The Ny-Ålesund Symposium:

"Towards a low carbon economy -India's leadership role"

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Good afternoon Ladies and Gentlemen,

It is a great honour for me to be invited to this illustrious gathering of dignitaries and experts as we contemplate one of the greatest challenges that we face- Climate Change. I come all the way from India, where unlike the weather here, the tropical monsoons have started. In my country farmers depend on good rainfall for a good crop and their livelihood, but lately ……..rain has been unpredictable.

So…. no matter where we are on this planet, we are all affected by climate change. Changes in the Arctic affect not just local people and ecosystems but also the rest of the world, because the Arctic plays a special role in global climate. Rising sea levels, heightened surface warming and more greenhouse gases are a direct result of the Arctic warming affect.

We are already using 30% more resources than the Earth can replenish each year, these limited resources will need to meet the needs of 9 billion people by 2050. Clearly the current consumption patterns will not work. New technologies have helped us learn more sophisticated ways of making steel or aluminum or electricity that have depleted natural resources, forests, oil reserves, clean air and water at a faster rate. Today the responsibility of technology is to reverse this trend. Today we still need sophisticated ways of making steel or aluminum, but we will need to look at greener fuels rather than say a coal based plant. That's the mind set change we need.

This is why the Economy and Ecology are converging issues. Rising dependence on energy is driving high-carbon economies. Low carbon economy refers to an economy which has a minimal output of greenhouse gas. In my talk today, I would like to highlight two things

1. why India is uniquely positioned to take leadership
2. how IT can lead the eco transformation.

India is uniquely positioned

Consider the emerging global dominance of China and India. Together these countries account for 40 per cent of the world's population and 11 per cent of the world's GDP. They are becoming the world's biggest consumers of everything ……from oil to consumer goods.

So how India is uniquely positioned? Our economy is growing at 8.5 %. To meet the needs of over one Bn Indians, huge investments are being made to build transport, energy and industrial infrastructure…… to build millions of new homes….. educational and health infrastructure. At this stage, we are best placed to take corrective action for a low carbon growth model, which could infact set an example to the world.

Indian companies too, are getting ahead of the pack, far sighted business leaders in India who have global ambitions, are recognizing that transition to a low-carbon model makes immense business sense in the long term. Infact in the region, Indian companies are way ahead disclosing their carbon emissions and setting performance targets for mitigation of GHG emissions, 44 Indian companies have responded to the Carbon Disclosure Project this year. My own company Tata Consultancy Services as one of the world's top 10 IT services players is playing a leadership role.

The fact that both climate change and energy security is being given the highest importance in India, is evident from the Prime Ministerial directive of a "National Action Plan" which identifies eight "missions" for focused policy interventions. Solar energy, energy efficiency, sustainable habitat, water, Himalayan ecosystems, sustainable agriculture, strategic knowledge for climate change and a "Green India". Each of the missions will proceed in what are known as Public, Private and People partnerships, which bring together central and state governments, businesses, civil society and community organizations to work together.

For a country with diversity on every front, from variances in climatic conditions in different regions to economic disparities, the National Action Plan is a big challenge. The kind of challenge that will result in leap frogging technologies, indigenous research and creative solutions. And I would like to emphasize on the words indigenous and creative because …….in India……. cost and local adaptiveness of the technologies are important for both technology transfer as well as mass adoption in the country.

There is absolutely no doubt in my mind that IT will be a key enabler in this transformation and TCS would like to be at the forefront of this opportunity. I will share with you later in my talk, how we are moving towards that goal.

Indian Govt and Industry stand united in discussing at a national level, the need, role and structure of Innovation Centres for building technological capabilities to combat climate change, identifying prototypes, options, opportunities and frameworks that can enable mainstreaming of climate friendly technologies before 2020 and make them actionable in the next few years.

Many of our world renowned educational institutions are involved. The Govt has requested the IIT's to work on photovoltaic cells and solar thermal system to be integrated in a microgrid. IIT Bombay, India's highest rated university and a leader in education and research has tied up with Applied Materials on new energy-related initiatives including the fabrication of next-generation solar cells. India's first integrated bioenergy center has been set up at IIT Kharagpur the country's think-tank, their focus is to advance the use of renewable energy in rural India

So what kind of technologies are of interest to India?

India has abundant sunlight, so solar is big on the agenda, infact the Govt aims to have 60 cities powered by solar by 2020. We hope to achieve leadership in the development, manufacturing and deployment of solar energy technologies through both routes of solar photovoltaics and solar thermal power. One of our Group companies Tata BP Solar is a market leader in Solar Photovoltaic technology in India with turnover of over Euro 1Bn, mostly from exports to Europe and USA.

Having said that, there are examples of villages being lit by solar energy, using LEDs to provide upto 40 hours of light on a single solar charge. Called NOVA this is the result of partnership between NGO's in India and US. Most importantly it is an affordable device, something of great significance to the rural poor. It is hoped that if the cost of solar power falls to the level of coal-fired power, market forces could help solar energy expand to reach a larger scale. India – EU Cooperation can be a big enabler towards this goal.

The Indian government has also set specific targets for renewable energy: by 2012 it expects renewable energy to contribute 10% of total power generation capacity and have a 4-5% share in the electricity mix. This implies that growth in renewable energy will occur at a much faster pace than traditional power generation, with renewables making up 20% of the 70,000 MW of total additional energy planned from 2008-2012.

On another front the Himalayan ecosystem is crucial for understanding and adapting to the retreat of Himalayan glaciers, which are the primary source of fresh water for much of the country. For this, India's space capabilities are being leveraged for climate studies.

Sustainable agriculture is yet another aspect of our action plan. Traditional methods of farming that use large amounts of water, fertilizers and seeds are being replaced by a more sustainable strategy of diversified cropping pattern. If scaled up, