and policy changes are required to enable large institutional investors such as pension and insurance funds to contribute to mid-term financing for EE and RE in India?
- What role can be played by Corporate Social Responsibility (CSR) funds in financing RE transitions? Is it possible to set up a Green Fund through CSR funding?
- How can environmental and sustainability reporting be better integrated into aiding valuations of RE/EE companies, in order to attract investors? In general, how can the Environment Sustainability Governance information flowing from corporates be benchmarked and evaluated?

Private sector contribution will be indispensable in meeting these challenges but will crucially depend on some serious rethinking on the 'rules of the game' that govern financial markets—behavioural norms, institutional frameworks and regulatory requirements that guide the allocation of capital.

Some efforts are underway at both the global and national levels in this direction. In 2014, UNEP set up an

inquiry to identify, develop, and recommend policy and regulatory reforms that would deliver a step change in the effectiveness of financial markets in channelling capital to the green economy.[3] At the national level, notable initiatives include the China Banking Regulatory Commission's Green Credit Guidelines and South Africa's adjustment to pension-related legislation to encourage trustees to integrate sustainability issues. In parallel, a growing number of investors internationally are taking initiatives in the form of direct low carbon investments, creation of low carbon funds, company engagement, and reducing exposure to fossil fuel and carbon intensive companies.[4] Closer home, recent initiatives such as Green bonds offered by IREDA, the BEE risk guarantee fund for energy projects and the uptake of the Equator Principle by IDFC suggest that the Indian credit market is willing to respond to the challenge of financing sustainability.

[3] UNEP (2014), "Inquiry into the Design of a Sustainable for Financial System: Policy Innovations for a Green Economy"

[4] Some examples of these initiatives are discussed in UNEP (2014), "Financial Institutions taking Action on Climate Change"

Improving the Efficiency of Energy Use

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Introduction

Energy efficiency (EE) plays a key role in decoupling energy use and the resultant emissions from economic growth. About 80 per cent of the world's primary energy consumption continues to be fossil fuel based. Thus, reducing fossil fuel use in different end-use sectors through EE can play a key role in reducing emissions.

Moreover, unlike many other options, EE measures are generally "win-win" in terms of paying off over the life cycle of the alternative option. In many cases, low-cost options exist with fairly quick payback periods. However, in many other cases, there are barriers relating to technology, finance, and institutional that hinder faster uptake of EE. At the same time, studies also indicate that improvement in EE has a multiplier effect on the economy. As per International Energy Agency (IEA) estimates, total investment in EE globally almost equalled the magnitude of supply-side investment in renewable or fossil-based electricity generation in 2011, indicating the relevance that countries are ascribing to EE across countries globally. In case of India as well, TERI estimates indicate that EE has the potential to save anywhere between 15–25 per cent of the energy use across different end-use sectors. Some of the key areas where EE can play a major role include the following:

- Industries including Small and Medium Enterprises (SMEs)
- Efficiency improvements on the supply side primarily in the coal-based power plants
- Reducing transmission and distribution losses, including introduction of smart grids
- House-hold appliances like air-conditioners, refrigerators, geysers, etc.
- Efficiency in transport sector including introducing energy standards for motorized vehicles
- Commercial and residential buildings

Key Questions

- Which are the three key sectors where scope for action towards enhancing EE is largest?
- What actions and timelines can we visualize to tap the EE potential in these areas?
- What steps could the private sector take and how much reduction can be committed in these sectors?

- Efficiency improvements in the agriculture pumping sector
- Municipal services like street lighting and pumping Information Technology (IT) can be applied as an effective cross-cutting tool across different end-use sectors for enhancing EE.

Support from Existing Government and Corporate Sector Initiatives

The corporate sector in the country, especially some of the large industries as well as new large corporate/commercial buildings, has been making efforts to introduce latest technologies and processes—thereby helping in reducing its energy consumption. Bureau of Energy Efficiency (BEE) has also played a key role in promoting EE across various sectors under the overall mandate of the Energy Conservation Act. However, there are still areas and initiatives where more focus is needed to push the agenda of EE across all sectors. A few of the areas are as follows:

- Perform Achieve and Trade (PAT) scheme in India is a market-based mechanism to enhance cost effectiveness of improvements in EE in energy intensive large industries and facilities, through certification on energy savings that could be traded. Seven industrial sub-sectors namely aluminium, cement, chlor-alkali, fertilizers, iron and steel, pulp and paper, and textile industries along with thermal power plants have been included under PAT programme with an aim to save 6.6 million tonnes of oil equivalent (mtoe) by 2014–15 (Press Information Bureau, Government of India 2012) from the identified industries. There are around 480 such large consumers of energy (termed Designated Consumers), which have been targeted in this first phase of the PAT cycle. The scheme has been working well in the first phase; the achievements and learning would help in further deepening and widening of the PAT scheme in the subsequent years
- There is a need for SME focused programmes and schemes for improving EE in the SME sector. Large industries can work with SMEs in their supply chain and support them in introducing EE concepts in their plant operations
- In case of the power generation sector, efficiency improvements of coal-based power plants by moving to "supercritical technology" would reduce coal requirements and emissions
- On the T&D front, India has high losses which again are important to address. Electric utilities can play a major role in promoting EE through focused Demand Side Management (DSM) Programmes. Decentralized generation can also help rein in the level of such losses apart from providing access to remote areas
- The buildings and appliances have significant scope for efficiency improvements. While promoting EE appliances, it is also important to find strategies to phase out inefficient appliances and equipment. Making Energy Conservation Building Code (ECBC) code mandatory and pushing for Green buildings in residential and commercial sectors can play a key role. Similarly, significant scope exists in various municipal services such as street lighting and water pumping
- Efficiency in transport: Fleet efficiency needs to improve as well as shift to public transport can enhance efficiency of the sector
- Rational pricing: Need to improve EE in the agriculture sector with rationalization of energy prices.

Key Challenges

The challenges to faster uptake of EE technologies and practices differ from sector to sector. Broadly, they can put under the following five heads:

- Financial (e.g., high upfront cost of efficient technologies, high interest costs, etc.)
- Technical (e.g., non-availability of customized localized solutions, sub-optimal indigenous R&D efforts and access to state-of-the-art technologies from developed countries)
- Institutional (e.g., implementing ECBC at local levels, bad financial health of electric utilities, monitoring and verification, etc.)
- Rational energy pricing (e.g., low electricity pricing in agriculture sector)
- Non-availability of skilled manpower across all levels

Inputs on the Names of Companies for Deliberation on the Respective Themes

This is a very broad theme covering all sectors. Some of the expected companies for the deliberation include ABB, ACC, Adani Power, Aditya Birla Group (Hindalco), Danfoss, GAIL, IFFCO, Ingersoll Rand, J K Paper, Johnson Control, NFL, NTPC, SAIL, Schneider Electric, Tata Power, Tata Steel, and United Technologies Corporation.

Low-carbon Technologies in SMEs

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Introduction

The strategic importance of Small and Medium Enterprises (SMEs) is acknowledged across the world. In India too, SMEs are an important component of the economy. They contribute to 45 per cent of manufacturing output, 40 per cent of exports, and employ the largest number of people, next only to agriculture. Most SMEs still use conventional technologies and practices that are inefficient. Many energy-intensive applications in sectors such as foundry, forging, glass, textiles, paper, chemicals, and so on have not benefitted from innovation in cleaner technologies. These sectors have been hard-hit after the opening-up of the economy and easy availability of cheaper imported products. Reducing the cost of production has thus become a priority in today's competitive marketplace. Adoption of energy-efficient technologies by SMEs will reduce their operating cost and carbon dioxide (CO_2) emissions. Hence, increased investment in efficient technologies in SMEs is desirable both from the national and global viewpoints.

Key Challenges

A vast majority of SMEs in India, especially in the energy-intensive sectors, still uses outdated energy inefficient technologies and practices. In general, energy efficient technology is more expensive compared to conventional or inefficient technology. The higher upfront investment is one the main barriers to adoption of energy efficient technologies by SMEs. Also, very little investments have been made for developing energy efficient technologies for a large number of traditional energy-intensive SME sectors. For such sectors, the absence of ready-made technological solutions commercially

Key Questions

- Technological solutions are not readily available, and there is a need to develop customized solutions to suit specific needs of SMEs. How can innovation (R&D) on energy-efficient technologies be promoted among SMEs?
- How do we accelerate the adoption of energy-efficient technologies in SME sector? How do we engage large industries in this process?
- A significant amount of energy is consumed in utilities like pumps, fans, transformers, etc. that are manufactured in SMEs. How do we promote manufacturing of energy-efficient equipment and phase out the inefficient ones?

is a major barrier. Some of the reasons for the poor uptake of low-carbon technologies in this sector have been the lack of availability of the off-the-shelf cleaner alternatives, little investment in innovation (R&D) of new technologies, low awareness of new technologies which are available commercially, limited in-house technical capacities to implement change, poor quality of local service providers (LSPs), underdeveloped support institutions, and lack of attractive financial options.

Energy-efficient technologies can be categorized according to their stage of commercialisation—pre-commercial, semi-commercial, and fully commercial. Pre-commercial technologies are those where readymade technological solutions are not available and hence R&D is necessary, e.g., improved waste heat recovery systems for furnaces. Semi-commercial refers to newly developed technologies that have been demonstrated in a limited number of units but have not yet reached commercial maturation or "taken-off", for e.g., an improved furnace design. Fully commercial technologies are those which are available commercially in the market but are yet to reach the saturation level, for e.g., IE3/IE4 electric motors.

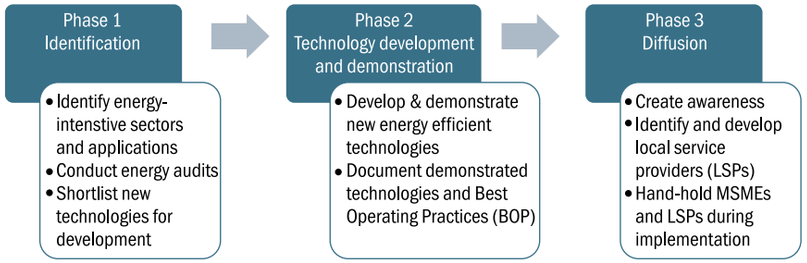
Opportunities

Efficient technological solutions that are commercially available in developed countries cannot often be used by SMEs in India due to their high upfront cost and scale of operation. The SMEs lack financial and technical capacity to undertake innovation (research and development activities) it is important to undertake development and demonstration projects aimed at providing off-the-shelf efficient technological systems for them. Development of energy efficient technologies for SMEs is not attractive for large engineering firms and consultancies in the private sector. Hence public funding is needed for R&D and demonstration of new energy efficient technologies for a large number of energy-intensive SME sectors. Demonstration of new pre-commercial technologies will help in popularizing these technological options among SMEs. In order to create a delivery system for the demonstrated technology it is important to identify and develop a network of LSPs. The LSPs who can be consultants, fabricators or consultancy organizations, can play an important intermediary role in hand-holding of the units to successfully implement the technology. It is crucial to support a new technology for a few years till it has been adopted by a sufficient number of units.

Awareness and capacity-building programmes for entrepreneurs, supervisors, operators, and LSPs are important for dissemination of semi-commercial technologies. Energy audits is a proved tool to identify energy savings opportunities at a unit level. SMEs require larger financial assistance to get their units energy audited. Appropriate interventions to support identification, financing, and implementation of energy efficient technologies and practices are need to be formulated for adoption of commercial technologies among energy-intensive SME clusters. The rate of adoption of such technologies can also be accelerated by providing concessional loans for energy efficient technologies to SMEs.

Considering the scale at which SMEs operate, there has to be a significant effort at the national level to develop cost-effective technological solutions customized to local conditions for them. It is important to develop tailor-made programmes to promote low-carbon technologies among SMEs especially in the context of climate change. A holistic approach which can contribute towards increasing the technological capabilities of the sector as a whole (entrepreneurs, supervisors, operators, and local service providers) is required. The Energy and Resources Institute (TERI), with the support of the Swiss Agency for Development and Cooperation (SDC), has successfully undertaken research, development, demonstration, and dissemination (RDD&D) projects for selected applications in the glass and foundry sectors. The projects have led to strengthening of the technological capacities of the sector stakeholders (entrepreneurs, supervisors, workers, and local service providers) as a whole.

A phased approach to promoting new energy efficient technologies among MSMEs is shown below:



Sustainable Buildings

THEME LEADS
Ms Mili Majumdar
Director, Sustainable Habitat, TERI

Ms Priyanka Kochhar
Senior Programme Manager, Sustainable Habitat, TERI

Introduction

In 2010 buildings accounted for 32 per cent of total global final energy use and 19 per cent of energy-related greenhouse gas (GHG) emissions. Findings of the Findings of IPCC's Fifth Assessment Report (5AR) envisage that this energy use and related emissions may double or potentially even triple by mid-century due to several key trends. According to the Global Energy Assessment (2012) projections for 2050, a 46 per cent reduction in global heating and cooling loads (compared to 2005 levels) can be achieved by deployment of today's best practices in construction and retrofit know-how.

As the world's largest democracy facing an increase in frequency and intensity of climatic events, it is imperative that India takes on a key role in deploying an alternate development path to mitigate the impacts of climate change.

The industry captains have been proactive in taking responsibility by integrating sustainability in their operations and within their value chain. While the costs of integrating efficiency in the built environment are significant, savings in energy costs typically more than exceed the investment costs.

As per estimates of the Government of India, less than 5 per cent of the $11.4 billion market for energy efficiency has been explored . Further, an investment of about $64 billion at 2009 prices until 2031 is required for provision of sustainable services and development of infrastructure. This provides an enormous possibility and opportunity for the corporate sector to chart out a vision for India to combat climate change and rise to meet challenges, create opportunities, and take the lead in the climate discourse.

As per the AR5, the global green building market is valued at approximately $550 billion in 2010 and is expected to grow through to 2015, with Asia anticipated to be the fastest growing region.

In order to create an environment conducive to meaningful growth, the Government of India has launched new initiatives to encourage active participation from the private sector. The foreign

Key Questions

- What expertise can corporate India offer to ensure sustainability in the planning and execution of '100 Smart Cities'? What business opportunities and financial structures are required?
- In order to achieve a holistic approach to city development, what resources need to be mobilized?
- What immediate steps are required to build efficiency and smartness in self-occupied buildings and those that can be influenced through the individual value chain?

direct investment (FDI) policy on the construction development sector, invitation to private sector for design and development of affordable housing in partnership, and collaborations to facilitate performance contracting of existing buildings have all been designed to ensure that development and growth meets the objectives of energy efficiency and environmental sustainability at various levels.

The Energy Conservation Building Code (ECBC) of India launched by the Bureau of Energy Efficiency (BEE) is in place since 2007 and the Government of India is taking necessary steps to mandate the Code. Several states of India including Rajasthan, Odisha, Andhra Pradesh, and Gujarat have already mandated the ECBC, and the corporate sector has greatly benefitted from its adoption. Penetration of energy efficient products for envelope and systems has also gone up several fold. The BEE has been very successful in its appliance labelling programme that has helped raise the bar of energy efficiency in the appliance sector. Green Rating for Integrated Habitat Assessment (GRIHA) has largely been adopted in the governmental sector as a tool to facilitate design, construction, and operation of sustainable habitats. The Leadership in Energy and Environmental Design (LEED) certification system was introduced through collaboration between Confederation of Indian Industry (CII) and the United States Green Building Council (USGBC) way back in 2003. Since then several corporate organizations have adopted the LEED system to demonstrate environmental responsiveness and has gained prominence as a tool to deliver green buildings through a globally acceptable system

The schemes such as 'Make in India' link development and growth to sustainable buildings by incentivizing compliance with green building rating systems such as LEED and GRIHA. The '100 Smart Cities' programme, being spearheaded by the Ministry of Urban Development, clearly delineates the requirement for each city to comply with an environmental sustainability framework. Furthermore, the National Housing Bank has also launched a major programme called Energy Efficient Housing Scheme to refinance energy efficient housing.

Taking the lead, United Technology Corporation in collaboration with TERI has launched a Centre of Excellence (CoE) for energy efficient buildings in India with an objective to mainstream resource efficiency in the existing building stock. The CoE conducts research to assess energy use and consumption patterns of existing buildings that would be used to set energy performance baseline along with a roadmap to make the buildings more energy efficient.

Another example is that of the strategic collaboration between TERI and the USGBC to develop high performance 'green buildings' in India and Southeast Asia. With an initial thrust on existing stock of buildings, the objective is to ensure implementation of key sustainability parameters on the ground through regionalization of LEED.

There are several bilateral programmes in the sector under aegis of the Government of India being supported through bilateral partners such as Swiss Development Corporation (BEEP), AFD (SUNREF), USAID (PACE D), etc. However, there is an urgent need to focus on deployment, identify mechanisms to upscale best practices and initiatives, and encourage technology business incubators that would help address some of the challenges associated with climate change Despite several government and private initiatives, the sector has not yet gained the ideal level of traction. Strong barriers hinder the market uptake of largely cost-effective opportunities to achieve energy efficiency improvements. Barriers include imperfect information, transaction costs, limited capital, externalities, subsidies, risk aversion, principal agent problems, fragmented market and institutional structures, poor feedback, poor enforcement of regulations, cultural aspects, cognitive and behavioural patterns, as well as difficulties concerning patent protection and technology transfer. More specific to India, lack of awareness, financing and qualified personnel causes lock-in effects in terms of emissions. The pace of policy uptake is especially important because ongoing development efforts that do not consider co-benefits may lock in sub-optimal technologies and infrastructure and result in high costs in future years.

Identifying Business Opportunities in Smart Cities

Based on discussions with corporate leaders, several opportunities were identified for the corporate sector to implement the vision of the Government of India. Solutions ranged from joint implementation of one model smart city to highlighting solutions already implemented at various levels.

In view of the deliberations, we envisage that the ambitious plan to implement "100 Smart Cities" across India is likely to be planned in a manner that considers redevelopment and retrofitting of existing sites, and greenfield development in identified areas.

Towards Sustainable Mobility

CHAIR
Mr Anil Kumar Gupta
Chairman and Managing Director, Container Corporation of India Ltd

THEME LEAD
Mr Shri Prakash
Distinguished Fellow, Centre for Research on Sustainable Urban Development and Transport Systems, TERI

Introduction

The nature and volume of freight transport in India has been undergoing significant changes over the last few decades. Characteristic of one of the largest and most rapidly growing economies in the world, not only have the volumes of freight transport increased exponentially, there has also been changes in the way the movement of these goods take place.

Based on energy and environmental considerations, various committees such as the National Transport Policy Committee (NTPC), 1980 and the National Transport Development Policy Committee (2013) have repeatedly emphasized on the need to move larger volumes of freight by rail. However, the share of freight transport on the railways has continued to decline from about 62 per cent in 1990–91 to about 36 per cent by 2012–13. A large number of factors have been responsible for this declining trend of freight transport on the railways including inadequate rail infrastructure, changing patterns of commodity, wise demands, increasing rail transport costs, etc.

This declining share of freight transport on railways has been capitalized by road transport which has in the last couple of decades become the dominant freight transport mode in the country. Augmented by the growth in the National Highways, road transport has seen a rapid growth since the turn of this century. However given that it is mostly in the unorganized sector, with a large number of small operators, the trucking and road-based freight transport industry in India is riddled with many challenges such as poor road infrastructure and old and low capacity vehicle stock. In addition to these operational and infrastructural issues, a large number of policy and regulatory bottlenecks limit the seamless movement of road-based freight transport across states and union territories of the country. All these lead to longer turnaround times and systemic inefficiencies in the interstate and long lead movement of freight on road transport. These inefficiencies also lead to increasing costs of goods transport accompanied by a much higher demand for energy and resulting emissions. Any factor limiting the movement of freight, such as prohibitive

Key Questions

- What kind of changes might be required to help in integrated transport planning for emerging industrial clusters/mining areas around the country?
- What steps can corporate India take/what changes to policy does corporate India need to increase their use of rail and water (IWT/coastal shipping)?
- What measures should be taken to improve recording and reporting of freight transport demands for the movement of raw materials and finished products and creation of a transport database for the same?

costs of crude or its limited availability has the potentials to completely bring the country to a standstill. These trends in shifting shares from road to rail have many implications on the economic growth trajectory of the country and it also critically impacts the levels of energy consumption for freight transport and its efficiencies.

In addition to improving the road- and rail-based freight transport, there is also ample scope for developing and strengthening the coastal and riverine transport systems in the country which have largely been underutilized. Water-based freight transport, given its economies of scale, is also an efficient mode of freight transport. India has to its advantage, a long and inundated coastline which it is in the right position to use for coastal shipping and a long list of perennial rivers which crisscross the peninsula and could be used for inland water transport. A large number of new ports have already come up in the recent few years or is being planned to become functional in the next few years. These have to be optimally used to move larger volumes of freight on water hand in hand with improving the quality of road and- rail-based goods transport. An integrated view of transport planning by improving the modal mix of freight transport across the country by combining the use of rail, road, and water could help in moving towards a path of sustainable mobility in India.

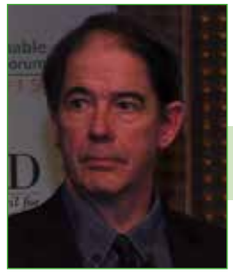
To help in moving in this direction, policy, and decision makers in India are often challenged given the lack of adequate information about the current and future needs for freight mobility. Coordinated and efficient multimodal transportation can only be made possible with adequate information to assist in planning and movement. A systematic method of generation and dissemination of information related to the nature and volumes of movement of goods such as raw materials and finished products is therefore extremely critical to help in enabling a sustainable transport framework for India. Such information would help unlock greater efficiencies in the movement of freight transport not only from improved planning but also through achieving efficiencies resulting from coordinated multi-modal movement of goods. Indian industry and corporate organizations are perhaps the largest users of freight transport in the country and would be the greatest beneficiaries if larger efficiencies could be unlocked in the movement of goods in the country. They are both the consumers and users of freight transport for moving both their raw materials and finished products and goods. It is for this reason that the discussions on Sustainable Mobility at the High Level Corporate Dialogue 2015 would focus on the topic of “Increasing efficiency in the freight transport in India”.

THEMATIC BREAKAWAY SESSIONS

Introduction to the
Thematic Breakaway Sessions

During the thematic breakaway session, participants discussed short-term and long-term corporate actions under ten themes related to climate change.

Sir Jonathon Porritt, Founder Director, Forum for the Future, chaired this session. The panellists included: Mr Susheel Kumar, IAS, Additional Secretary, Ministry of Environment, Forest & Climate Change, India; Dr Bindu N Lohani, Vice-President of the Asian Development Bank (ADB) for Knowledge Management and Sustainable Development; Dr Henrik O Madsen, Group President and CEO, DNV-GL; Dr Ajay Mathur, Director-General, Bureau of Energy Efficiency, India; Mr Onno Rühl, Country Director, World Bank India; Dr R K Pachauri, Director-General, TERI & President, TERI BCSD.



Message from the Chair

Sir Jonathon Porritt
Founder Director, Forum for the Future

"Underpinning all of this is the knowledge that energy efficiency still remains the cornerstone of any low-carbon corporate strategy. However smart our new technologies may be, however exciting the prospective breakthroughs on energy storage and smart grids, it's impossible to make the sums add up without dramatic improvements in energy intensity per unit of GDP."

The debate about whether or not business can ever be a 'force for good' in the world is over; the last decade has shown us countless examples of individual companies making a substantial contribution to resolving some of today's most pressing social and environmental issues – including climate change. The debate now is all about moving beyond those individual examples to transform the whole sectors.

And there's a dimension beyond that: how best can we use the power of business to help persuade governments to address today's converging crises with a much greater sense of urgency and purpose – especially the challenge of accelerating climate change.

In conventional governance terms, that is of course the wrong way round. Historically, governments have either mandated change in business behaviour (through regulation, taxation and so on) or incentivised that change through a whole host of available interventions. Over the last couple of years, however, governments have progressively scaled back on both. And that's now the biggest single barrier we face in terms of expediting the transition towards a more sustainable, low-carbon world – which is, at long last, well and truly under way.

That understanding of the role of business is not a universally held point of view. There are many NGOs who continue to lay the blame for worsening environmental degradation and continuing chronic poverty on global corporations – not on governments. Naomi Klein's new book, 'This Changes Everything', is primarily an attack (and a very eloquent attack too!) on today's 'extractivist sectors' (oil, coal, gas and mining), but at the same time she envisages no major role even for the most progressive of companies in helping fashion a more sustainable economy. And her contempt for today's 'green billionaires' is visceral.

I don't really get this – especially when considering what has to be done on addressing climate change over the next year. After another embarrassingly mediocre display by governments at the 20th Conference of the Parties in Lima (despite some very encouraging announcements by both the US and China in the preceding weeks), almost all of the big and controversial issues are still to be resolved by the Conference in Paris at the end of 2015. It's clear that a lot of the heavy lifting for that is going to have to be done by the business community.

There's nothing new in that, with a lot of corporate muscle already at work on multiple low-carbon agendas. Business coalitions such as the UN Global Compact, the Prince of Wales's Corporate Leaders Group and 'We Mean Business' have upped their game over the last couple of years in terms of advocating for low-carbon strategies. The Consumer Goods Forum has driven really hard on both deforestation and refrigeration issues, empowering a lot of companies to go the extra mile in terms of their own commitments.

Perhaps even more importantly, the pace and scale of innovation for a low-carbon world has now achieved an unstoppable momentum. In sectors like lighting, transportation, building design and materials, logistics, waste management, energy storage and transmission, additive manufacturing, industrial biotechnology and so on, the 'low carbon imperative' is having a bigger and bigger impact. Global IT companies, for instance, are now at the heart of this new wave of innovation, disrupting conventional business models all over the place whilst breathing new life into the idea of smart cities and smart communities.

At the same time, it's now clear that companies involved either in the extraction or the combustion of fossil fuels are starting to feel the heat, with trillions of dollars of shareholder value now at risk as investors begin to think much more strategically about the risk of 'unburnable carbon' and the impact of this on all future hydrocarbon investments. Other companies are rapidly stepping into the breach, with tens of billions of dollars now flowing into the renewable energy sector every year. And more and more companies will be making commitments to '100% renewable energy' through the course of this year – whether by 2020 or further in the future.

Underpinning all of this is the knowledge that energy efficiency still remains the cornerstone of any low-carbon corporate strategy. However smart our new technologies may be, however exciting the prospective breakthroughs on energy storage and smart grids, it's impossible to make the sums add up without dramatic improvements in energy intensity per unit of GDP. This is particularly the case in a country like India, where potential efficiency gains are literally enormous – as some of the country's leading IT companies have already so eloquently demonstrated.

The combined effect of all this is a powerful one. It provides governments with 'a licence to lead'. Where once the majority of companies might have been urging governments to hold back, go slow and protect entrenched interests, the prevailing voice of the business community today is exactly the opposite: get on with it, seize hold of the moment, and reward today's entrepreneurs, innovators and investors who are intent on creating wealth through hyper-efficient, low-carbon strategies.

Thematic Breakaway Sessions

Adapting to the Impacts of Climate Change

> *There was a wonderfully reassuring sense on our table of business people that people were aware of environmental risks today.*
>
> **Mr Uday Khemka**

The discussion in this thematic breakaway session focused on the impacts of climate change and how corporates can help raise awareness about climate risks. There was a general consensus within the group that today people were aware of environmental risks but could not differentiate between environmental risks and real climate impacts. It was agreed that there should be a specific risk mapping exercise for all varied sectors and geographies and each country should commit to it as part of its national commitment during the 21st Conference of Parties (COP21) scheduled to be held in Paris in November–December 2015. It was discussed that the right approach should be specific mapping of the risks (both spatially and sectorally), awareness created for those risks for all the stakeholders, and then ultimately identification of the opportunities. As its short-term goals, the group agreed that adoption of a multi-stakeholder and multi-sectoral approach will indeed help identify the climate risks based on geography; and that a thrust be given on corporate governance, creation of standards for credit and insurance, ways of assessing risks, and stakeholder engagements by businesses for awareness. Adaptation measures to assist in measuring and strategizing actions were also explored during the session. There is also a need to re-evaluate methods of social impact assessment that include stakeholder's consideration.

Ensuring Water Availability in a Changing Climate

> *We should look at water, energy, and food as a nexus together.*
>
> **Dr Bindu N Lohani**

The discussion in this thematic breakaway session focused on the problem of water scarcity in India and how the water footprint of corporates could be reduced. The issue of ensuring water availability in changing climate scenario as well as various issues of use inefficiency, pricing, water audits, measurements, etc., were taken up for discussion during the session.

The group arrived at a consensus that measurement of water footprints within and across the business value chain and aggressive implementation of measures to improve water use efficiency will comprise the set of short-term goals. The long-term goals include the introduction of water pricing through market mechanisms and forging industry partnership with government to minimize water usage in the agriculture sector. There was also a discussion about the need to address the inefficiencies in the urban water supply.

Mr Onno Rühl, Country Director, World Bank India, highlighted that setting targets for water efficiency in addition to the pricing mechanism is very important.

> *I loved the idea of setting targets for water use efficiency.*
>
> **Mr Onno Rühl**

Improving the Efficiency of Energy Use

This thematic breakaway session on "Improving the Efficiency of Energy Use" discussed not only about the targets at the end point and the ways to move forward towards those targets but also included these across the entire value chain. As their short-term priority, the group envisioned a plan to decrease the specific energy consumption across all industry sectors. Discussions were carried out on reporting voluntarily on energy efficiency including public disclosure of Energy Performance Index (EPI) of buildings in real estate transactions, making the Perform Achieve and Trade (PAT) scheme driven by benchmarks much more ambitious, financing and procurement policy of large corporates, etc.

The group's long-term priorities included development of conducive financing and procurement policies for improving energy efficiency in Small and Medium Enterprises (SMEs); voluntary reporting by the industry to enable informed decision making by policymakers on issues such as phasing out of subsidies on conventional energy; and increasing the level of green energy production from 6 per cent to 30 per cent by 2030.

One of the speakers felt that in the long term, elimination of subsidies, which exist in pricing of energy,

is extremely critical to drive behavioural changes that are distorting some of the markets for energy efficient products, especially in agriculture sector.

> *In order to successfully meet the clean energy requirements, the public and private sectors need to work in tandem.*

Dr Bindu N Lohani

Sustainable Buildings

> *Most of India's buildings of 2050 still need to be built and it is the largest user of energy.*

Mr Onno Rühl

In this thematic breakaway session, discussions focussed around the need to integrate efficiency in buildings within the value chain that each of the corporate sector commands. The panelists proposed that best practices and experiences need to be showcased on a platform. Therefore, an aggregated knowledge platform (online or publication) to be developed. Another issue that was taken up was that of state level implementation of the initiative on smart cities. A quarterly dialogue between the corporates to strengthen the implementation was proposed. Strengthening of the smart city framework implementation and addressing innovative and practical technologies that can be implemented on ground were also identified as activities that need attention and implementation. The group explored role of corporate India to ensure sustainability imperatives are embedded in the planning and execution of city development. The discussants in this group also emphasized the role of education and capacity-building of employees, customers, vendors, technocrats, financial institutions, and bureaucrats.

> *Regarding our buildings, (in Denmark) we decided that we would pursue the highest quality on energy efficiency and also on the environmental issues.*

Dr Henrik O Madsen

The need to bring about greater clarity on what a smart city would be, was also brought out by one speaker. A smart city in the Indian context could be different to the one in the western countries and, therefore, there the need to define smartness across different sectors which includes all stakeholders was identified. It was also discussed that there was a need to look at creating awareness, educating people about these aspects, and then making it relevant to them.

The group urged TERI and USGBC to create solutions to implement smart cities, encouraging quarterly corporate dialogues.

> *It is about regulation on the one hand which is easily enforceable, and business models which allow learning and cost reductions on the other hand.*

Dr Ajay Mathur

Efficient Waste Management

The discussants in this thematic breakaway session focused on the ways to call for a corporate outlook towards efficient waste management. The group had very detailed discussions and deliberations on various short-term- and long-term goals on efficient waste management. The group came up with three short-term- and medium-term goals. The first short-term goal fostered a national policy on the motto—Reduce, Recycle, and Reuse. It was felt that the same will become a foundation for corporates or individuals to move on towards the path of efficient waste management. The second one was enabling legislation for mandatory source segregation because it was felt that unless we have a good legislation for source segregation, recycling and reuse become quite tedious and it has been experienced in India. The third goal was that once the product has been recycled and recovered, there has to be an enabling policy support to market it. Therefore, the short-term goals fostered a national policy on the slogan—Reduce, Recycle, and Reuse; enabling legislation for mandatory source segregation of waste for efficient dry waste recycling and policy support.

The group also came up with long-term goals, which comprised: cost recovery for waste management to make it sustainable, imparting skill development for the formal and informal operators of waste management and strengthening the recycling infrastructure.

The group felt that imparting skill development in formal and informal sectors is very essential as a number of plants are coming up across the country and, therefore, we do need to have formal/informal waste managers who would know the nuances of efficient waste management. During this session, there was also a discussion on developing regional based waste recycling centres and creating awareness, which would really help in making sure that the wastes are scientifically getting disposed and recycled. It was also felt that there was a need to raise awareness among people about recycling of products through advertisements in the media.

> *Most corporates advertise through media about their product but they never say how they are taking this product back. They should include that in their advertisements, which would create a lot of awareness within the community and help in segregating waste.*

Mr Suketu Shah

According to Dr Bindu N Lohani, Vice-President of the Asian Development Bank (ADB) for Knowledge Management and Sustainable Development, by 2050, nearly 80 per cent of Asians will reside in cities, megacities or secondary cities. He also stressed on how these cities are the primary source of 70–80 per cent of the greenhouse gas emissions. According to him, waste management needs to be tackled through increased emphasis on its management in the cities as well as pursuance of the 3Rs—Reduce, Reuse, Recycle.

> *On the issue of national policy on recycling and reuse, we are in the process of revising e-waste rules and the municipal solid waste rules.*
>
> **Mr Susheel Kumar**

Towards Sustainable Mobility

The group, comprising representatives from railways, roadways, and waterways, engaged in an invigorating discussion on the nature of transportation in India. An energy-intensive industry, transport assumes major responsibility for causing harmful emissions in the environment, in spite of the changes in technology. The group, in this context, discussed the various long-term and short-term goals to attain sustainable transportation and mobility.

The short-term goals included the need for an integrated policy and legislative environment which will include regulation, self-regulation as well as incentives to attract capital into areas such that seamless integration of infrastructure, of the three modes of transport, can be achieved. Development of energy-efficient technologies to improve the emission standards, for the industry, was also deliberated upon.

The discussion of the long-term goals centered on the need to build the capacity and capability of transport systems which included the need to improve capacities for all the three segments, in particular, the railways.

Innovation for long-term energy efficient and low emission technology along with incentivizing the various modes of transportation was also recommended. In order to achieve these goals, it was decided that there is a need for increased collaboration between corporate India and the government since private sector participation is essential to improving the efficiency of the sector.

Henrik O Madsen, Group President and CEO, DNV-GL, emphasized on the development of energy efficient technologies for automobiles. He spoke about the present-day indiscriminate usage of fuels and stressed on the vision of saving oil, by 2050, whereby all heavy duty transport, i.e. ships, trains, trucks, could run on natural gas or biogas and all light transport on electricity.

The group discussion also focused on the success story of fuel shifts in India and the subsequent promotion of modal shifts in a realistic manner.

> *Transport is an energy hungry industry and takes a lot of blame for the emissions. Change in technology has not been able to address these two core issues: it has not maintained energy efficiencies maintained by other sectors, and controlling and reversing the effect of emissions on the environment.*
>
> **Mr Yash Vardhan**

Ensuring and Expanding Access to Energy

> *The onus is on the CEOs to rise to the occasion in bringing down costs and providing off-grid solution to meet the rural energy needs.*
>
> **Mr Susheel Kumar**

This thematic group discussed the overall growth and accessibility of energy, electricity and related needs in terms of certain long- and short-term initiatives. The significance of expansion and up-scaling of micro-grids, particularly with regard to the deliverable capacity of the electricity sector, was highlighted in order to improve basic access and increase livelihood opportunities in agriculture and related sectors.

The discussion also focused on the integration of cooking and lighting needs and technologies such as domestic energy systems, and household energy. The short term initiatives included setting up of a platform where there could be sharing of learning, of experiences, and case studies so as to bring these on the same platform. In the context of long-term initiatives, the need for last mile delivery value chains, based on local entrepreneurship, was emphasized. It was essential to set up enterprises which facilitate delivery with regard to access and facilitate the actual research development, customization, and innovation, not only in terms of technologies and products, but also in terms of processes and business models.

The group also discussed the implications of energy poverty—one of the root cause behind low quality of life at the global level. In this context, the work accomplished by The Energy and Resources Institute (TERI) in open-source innovation, to create self-sufficient village clusters was highlighted.

Low Carbon Technologies for SMEs

> *We should try and replicate the example of Bangladesh which has revolutionized access to energy and solar.*
>
> **Mr Onno Rühl**

The group deliberated on the strategic significance of Small and Medium Enterprises (SMEs) and emphasized that the various segments of SMEs require different energy-efficient technologies and practices. In many energy-intensive sub-sectors, low carbon technologies are not available and need to be developed. The large corporate sector can play a significant role to drive the energy efficiency in the SME sector (especially among their vendor units) by providing the required technological and financial support. The other significant steps that could be undertaken by the corporate sector with their CSR funds include capacity building of workers to practice more energy-efficient and sustainable practices. The role of manufacturers of energy-intensive appliances, by creating more awareness through the medium of mass media, was also stressed upon. The group also deliberated on the role of undertaking energy efficiency initiatives in the energy-intensive agricultural sector, especially towards developing energy-efficient designs of pump-sets. . The role of DISCOMS in supporting SMEs to adopt energy efficient products was also emphasized.

Access to energy is a global agenda in terms of providing access to 100 million people by 2016, either through the grid or by standby systems.

Dr Bindu N Lohani

Expanding the Use of Renewable Energy

Industry needs to come together and build their own RE through Group Captive.

Mr Ardeshir Contractor

The discussion focused on the steps required to improve the share of clean and renewable energy and how industries can support the 'Make in India' campaign, by investing in renewable energy sector manufacturing and creating a huge market for the renewables. The group also deliberated on several short-term and long-term goals in pursuance of energy management, the need for success of the level of implementation of existing guidelines and policies encompassing production of components on a global scale, R&D and development

of systems and others, and components like batteries, hybrid power, thus incorporating a holistic approach.

The development of technology for an integrated approach with the conventional grid as well as expanding the transmissions capacity, and developing industrial clusters or end users near the renewable energy potential areas for the more efficient use of renewable energy was also discussed.

The challenge, for renewables, is to simultaneously expand volumes and bring down cost.

Dr Ajay Mathur

Financing the Energy Transition and Sustainable Developments

The discussion of this thematic group revolved around the broader realm of how to unleash market driven forces, within the private sector, by lowering cost of capital and improving returns, in a way that is driven on commercial grounds. The session deliberated on

the availability and importance of credit availability from different sources and the ideal mix of these so as to drive further the financial investments in RE/EE sector. In this regard, two recommendations were made—first, adopting certain energy areas, within the priority sector for banks, would open up availability of capital which is otherwise tied up within the banking system at a lower cost and the banks themselves are efficient at how to make lending decisions. The second equally important recommendation referred to the establishment of green bonds, either issued by the government or a government agency, which carry the credit of the government but provide private sector financing for capital projects.

Based on her ambitious goals, India will be a global leader in driving down costs and developing greater manufacturing opportunities for Indian companies.

Mr Onno Rühl

The disappearance of some of the subsidies to hydrocarbons and allotting subsidies to renewable energy sources would substantially help the growth of the sector.

Mr Henrik O Madsen

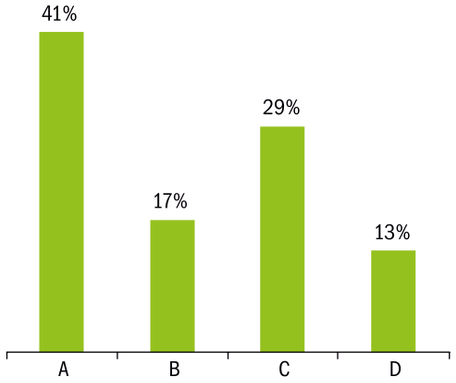
In his concluding remarks, Dr R K Pachauri said that there was an important congruence between goals that define sustainable development and actions that would help us deal with the challenge of climate change. He further elaborated that performance of these actions, with co-benefits, will benefit the future generations.

VOTING RESULTS

Adapting to the Impacts of Climate Change

Short-term Action

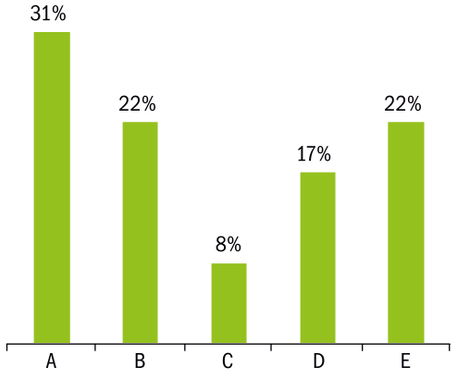
A. Multi stakeholder, multi sectoral approach to identify the risks and opportunities by geography and its mapping
B. Corporate Governance: Exploration on adaptation measures needed to be done to mandate the board to assist in measuring and strategising action, create Climate Risk Footprint
C. Creating standards for credit and insurance, market way of assessing risk
D. Business stakeholder engagement to create awareness



Sustainable Buildings

Short-term Action

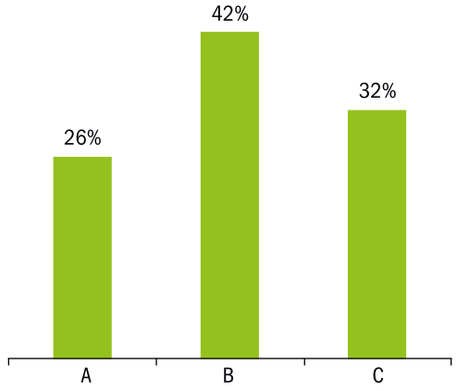
A. Education and capacity building of employees, customers and vendors; and technocrats, financial institutions and bureaucrats
B. Define methodologies, tools and expertise to offer solutions in consortiums
C. Quarterly corporate dialogues for exchange of ideas at State level
D. Define role of stakeholders and communicate suitably to decision makers
E. Develop campaigns and platforms to raise awareness and develop tools



Efficient Waste Management

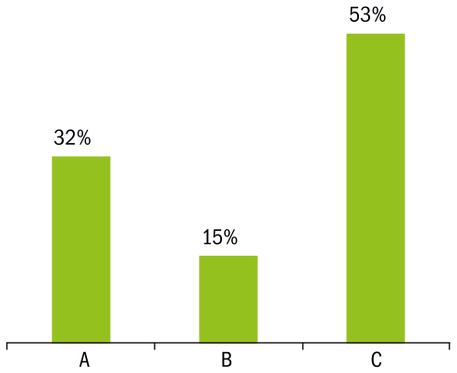
Short-term Action

A. National policy on waste reduction and recycle (3Rs)
B. Enabling legislation for mandatory source segregation of waste for effective dry waste recycling
C. Enabling policy support for promoting market for recycled products and transportation



Long-term Action

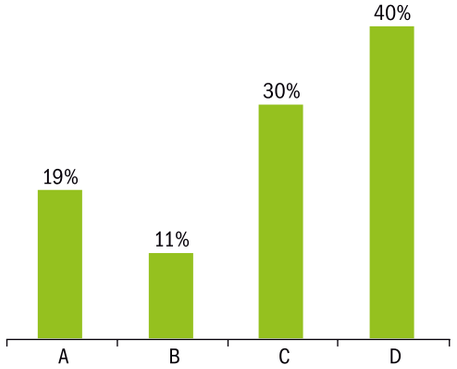
A. Cost recovery for waste management to make it sustainable
B. Imparting skill development in formal and informal waste operations
C. Development of waste (regional) recycling infrastructure



Improving the Efficiency of Energy Use

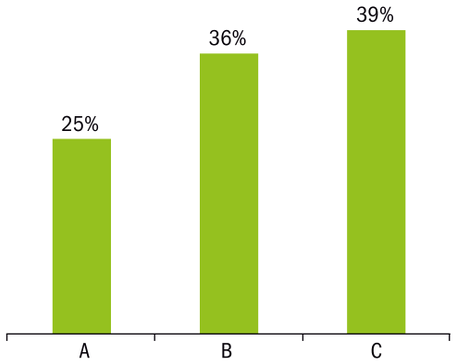
Short-term Action

A. Voluntary reporting of energy efficiency including public disclosure of energy efficiency of building in real estate transaction
B. Make PAT scheme driven by benchmark, more ambitious
C. Financing and procurement policy for improving energy efficiency of SMEs
D. 30% specific energy improvement by 2030 across sectors



Long-term Action

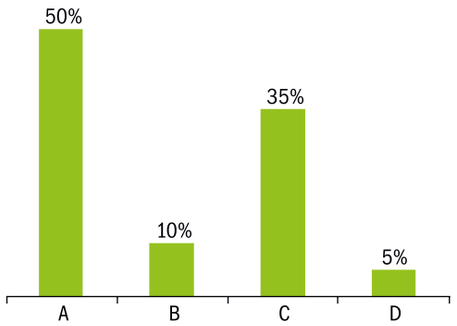
A. Commit to move from 6% green to 30% green energy production by 2030
B. Cover transport, agriculture, equipment and appliance manufacturing for output efficiency norms
C. Policy change and price of energy (removing of subsidy)



Ensuring and Expanding Access to Energy

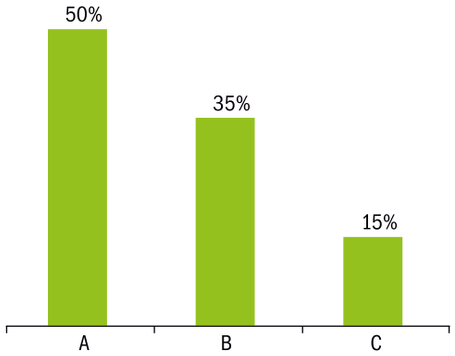
Short-term Action

A. Support innovation and installation of solar micro grids for both consumptive and productive needs
B. Create a knowledge sharing platform on energy access among corporates and other stakeholders
C. Support scaling up of energy access using combination of private-public-debt-equity-carbon finance
D. Integrate basic lighting and cooking needs through technologies like Integrated Domestic Energy Systems to eliminate energy poverty



Long-term Action

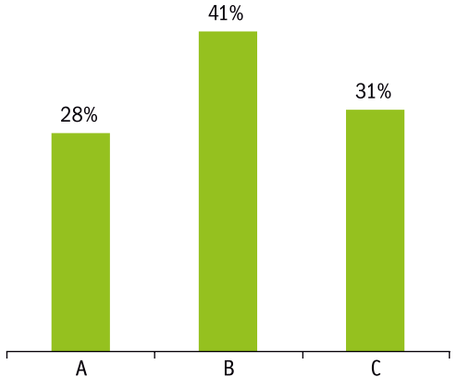
A. Foster innovation in technology and business models particularly financing instruments through multi-stakeholder partnerships (PPP/grant: equity:debt)
B. Facilitate innovation, customization, research and development for new options for meeting household and livelihoods energy needs
C. Facilitate expansion of market Value chains particularly local enterprise based last mile delivery of energy products and services



Ensuring Water Availability in a Changing Climate

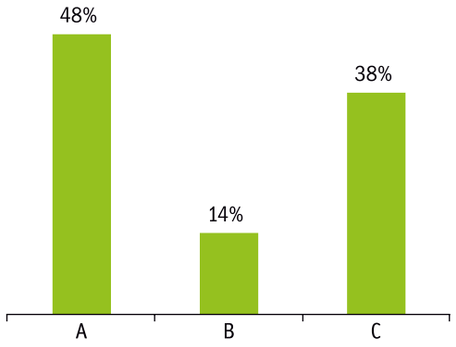
Short-term Action

A. Measure water footprint within and across value chain
B. Be more aggressive about efficiency within industry targets (net positive)
C. Zoning of industry and agriculture by water availability



Long-term Action

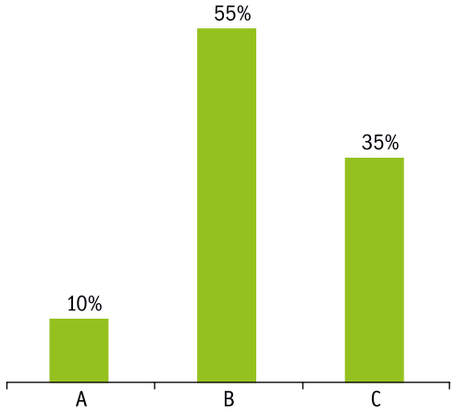
A. Explore pricing water through market mechanism, scaled pricing for usage
B. Privatize water utility for industry
C. Industry partner with government and agriculture to reduce agriculture water use



Expanding the Use of Renewable Energy

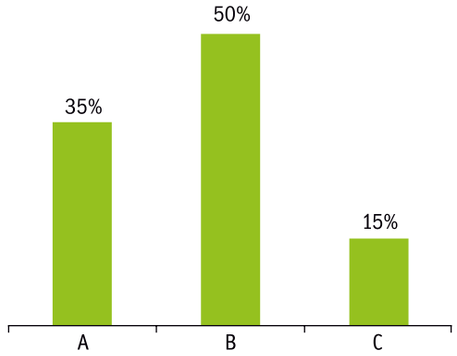
Short-term Action

A. Encouragement of Group Captive concept
B. Educating industry on energy management systems
C. Immediate implementation of existing policies and guidelines



Long-term Action

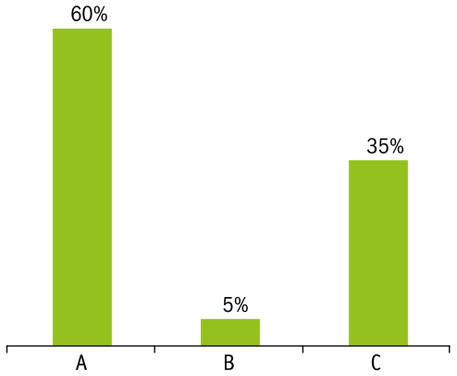
A. Manufacturing development of mainstream renewable components
B. Development of technology, storage, and systems approach
C. Development of hybrid power



Financing Energy Transition and Sustainable Development

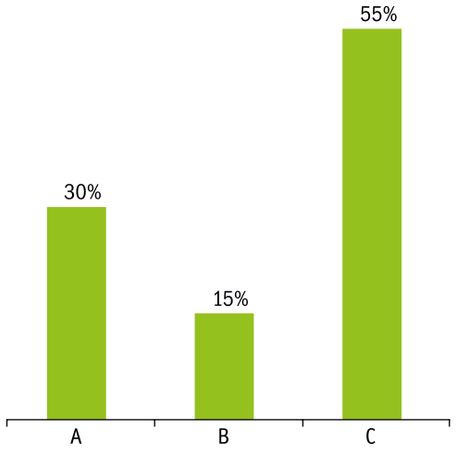
Short-term Action

A. Priority sector lending requirements to have specific Renewable energy/ energy efficiency category
B. Level playing field for non tax equity
C. Interest subvention Scheme for Renewable energy and energy efficiency



Long-term Action

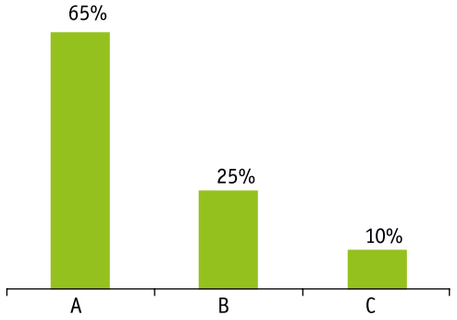
A. Support Green Bonds in India
B. Lower the cost of equity and debt capital
C. Stable regulatory policies for renewable energy sector supported by government guarantee



Low-carbon Technologies in SME

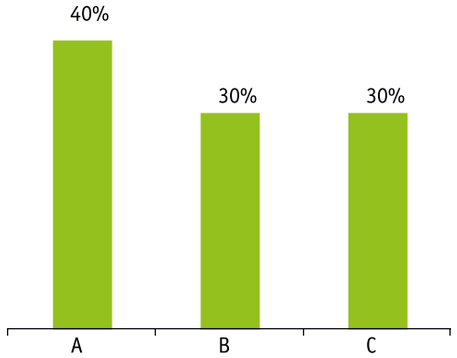
Short-term Action

A. Encourage large corporates to develop their supply chain in a sustainable manner and make a business case by sharing the gains
B. Encourage the cultural change in vendors by training the workers and supervisors in energy efficiency systems
C. Encourage the basket of products covered under BEE Star Labelling System



Long-term Action

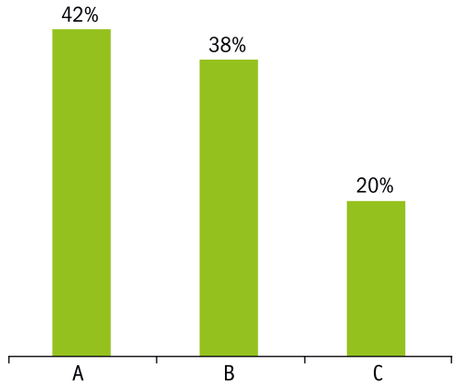
A. Provide public funds for technology development targeted at the SME related technologies
B. Cover the energy efficiency aspects under the CSR mandate of large corporates
C. Banks to consider energy efficiency loans in their risk assessment criteria



Towards Sustainable Mobility

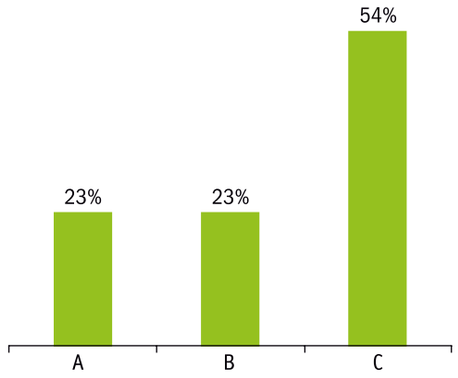
Short-term Action

A. Integrated transport policy and legislation
B. Barrier free common user infrastructure for seamless transfers
C. Informing energy efficiency and emission standards



Long-term Action

A. Create capability for sustainable transport systems
B. Innovation for energy efficient and low emission technology
C. Incentivize development of rail and transport systems as backbone for long distance with road as delivery vehicles for the last mile



SPECIAL LUNCHEON SESSION

The Special Luncheon Session was moderated by Mr Karma Paljor, Business Editor, CNN-IBN and Mr Suresh Prabhu, Hon'ble Minister of Railways, Government of India was the Guest of Honour for the session who was joined on the stage by Dr R K Pachauri, Director-General, The Energy and Resources Institute (TERI).

Dr R K Pachauri: We have the benefit of listening to our Guest of Honour for this session Mr Suresh Prabhu who is if I may say one of the brightest leaders on the political horizon in this country and of course his greatest qualification is that he is a wonderful friend. With this, I hand over to the moderator of this session.

Mr Karma Paljor: This session is going to be very interesting because we have our Hon'ble Minister of Railways, Government of India Mr Suresh Prabhu here who has been entrusted with the challenging task of reforming and bringing on track a sleeping giant, the Indian Railways. Earlier, as Power Minister of the country, he was responsible for the initial bit of reforms.

So, let us open the session. The Minister will make some statements. I would like Dr R K Pachauri to make the opening remarks, after which we take up a few questions and open the session for the audience as well.

Dr R K Pachauri: Well, thank you very much. I am delighted to have Mr Suresh Prabhu here and I am not going to attempt an introduction of this very

distinguished leader. In the Government of India, he has handled the challenging task of managing the Ministry of Environment and Forest, the interlinking of rivers, the Power Ministry, and several other important missions. Now, as we already know, he is responsible for the Indian Railways, a mammoth organization and as far as I know, the largest public sector organization in the world, in terms of the number of people it employs. It is also an institution that we in India are very proud of. Frankly, when it comes to dealing with reducing the greenhouse gas emissions and ensuring energy security, something I briefly mentioned in the previous sessions, the railways and their achievements so far, are going to be the defining factor in ensuring

> *Railways should also go green to the maximum possible extent.*
>
> **Mr Suresh Prabhu**

sustainable development and energy security. It is also important to remember that when we are talking about transportation, what we need is an inclusive system which allows even the poorest of the poor to be able to move from one location to the other, to move their goods from one location to the other. The Railways, therefore, are really a major part of the effort to create an inclusive transport system. This is all I will say for a beginning and maybe this is a subject on which you would prefer to hear Mr Suresh Prabhu.

Mr Karma Paljor: Sir, this time the Republic Day was widely watched, also because the President of the United States was the chief guest. While watching TV, even though it was raining quite a bit, I saw that the two most well-prepared and well-dressed people were Mrs and Mr Suresh Prabhu. They were wearing very interesting rain coats. That was excellent planning Sir, was it you or your wife who was responsible for that planning? Will we see the same kind of planning in this Railway Budget because we have a lot of hope from you.

Mr Suresh Prabhu: I only wish that the Railway Budget fetches us a lot of revenue which will be a good thing. Of course, the Railways, as Dr Pachauri pointed out and you all know, is a very important infrastructure sector, an important backbone of India's economy as well as one of the most important components of India's social life. The entire challenge lies in the enormity and size involved because there are almost 27 million people travelling daily by the Railways in India. So we are trying to change the energy mix by conducting water and energy audits and to complement these efforts an Environment Directorate in the Indian Railways has been created for the first time which is designed to look at all environment related issues in a holistic manner.

I would like to share with this audience that we have decided that railways should also go green to the maximum possible extent. So, we are trying to change the energy mix, we are trying to introduce water audits, we are also trying to conduct the energy audits, and have created for the first time, an Environment Directorate, in the Indian Railways, which is going to look at all issues, related to the environment in a holistic manner. The Railways played their role in making this happen. In any case, if you compare the Railways with other modes of transportation, this is a far more environment-friendly mode of transportation. In order to tackle the menace of vehicular pollution, the root cause of a large amount of emissions, particularly in the larger cities, we need to create such a railway network through which people can travel. We also need to remember that for a long time, the share of transportation of goods by railways was far higher than by roads. Due to improvement in the road network, we lost a significant part of our share of goods transportation to the roadways, but if we can get that share back, it will be a positive contribution to the environment. So, we need to make sure that we have a proper and environment-friendly public transportation system in place and I think railways offer that in a significant way.

> *When it comes to dealing with reducing the greenhouse gas emissions and ensuring energy security, the railways and their achievements so far, are going to be the defining factor in ensuring sustainable development and energy security.*
>
> **Dr R K Pachauri**

Mr Karma Paljor: Sir, the organisers of the voting session held in the preceding session, tell us that the one point which received 54 per cent of the votes is—incentivizing the development of rail and transport systems as a backbone for long distance, using road as the delivery vehicles up to the last mile. If you consider this point, the worry is that when it comes to the freight corridor, it has been delayed many times and again a new date has been set for it to become a reality. What is your vision for a freight corridor because if it does come in place, then 'Make in India' becomes easier?

Mr Suresh Prabhu: The freight corridor will definitely be ready in two years from now. We are targeting its completion for use by 2018–19. There will also be a substantial increase in the speed of goods transportation which today is at an abysmally low level. Therefore, the turnaround time in terms of transporting goods from one place to another, refilling, and bringing it back, will substantially improve. There will also be a considerable increase in the speed of passenger traffic. Therefore, it is a win-win situation. You are absolutely right that it has been delayed, but now I think we will definitely try to complete it in the stipulated time frame.

Mr Karma Paljor: Is this the Railway Board deadline or the more reliable Suresh Prabhu deadline that we trust?

Mr Suresh Prabhu: Railways comprises a large number of people and I am only the head of the family. The entire family has to galvanize and work together in order to try and achieve our aims. In fact, if we all work together as a team and work towards a common goal, things can really change, similar to working towards the goal of climate change where we need team effort .

Mr Karma Paljor: The captain also has to do his bit Sir. Let us talk about the other important issue of safety.

> *We need to make sure that we have a proper and environment-friendly public transportation system in place and I think railways offer that in a significant way.*
>
> **Mr Suresh Prabhu**

As I quote from the Kakodkar Committee Report, who have not quoted a figure, but described how thousands and thousands of people die every year on railway tracks and accidents and it is increasingly becoming a worry, so modernization, unmanned rail signals, etc., are becoming big issues that you will have to tackle on an urgent basis. What is your plan for this?

Mr Suresh Prabhu: Safety of passengers is the most important thing and so, it is one area where we really need to bring in technology. The largest numbers of accidents take place at the unmanned level crossings. But you must understand that accidents at unmanned level crossings occur not just by railways; they are also identified as a road–rail accident. The railways have a right of way. When you are going on the rail track, it is the duty of all those who cross the track to find out whose right of way it is. If I am going to the airport and an airplane passes by, all the vehicular traffic stops, thus giving the first right of way to the aircraft, and thereafter crossing it. So if you can actually use some caution, such accidents can be reduced considerably. But in India we lose so many people to road accidents, so, this is also an extension of that in a way because all these accidents happen as the car hit the railways. You can say that the railways hit the car but the former already had a right of way. It is important that we try to understand this argument in the right perspective. However, in order to avoid such instances, on the side of the railways, we are trying to use geospatial technology to prevent such accidents. For instance, if there is a moving object, like the rail engine on the tracks, we could send a visual as well as sound signal to alert the person. We can also send probably an SMS, through that system, so that people in that area would know that they are crossing a particular line and there is an approaching train. But safety has gone beyond that. Today, there are 11,000 unmanned level crossings and they will continue to rise because of the increased pace of urbanization, so, in the latest construction designs, we are trying to make sure that we have elevated railways so that this situation will be addressed permanently, for the future. For now, the amount of money required to accomplish these tasks is not even quantifiable and this money needs to be raised—whether through the passenger fares or through an increase in the freight rate is an issue that we need to discuss.

Another significant aspect of the safety in railways is through creating a better signaling system. Anti-collision devices to prevent one train being hit by another one and modernizing the tracks so there is no derailment are important for reducing the number of train accidents.

Dr R K Pachauri: Mr Suresh Prabhu has shared a very interesting fact with us. Just as we are talking about smart cities in this country, perhaps one needs to develop a plan by which we have smart railways as well. A lot of people here, who represent business and industry, are aware that one of the strengths of the railways has been its ability to do everything in-house. The railways have everything at its disposal but that has also been one of its weaknesses. So, what you see as an opportunity for business and industry to get involved in refers to the various elements of work, that the railways is going to carry out, because I think that will also bring in new technology, new ideas, and new partnerships. So, essentially I just wanted to ask about the concept of 'smart railways' and how do you ensure that the railways also provides opportunities for all-round development and receives inputs for the development of railways from outside.

Mr Suresh Prabhu: You are absolutely right. What we really need is that in future, whatever we do is divided in two phases, that is, firstly, upgrading the present infrastructure to make it as smart as possible by investing a large amount of money as well as human resource into the technology development and secondly, all future infrastructure, that we create, has to be smart enough to ensure that at least the incremental infrastructure will be really smart. I think we already have countries like Japan and others participating with us. In fact, President Obama also reiterated that his country would like to work with India. Our Prime Minister, Shri Narendra Modi, spoke to him about our plan to modernize the rail infrastructure. At this point, I think there is a great opportunity to obtain the influx of state-of-the-art technology into railways, in a proper manner, for the future. We should not try to do some incremental changes but should try to go in for a transformative change. There is a great opportunity for the railways to actually do that. I completely agree with you that the railways, in my opinion, could contribute to 2–3 per cent of the Gross Domestic Product (GDP), only by making sure that we upgrade them in a proper manner. This in itself could help India's GDP to increase substantially and that could also help 'Make in India' possible, besides, making business in India far easier. The cost of doing business will also be curtailed because if you have railways moving bulk cargo, as efficiently as possible, the cost will also automatically go down. So, it is a win-win situation. Railways need investments, the investment will lead to growth, the growth will lead to more savings in the economy, more savings in the economy will lead to more investments, and so, the cycle which is now vicious will become a virtuous one.

> *The railways are really a major part of the effort to create an inclusive transport system.*
>
> **Dr R K Pachauri**

> *We should not try to do some incremental changes but should try to go in for a transformative change.*
>
> **Mr Suresh Prabhu**

Mr Karma Paljor: Two questions before I open it up to the audience, to ask some questions. One is, now you have a political mandate. Every year you have seen that the industry is penalized by way of freight fare increase, but we don't see the same kind of decision for passenger tickets, that is the fares are not increased although, every year when we go to railway stations to interview people, they are willing to pay an incremental increase in order to receive certain facilities. So, now that you have that mandate, will you look at it? I know it is a difficult question to answer before the Railway Budget but are you looking at some kind of fare increase this time around?

Mr Suresh Prabhu: I think you are a very responsible journalist. I don't think I can answer any question like this just on the eve of the budget. I am really surprised that you are asking me a question of this kind.

Mr Karma Paljor: The second question is Dr Pachauri put it very mildly that the railways do everything. Some people have been very unkind to compare the Railway Board to a mafia organization where they do not allow anybody to come in. They want to do everything themselves, even the laundry, so for the private sector to get in, we need to open the doors, for them, to have some kind of efficiency. On those lines when will we see decentralization and improvements in the functioning of the Railway Board?

Mr Suresh Prabhu: I am really surprised that you are not following the news properly. My first decision as a railway minister was that not a single rupee tender will come to the railway minister. I delegated all the powers of commercial decision-making to my general managers. This is, in the words of Mr E Sreedharan, one of the most well-known railway personnels, a landmark decision and watershed moment in the history of railways. This could have been possible due to the reforms and I really don't know many railway ministries are there in the world where this decision has been decentralized to this extent. I want to further decentralize it to the level of divisional railway managers as well as station masters, although not all decisions taken by the general managers will have to be delegated, but there will be further delegation because an organisation, of this kind, can work only with empowering people to take decisions, who are actually on the job, and who have a mandate to fulfill certain obligations, in terms of results. They must be empowered so that they can actually produce the desired outcome. Unless you give them inputs they cannot do it. So, we have already taken the decision.

Delegation is an ongoing process. We also want to bring in proper business processes to be re-engineered so that more efficiency will be brought in and this is an ongoing process. Complete transparency has also been introduced in terms of the appointment procedure of the Railway Board personnel.

> *Just as we are talking about smart cities in this country, perhaps one needs to develop a plan by which we have smart railways as well.*
>
> **Dr R K Pachauri**

More importantly now we want to introduce complete transparency in terms of all decisions. Of course, there will be e-tendering but also on the website. Dr Pachauri will recall how during my tenure as Minister for Environment and Forest, all the environment clearances, the movement of files, and everything else was available on the website. The same thing we did in all the ministries that I handled. I am happy that you raised this issue, we will definitely do this, this is our commitment, and something which is part of a mission that we have to make the operation of railways as transparent as possible.

Mr Karma Paljor: We would now like to open the floor for questions.

Q&A Session

Question: Railways has been one of the largest consumers of energy, whether it is through diesel or electricity. Why is it that railways is not promoting the use of renewable energy, through private entrepreneurs, by just investing a little amount and buying renewable energy at a much lower cost? That will not only save capital but it can also be done in a very transparent manner.

Mr Suresh Prabhu: We have already started this process. In fact, we are trying to assess the entire potential of railways in terms of solar and wind renewables and we are looking at a few projects, which include Rail Bhawan being installed with rooftop solar now. All the stations in the next few years will be covered by this rooftop solar technology. We have also started some wind processing units. Besides, we are also going in for energy audits to ensure that there is proper energy conservation that happens in railways,

so we can save both on the diesel as well as electricity that we buy and conserve it. In fact, railway tracks could also be a potential for solar energy. We would like to cover the railway buildings, railway stations, schools, colleges, and hospitals. This is a major programme. We are also doing water audits and The Energy and Resources Institute (TERI) is also conducting a water audit of railways. We are looking into all these aspects. With reference to your query regarding the investment of private sector, railways are not a power manufacturer, so obviously it will be all through tenders and obviously private sector will do it.

Question: For energy efficiency, cleanliness which the railways is striving for, what are the metrics that you would be tracking and perhaps if there is a portal where this can be made available, then this is a very quantitative way industry and others can participate and help railways.

Mr Suresh Prabhu: We will find some answer to this very soon.

Question: Do you have any plans for a Transit Oriented Development (TOD) along your freight corridor or your railway tracks and are there any plans to develop stations such as TOD so that you can also generate some revenue which will reduce some trips as well?

Mr Suresh Prabhu: There is already a clear cut policy laid down and available on the website too. If you want any particular information you can ask me but there is already a policy which we have to expand more in that area.

Question: The Government is very earnestly implementing the "Swachh Bharat Abhiyan. But is it not true that the railways are the one which is causing the largest quantity of public defecation. Is there is no solution to this problem?

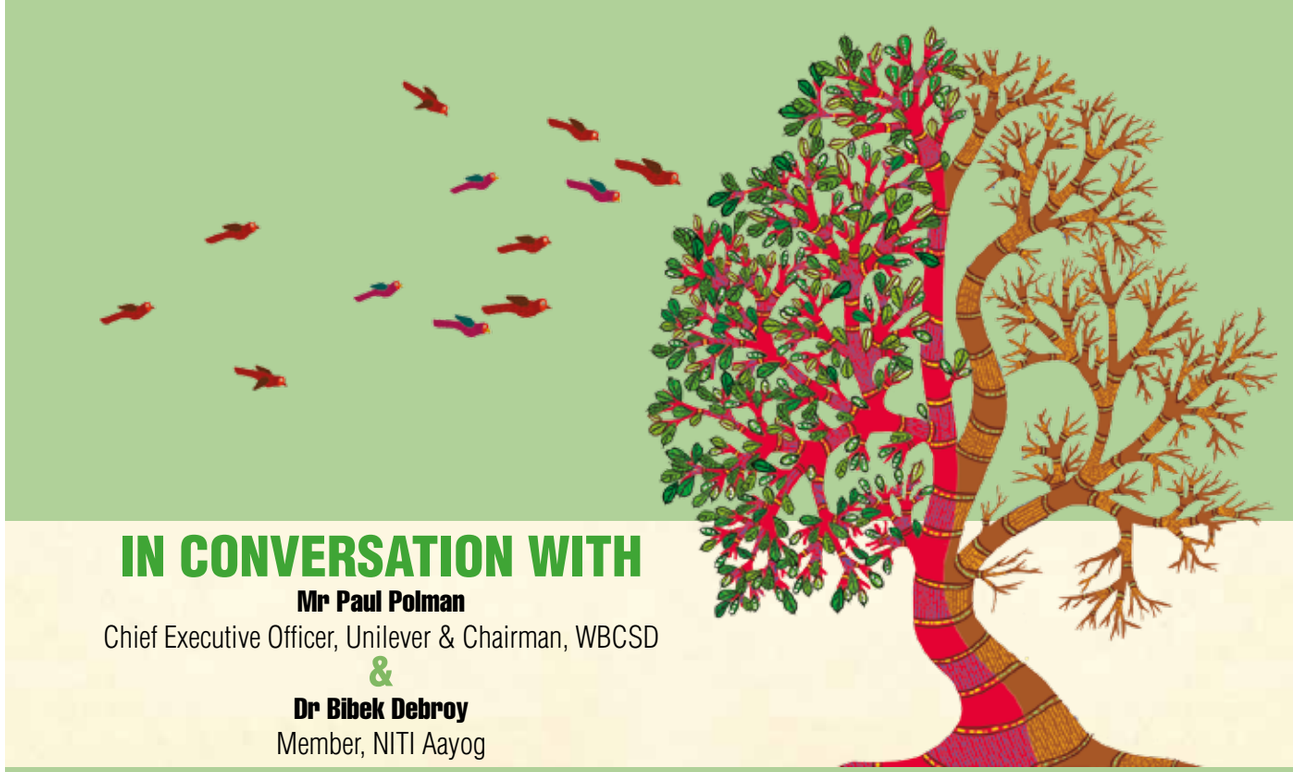
Mr Suresh Prabhu: You please give me a suggestion because this is an issue that I am also concerned about. You are as much a citizen of the country as I am. I am a Minister so I will be able to act on it. You have pointed out a problem which all of us are aware of, give me a good solution which can be done in a year, and I will do it.

Question: According to the D K Mittal Committee Report, there are 140 routes on which trains are running but they are incurring losses. So, in the upcoming budget will there be no announcement to the same end?

Mr Suresh Prabhu: You must be conscious of the fact that all such announcements of any kind on the eve of the budget outside the Parliament are highly uncalled for. Please understand that there is some parliamentary etiquette which I have to follow.

Mr Karma Paljor: With that we come to the end of this session. I would like to thank the Minister for taking all our questions. A round of applause, ladies and gentlemen, for the Hon'ble Minister of Railways, Government of India, Mr Suresh Prabhu. We certainly have great hopes from you. Thank you.

> *"Railways comprises a large number of people and I am only the head of the family. The entire family has to galvanize and work together in order to try and achieve our aims."*
>
> **Mr Suresh Prabhu**



IN CONVERSATION WITH

Mr Paul Polman

Chief Executive Officer, Unilever & Chairman, WBCSD

&

Dr Bibek Debroy

Member, NITI Aayog

The session was moderated by Ms Shereen Bhan, Managing Editor, CNBC-TV 18. It was an interactive session and questions were posed by the moderator to Mr Paul Polman, Chief Executive Officer, Unilever & Chairman, WBCSD; Dr Bibek Debroy, Member NITI Aayog; and Dr R K Pachauri, Director-General, TERI & President, TERI-BCSD.

Ms Shereen Bhan: Good evening ladies and gentlemen, thank you very much for joining us for the grand finale of what has been an exciting day talking about climate change and the environment. India is at very interesting crossroads today. We are an economy that aspires to be one of the fastest growing economies in the world and at the same time we need to understand what that means in terms of consumption, managing the environment, and protecting it. I think there has to be a path that has to be found where we balance the needs of a developing economy with the needs of the environment. I think we need to put in place institutional and regulatory mechanisms, also in the quest to make it easier for people to do business in India. We also need to be cautious about what that is going to do as far as the environment is concerned.

Mr Paul Polman, you have been talking about sustainability at Unilever for years now. You have been talking about what corporates and corporate participation can do as far as the climate change and the environment is concerned. But the fact of the matter is that when you talk about voluntary participation the numbers do not look good. Unilever is one of the few examples where you actually have time-bound goals and objectives that you hope to achieve but if I were to ask you about voluntary participation to achieve the objectives of climate change and sustainability, the numbers don't really seem to suggest that voluntary action is working. Is there need for mandatory legislation?

Mr Paul Polman: Well, it is clear that the situation that we find ourselves in—at a global level right now—where we hit increasingly some of the planetary boundaries, where we use more resources than we really can replenish, and where we have to deal with an issue of staying below the two degree limit.It is clear that we are not doing enough and I think we are getting to a point now that we actually realize that we all need to do things differently but the challenges of poverty alleviation and climate change, obviously are very closely linked and are so humongous that we have to work together to solve these problems. Interestingly, because the cost of not acting is going up quite rapidly one could see increasingly the movements of businesses, of governments, wanting to make a change. Forty governments now have a price on carbon and 1,000 CEOs have signed the price for Carbon Statement at The World Bank. Many good companies in India have wonderful plans. So, what we need to focus on is not to question ourselves whether we are doing it or not, but what will it take to scale, what can we do is the governments to put policies in place and frameworks in place, what can we do in businesses to go together at industry levels, to move things to a tipping point. We also feel that if the more responsible businesses go together then we can get critical mass to move things forward. We see it happening in the building industry, transport mobility, and deforestation. So, I am fairly optimistic provided that we have enough leaders who are willing to continue to work in this direction.

Ms Shereen Bhan: A lot of work has been done by several companies and governments around the world to actually mainstream the conversation around environment and climate change, but the actual reason I asked you the question on whether mandatory legislation is required because you are a member of the UN Global Compact and it has certain objectives that it hopes to achieve, and if we look at the number of companies that have actually failed to meet the principles of the UN Global Compact, just for the year 2014—657 companies were expelled from the UN Global Compact because of non-compliance. How do you address an issue like that? Is there now a need to review the relevance itself of the UN Global Compact? There has been an argument that suggests that perhaps the principles are not relevant to small- and medium enterprises; it is a one size fits all approach, what do you have to say as far as some of those criticisms are concerned?

Mr Paul Polman: We don't mind criticism because it makes us more determined to do what we need to do. So, I am not going to deny that. But just to put the statistics right, if I may, the UN Global Compact has 12,000 members. If 657 companies are expelled, that is only about 5 per cent. In fact, this is a voluntary scheme that people don't have to pay. So, again, you will see some companies signing up but not compliant. Being "non-compliant" on the Global Compact Board means that they don't report. It does not mean that they don't do it, but they don't report or there are a very few exceptions where they really don't stick to the standards.

The Global Compact has been a movement for good, which really has had an impact. The high number of companies, 1,200 financial institutions, trillions of dollars linked to that, the same with companies that myself, our company Unilever included, signing up to the requirements of the REGI framework on social compliance, these are all things that UN Global Compact is driving and it is a force for good. But your question actually runs deeper. On some of the things you need governments to help you because we want level playing fields as businesses. We don't want free riders. If we don't have a system where we externalize some of these costs that we have, the cost of carbon or water or frankly the cost of poverty and insecurity, if we don't figure out how to externalize them, we then need to have governments that help us put frameworks in place. There is a thinking sometimes out there that businesses do not want legislation. Businesses want legislation but they want the right legislation. Right now we have the wrong legislation that leads to wrong behaviour. The Global Compact is a moral standard which I think is very good but certainly to your question, not enough.

Ms Shereen Bhan: Another question, Mr Paul Polman, I remember reading an article where you had said that consumers want growth and governments are unable to provide the growth and, hence, it is left to corporations to actually be able to deliver on the promise of growth. You were talking about how governments or governance has failed even as far as legislations related to the environment and climate change. If you were to talk specifically about the dilemma that is facing the Indian government—you have the needs of the environment on one hand, and you have the needs of protecting the natural resources on the other hand, what would be the ideal framework in a situation like this?

Mr Paul Polman: We have many issues of global nature today, i.e., climate change, the financial market, IT, etc., that are very difficult to solve. The same holds true for geopolitical tension as well. Unfortunately, the governance process that we still have globally was designed in about 1948 (Bretton Woods Systems) when 90 per cent of the world economy was in Europe and the US and it does not reflect the fast changing world that we live in today. So, I wouldn't say there is governance failure, what I have always advocated for is that business proactively needs to work to de-risk

the political process and then have governments join. In India, there are great programmes now—'Clean India', 'Smart City', 'Make in India', etc., with an objective to finally once and for all lift all people out of poverty. Sub-Saharan Africa and India are the regions where there are 800–900 million people not having access to clean sanitation, 60 million people stunted, 600 million people have no access to toilets; these are serious issues that we ought to be able to solve today without even asking for new technologies, or talents, but we have to do this together and even the government's ambitious objectives require Indian businesses to come together to be part of that. Then you can achieve these objectives even within the time frame that Prime Minister Modi has set, 2019, 150th Anniversary of the birth of Mahatma Gandhi. As rightly pointed out, the climate change that we are talking about and poverty alleviation are basically two sides of the same coin and it is really the poor that continue to suffer from our inability, irresponsibility, and lack of willingness to take actions. You have your annual union budget coming up in few days time and I certainly hope and I told the prime minister also on the topic of climate change specifically, to be courageous now, we have seen the US stick out their necks, 30 per cent reduction by 2025 versus 2005, Europe 40 per cent reduction, climate peaking in China by 2030. We cannot solve this if India, the second biggest economy in the world is not going to play an active role.

Ms Shereen Bhan: Are you disappointed with what happened when President Obama came to visit India because we haven't signed an agreement like the one between China and America but both sides—at least India has committed now to move towards a low carbon path. Are you disappointed with the fact that there isn't an actual target there?

Mr Paul Polman: There is a process where the countries will now submit their individual targets by June where we have the countries negotiating on a climate change agreement in December in Paris. So, the Indian government has all the possibilities to submit their proposals in that timeline. We should not make that dependent on Presidential visits or political campaigns. We are talking here about issues of humanity. So, I hope that in the framework that is being set, the schedule of meetings that the Indian government participates in, will show what their commitments will be.

Ms Shereen Bhan: Dr Debroy, let me come to you now. We have been talking a lot about what the government can actually do as far as this area is concerned. Let me quote to you what Sunita Narain has recently written, she says, "We have lost the development agenda in environmental management. We need to move beyond conservatism to sustainable management of natural resources. Environment must become India's development agenda again. We have seen what has happened with the mining mess for instance and that is just one example." How do we get ourselves out of this situation, how do we balance the need of development with the need of the environment and what can we expect now as far as the government is concerned?

Dr Bibek Debroy: Sunita Narain is a close friend but that does not mean I can pretend to answer on behalf of her. Though I work for the government, on this particular issue what I am saying by no means reflects the government's views and, therefore, I can afford to be courageous. Let me tell you how I look at the issue of environment and my take on the environment is not about Paris, rather it is about Delhi. Do you realize that India is a country that still has a per capita income of $1,600? A large percentage of the population is below the poverty line and it does not have access to electricity. To my mind issues of the environment within the country are primarily a function of getting the prices right and getting the ownership of property rights right. Quite often, there are several instances where the property rights are unnecessarily centralized. The government has already got several initiatives on 'sustainable' development of clean energy, including solar energy but these are the things that we are doing of our own preference and accord and that is the way it ought to be. I am concerned about the issue that countries with per capita incomes of $65,000 and above try to impose commitments on us. Worldwide, there is sufficient empirical data to show that priorities depend on the level of development and on per capita income. The best thing the developed countries can do for us is to open up their markets, ensure that our per capita incomes go up and we will do much more for the cause of the environment or any commitment that you can think of. In fact, technology is expensive and about 90–95 per cent of that technology is in private hands. Are you going to fund that transfer?

Ms Shereen Bhan: Mr Paul Polman, respond to that. We are back to the argument that has been at the heart of this debate and that is the developed versus developing debate. President Obama during his visit to India also said that we need to look beyond this debate because while it is fair for developing countries like India to say that we are not consuming as much as the US has, we have had a raw deal so far and you are trying to get us to commit to something which the developed countries have been able to enjoy for years, Dr Bibek Debroy says we need to address our own priorities before we can address global issues pertaining to climate change and we are back again to the heart of this debate.

Mr Paul Polman: There is undoubtedly a need to develop in this part of the world and that development will happen in terms of urbanization, lifting people out of poverty, and many other positive things. Some countries have done it earlier than India but I think India has now also made commitments to what they think is really needed to make that possible. The fact is still that climate change will actually stifle that. We just issued a new report called the "*New Climate Economy Report*" where we pointed out that if you don't tackle the issue of climate change you will not be able to develop these economies. This is true for India as well. Delhi is a great city but unfortunately it is one of the most polluted cities in the world and 15 out of 30 most polluted cities in the world are in India. India has about one million premature deaths because of climate change. So, the cost of pollution in India is enormously high for the system. If we would think about doing things differently, then you would actually be able to grow much faster and actually lift more people out of poverty. That is really what we are saying and there are three areas we want to focus on in India and in any place in the world. These areas are: what type of energy do you want to consume, how do you want to manage your cities to be efficient and how do you want to deal with your land use? In all these areas there are

enormous opportunities for businesses to participate, for governments to put its strength and at the same time reduce your total carbon footprint. Why would you not want to take that?

Ms Shereen Bhan: Why would not you Dr Bibek Debroy take this is a logical argument. If out of the 30 most polluted cities in the world, 15 are in India there is an economic case and economic benefit for India to want to move this down.

Dr Bibek Debroy: I would like to point out that the environment in Delhi has actually improved. I feel that it has improved because the people in Delhi felt that protecting the environment and the issue of pollution were important concerns for everybody. It was not due to any external pressure but there was an inner feeling for improvement and welfare.

Ms Shereen Bhan: Dr Debroy, I think all of us here want to be solution oriented, all of us here want to arrive at solutions that will work not just for Delhi and for India but will also try and address the larger issue of climate change and the environment. Now, as a member of the NITI Aayog, the erstwhile Planning Commission, what would you advise the government to do on these crucial issues? You talked about energy and Mr Polman talked about renewable energy; ₹6 lakh crore is expected to be invested in the renewable energy sector, whether the government gives incentives or not is a different story, whether we actually get the US private companies to transfer technology, I don't know. But what should we really expect in terms of a model framework to promote?

Dr Bibek Debroy: Please understand that I am not here to speak here on behalf of NITI Aayog. In my personal capacity, what I want to do actually when I get the time is to write a paper on the great saving to the environment that will be done if toilet paper was to be abolished. But that is what I wanted to do in my personal capacity. On behalf of the government I am not going to say anything here.

Ms Shereen Bhan: Dr Pachauri let me get you to come in and mediate what seems to be two sides of this debate at this point in time. In his personal capacity, Dr Bibek Debroy, even though he is a member of the erstwhile Planning Commission and now NITI Aayog, says that we must protect India's interests and committing to anything that the US wants us to commit to or COP21 hopes to achieve may not necessarily be in India's best self-interest. Mr Paul Polman believes that there is an economic case and an economic benefit for India to move down that path. What are your views?

Dr R K Pachauri: Let me start by agreeing to the elements in the interventions that we have had from our two distinguished panelists. I think I agree entirely with Dr Debroy that India obviously has to do what is in India's interest. Of course, there is also a huge overlap between what we should do for global reasons and what we should do for our own national benefit. What I would like to submit is a very fundamental issue, should India develop, for instance, like North America or some parts of Europe or Australia—I think this is a very basic question that we need to answer. In fact, because of the developed model that you have in other parts of the world, it has contributed to a rapid growth in our GDP but some of its externalities have really not been accounted for.. Some of the most prosperous societies have an alarming rate of increase in the disparity in incomes. The impacts in terms of climate change on some of the poorest regions in the world, is understandable from the fact that 95 per cent of the deaths that take place on account of disasters occur in developing countries, so we are very vulnerable.

So, what I would like to refer to also is what Dr Debroy said about India investing in solar energy. We are doing it for reasons, essentially because we need energy security. We have modelled and we have come up with projections of energy demand on a business-as-usual basis at our institute. But the point that I am making is actions that are required for mitigating emissions of greenhouse gases have huge co-benefits in terms of energy security, and in terms of a better environment at local level which gives enormous health benefits and possibly even greater employment. So, I think what we really need to do is to look at the intersection where global interests and national interests come together.

Ms Shereen Bhan: Are we close to that? Are we close to national interests aligning with global interests today, because I don't see that happening on this panel?

Dr R K Pachauri: If you listen to the utterances of the prime minister, he is very focused on climate change. He has done a lot in Gujarat while he was the chief minister in terms of promoting clean energy. But all of this to my mind has local environmental benefits and it has huge benefits in terms of energy security. So, I think that is possibly what we should focus on and my advice to the government would be to identify these as actions that become part of your INDCs. This is what we can contribute to the world. We are doing it for national reasons, obviously.

Dr Bibek Debroy: Just to add half a sentence to what Dr Pachauri has said—there is a great deal of overlap unless one is looking for a specific quantitative commitment. If one is looking for a specific quantitative commitment, the overlap does not exist.

Ms Shereen Bhan: But I think we have moved beyond that, which was pretty evident at the time of President Obama's visit to India, the fact that we did not commit to a quantitative commitment. Mr Paul Polman, since we are talking about solutions and I had raised the issue of investing in the renewable energy sector, you talked about this wanting to be courageous, or hoping that the current government will be courageous. When the government announced ₹6 lakh crore is what has been envisaged as the likely investments into the renewable energy sector, is there any room, scope for collaboration, technology transfer, what kind of sweeteners will the government need to put on the table in order for that to fructify?

Mr Paul Polman: I don't think there is any disagreement that India needs to do what is right for it. The real question is how to do it. We are at a point now that we increasingly see that we can have the cake and eat it too. I mean we can create a prosperous society in India for everybody, a more inclusive society and at the same time reverse the effects of climate change, and that also gets to the essence of IPCC report. We have to figure out how to improve the standards of living of the people and ensure the long-term future of India. That does mean setting up waste recycling systems and thinking about energy differently where too much gets lost. We need to think about the poor people who are suffering unfortunately. In India too many people have suffered for too long. It is the same for agriculture. Agriculture here has a very low yield. You need to make agriculture more efficient, small holder farmers should get more money, carbon footprints will be less, we have enough learnings now on climate smart agriculture and since it is a favourable situation, why would you not take that. The same thing is true for energy, land use, and for cities itself. Take the example of livestock in agriculture, the cows in India give half the amount of milk than the cows in the rest of the world. Why would you just take all that and make methane and do more to climate change? Why don't you work with technology that is available? That is what this new climate economy report is saying. You can have the cake and eat it too. Just develop your economy smartly and many companies participating here are willing to help in that.

Ms Shereen Bhan: You can have your cake and eat it too Dr Bibek Debroy, it is a question of change of mindset, it is a question of thinking smarter, it is a question of aligning objectives at the front end with the objectives at the back end.

Dr Bibek Debroy: I would just like to specifically listen about the plans for India rather than delving into negative aspects and the lecturing citing all those things.

Ms Shereen Bhan: I think several specific points were made here in terms of what the governments can do, what Indian corporations can do, and what foreign corporations operating in India can do. I think several relevant examples have been examined here. Agriculture yield being very low, Dr Debroy, you and I have had panel discussion on those issues, so it is not something that somebody else is lecturing us about.

Dr Bibek Debroy: But someone telling us that suggests that we don't know.

Ms Shereen Bhan: Maybe someone is telling us that we don't know because we have known and not acted on it.

Dr Bibek Debroy: No, not really. If someone has not acted on it there are very genuine reasons why the acting on it has not happened.

Ms Shereen Bhan: What is the reason for not improving agricultural productivity?

Dr Bibek Debroy: We can improve agricultural productivity by delivering amongst other things, electricity, water, and roads. Around 150,000 villages in India do not have electricity. You want the Government of India to tell them that they shall not have electricity or will only have off-grid solar power?

Ms Shereen Bhan: No, I mean government says electricity for all, but the government has also said it is putting its might behind.

Dr Bibek Debroy: Comparisons are often made between India now and the so called gilded age of American history beginning with 1870s. How many people here are aware of what the US per capita income was then? In today's dollars it was $3,500. Please remember that.

Ms Shereen Bhan: I don't think anyone in this room is arguing with the fact that there is an issue of inequality, there is at the heart of the matter…

Dr Bibek Debroy: I do not think that anybody in the private sector has offered to give us free technology in the energy saving area. That is why I said that you should be prepared to do something rather than only instructing us on what to do.

Ms Shereen Bhan: Dr Pachauri said that you enjoy a position of influence which you do because the NITI Aayog is supposed to be very vital for the prime minister on policy matters. So, if you were to put together specific action points, whether it is 'Make in India', 'Smart Cities', 'Digital India', 'Energy for All', the urban infrastructure mission, etc., keeping the challenges of protecting the environment, and climate change, what would those suggestions be to the government, how do you marry our development objectives with the objectives of conserving and protecting the environment?

Dr Bibek Debroy: Very good question, but I shall certainly not disclose it to the media and the public even before the Prime Minister has seen it.

Ms Shereen Bhan: Mr Paul Polman, let us talk about solutions and the road ahead. Please share the examples of what you have been able to do at Unilever when you put your sustainability living plan in motion because convincing a corporation to achieve certain time bound objectives is a lot simpler than convincing a government to then empower local bodies in order to achieve similar objectives. Trying to transform the global supply chain, trying to get shareholders to buy into your story, trying to get investors on board with what you were trying to sell, how hard was that, and companies who are trying to embark on that path today, what would be your advice to them?

Mr Paul Polman: It requires determination and leadership to do the right things and you can often achieve quite a lot. Many of the companies present here, including mine, have thought about how to run their manufacturing processes at zero waste or green energy. In fact, in India we have 30 per cent green energy already, which is a very economically viable concern. So, we work with small holder farmers and take actions to get sustainable farming and we know that it requires an investment. Investment does not necessarily mean more money, it means investment in time and energy to make these transitions work and often you need to work together with the governments, NGOs, civil society, and businesses. You have a palm oil sector in India and you are an enormous consumer of palm oil. To help people live better, you want that palm oil to be produced sustainably. Due to the global problem of deforestation, which itself is 15 per cent of global warming, we are going to run out of forests; the essence that gives us life. No country has the right to do this, nor has any country the right to lecture the others on this, we just have to solve this together. So, we like to work with Indian farmers, we have a few million that we work with. We like to see if we can bring sustainable agricultural practices to them, we like to see if we can increase their yields, we would like to see that they have a better livelihood. Usually we focus on women and if we do that in our value chain we have about 5 million of them. Then we see that they invest in their families, get better nutrition, nurture their children to create a better economy. So, it is a business model that actually is not only good for the business itself, it is also good for all the other stakeholders.

We are in the ice-cream business and one of the biggest users of freezers for ice-cream cabinets. We sit together with all the other companies for discussions and feel that why don't we go together to all these governments and create a standard of natural refrigerants instead of the HFCs and CFCs. We do need these governments to put standards in place and to enforce these. All of us in the industry need to work together with the help of technologies as the solutions are available today. We brought together the total consumer goods industry, major manufacturers and retailers, including Indian based ones and we said why not we make a commitment that by 2020 we don't sell anything anymore in our value chain — paper, soy, beef, pork, palm oil, that comes from illegal deforestation and when these commitments are made they send an enormous signal up the value chain and people actually start to confront these industries. Therefore, we need to do it together. We need to work with small holder farmers but who is going to look at their land rights, who is going to look at indigenous tribes, who is going to ensure that these people get a fair value in the value chain, who is going to provide all the training that they need to become real farmers and get their income? Companies alone cannot do this because then they would not be a viable concern. But, if we work together with the overseas development agencies, the DFIDs, the USAIDs, if we work together with NGOs who often have capabilities on the ground and governments—then our work will be a lot more easier.

Prime Minister Shri Narendra Modi told me the other day that he wants to put a toilet in each and every school and home in India. But a toilet is not enough if you don't bring a change in your habits. You need to train them to wash their hands five times a day at the right moments. By employing the practice of hand washing, hundreds of thousands of children who die before the age of 5 years could be saved. The situation of about 500 million people having infectious diseases like pneumonia, diarrhoea, etc., could also be avoided. If we could teach most of the Indians to do more hand washing, we help a child reach the age of five years, I don't think anybody participating with us here would object to that. We certainly would sell more bar soaps, which is very good for us, we could create even more employment in India and we make these communities function. It has nothing to do with lecturing and nothing to do with foreign powers moving into India. If you see what the prime minister is doing with smart cities, with 'Clean India Campaign', with the agricultural thinking and many of the other projects that he has started to work on, he is the first one who understands that he has to work hand in hand with the business community. The business community in India is the bulk of your economy and the investments. Prime Minister Modi is reaching out because he set these objectives and he can really see that we can only achieve these goals if we work together. Fortunately, we have enough people that put the interests of others ahead of their own and are not in those parochial mindsets. We must concentrate on preventing people suffering and dying every day.

Ms Shereen Bhan: Dr Pachauri, given the fact that there are interests and there are positions, and there are very rigid positions but as far as this matter is concerned, there seems to be a convergence on some of these issues. What are the objectives that you believe you will be able to achieve in Paris?

Dr R K Pachauri: Well, let me spend a little time giving you the background, why we should be discussing this issue. Around 20 to 25 years ago the world did not know what climate change was. They did not know what was causing it, they did not know what the reasons were and how we might be able to address them. Today, the Intergovernmental Panel on Climate Change (IPCC) has given us knowledge on the basis of which we really need to reappraise our position with respect to what we define as development. If we are going to take action globally, to reduce emissions

of greenhouse gases, if we want to limit temperature increase to 2 °C Celsius by the end of the century, we need a 40–70 per cent reduction in emissions by 2050. We need to triple or quadruple zero or low carbon sources of energy by 2050. It also represents a huge opportunity and a whole list of new technologies that will have to be developed. Those don't necessarily have to be developed in the developed countries. You look at a company like GE, they have something like 2,500 engineers in their R&D set up in Bangalore and they are designing turbine blades and everything else and things that are also relevant for India. So, my submission is that we really need to use knowledge, on the basis of which if countries have made a mistake in the past, we don't necessarily need to repeat those mistakes. But there is clearly an issue of equity involved over here.

The worst impacts of climate change are going to be felt by the poorest countries in the world. I think the developed countries have not really delivered in terms of what they should have done even by way of the percentage of their GDP in terms of development. There are exceptions, the Nordic countries, the Netherlands and several others, but I am afraid this is something that has to happen because otherwise you can't even expect countries like Bangladesh or the small island states being able to adapt to the impacts of climate change. So, my submission is that, yes, there are things that we need to reappraise and we need to take in hand largely for national reasons. But we should also look at opportunities because this would give the developing countries an enormous range of opportunities which we have not even begun to assess. So, it is a whole new paradigm or a whole new world that we are talking about.

The expectations from Paris are, yes, there will be an agreement. My own concern is that if it is going to rely only on INDCs then it is entirely possible that what you get in the aggregate will be far below the trajectory that you need for reducing emissions along the required pathway. It is for this reason, we are bringing out a book the next day where TERI has done substantial amount of research on the issue of climate change and we are listing different countries in terms of their responsibilities and their performance.

Ms Shereen Bhan: Maybe you can give us a sneak peek of some of the key highlights from the book because we are at the end of this discussion.

Dr R K Pachauri: Well, we have decided that we are going to bring out a volume based on research each year which will give you an international view of what is happening in specific areas related to sustainable development. Since our theme this year is the 'Sustainable Development Goals and Dealing with Climate Change', what we are doing is appraising different countries in terms of their record and I can tell you some of them look pretty bad, some fortunately also look very good. There are some countries in Europe that are doing extremely well, and there are others in a particular geographical region which are doing pretty badly.

If we are coming to the end of this session, I am very happy that we had this exchange a little earlier because let us accept the fact that bringing about change is not going to be easy. I think there are a huge set of issues where you have got to change mindsets, you have got to bring information to the doorstep of decision makers and may I say that my own perception is that the prime minister is quite focused on it. We had a meeting of the Advisory Council, I am a member of the Advisory Council on Climate Change and I was pretty encouraged by the position that he thought India should take.

Ms Shereen Bhan: I think Mr Polman must be used to this. It is like a regular Board Meeting or an investor analyst call for you, you are pretty used to this kind of stuff, aren't you?

Mr Paul Polman: The good thing now is about 34 trillion of analysts' money is going for a price on carbon, many of them are looking at their investment portfolio to see what they want to invest in. India is a country that needs a lot of finance to make these transitions possible. So, it is good to stay on that same path. I don't think there is a disagreement on what we want to achieve. From the many discussions I have been in with CEOs and the corporate community, they are on all sides of the spectrum, so there is absolutely no issue with these types of discussions. But what I have seen in the business world is that because they incur these costs very quickly on their own P&L, I have seen an enormous change. Companies are increasingly talking about climate smart agriculture or having energy discussions or they are talking about solutions that their companies are driving, that they would love to scale or get some help, in terms of frameworks. They are running ahead unfortunately or fortunately of most of the governments. But increasingly the CEOs of global companies are willing to put together their combined efforts, know-how, knowledge, and even their energy. So, I am very positive about some countries and you mentioned some of the Nordic countries in Europe are rising to the challenge. They are showing that they can grow double, triple their GDP and actually reducing in absolute value their carbon footprints. Why not learn from those, like we benchmark for the other companies and drive ourselves to higher levels. In this case it is even more important once more because these higher levels are actually higher levels of humanity. They are not higher levels of profitability or they are not higher levels of making your multinationals even more profitable, they are higher levels of giving everybody in this world a chance to have a decent life, a chance to be included, and a chance to rise to their fullest potential. That is really what we are talking about and frankly an Indian citizen is not different than a citizen in Africa or a citizen in Asia in this respect. They are all the same citizens and that is what we need to fight for and we have a unique opportunity to do that now. I agree that the combined contributions from the countries are probably not going to be as ambitious as we need. But, we need not be cynical and think that here is an opportunity for the business community, including the business community in India to say we have the solutions. Even where we don't have the solutions, we might have some technologies that have not been invented here or they might not be economically available. We can work together to accelerate and solve it. Without taking the risk, in 2071 the odds that something goes off balance is still very high. When we talk about 2°Celsius globally that does not mean the world has an average 2°Celsius. See what is happening now already when we aren't even at the 1°Celsius more or less. We are already incurring 3.7 trillion extra

costs above the normal despite climate disasters. So, why don't we rise to the challenge? Business people are well placed because they are action focused, want results, and they also know how to rally the resources, which in this case are more probably than governments have now. I am actually more encouraged that there is a critical mass of business people that are willing to rise to the challenge and that is good for them, we should support and encourage them.

Dr R K Pachauri: Let me just say something very briefly, you asked what is going to happen in Paris. I think there are two things that are going to be crucial. One is the fact that the developed countries had to commit enough resources. We have got about $10 billion committed for the Green Climate Fund but I think we need an assurance globally for much more. The second point I would like to make is what Mr Polman just referred to. With these contributions that countries are going to make over there you may end up getting very little by way of the total aggregate reductions and emissions. I think it is going to be critical that we have a review process in place. I have been saying this, I have said this to our prime minister and others. Now there is a lot of resistance to that on the part of several countries but unless you have this in built you are not going to be able to get a dynamic set of solutions. I also want to say that it is absolutely crucial that we look at the impacts of climate change in different parts of India and start taking adaptation measures. Otherwise, we would suffer substantially.

One fact that I want to mention about the 2° increase in temperature, that is not utopia because even with that by the end of the century we will get sea level rise of 26–55 cm and I think Mr Polman is right, these are average values and there are some parts that are going to suffer far more than others. We really don't want to create reasons for conflict, we don't want to displace people because that is going to disrupt the social fabric of human existence.

Ms Shereen Bhan: Absolutely. I think you have summed it up really well. We don't want that kind of disruption. What we are hoping for is more convergence on the issue of the environment and on the issue of climate change. There are vested interests, there are rigid positions on this matter, some legitimate concerns. We do hope that the developed world will actually not be as miserly as they have been in the past and I hope that whether it is governments, policy makers, or corporate citizens, we do actually achieve some sort of a convergence in Paris. Thank you very much Mr Paul Polman, Dr Bibek Debroy, and Dr R K Pachauri for joining us here this evening. Thank you very much ladies and gentlemen.

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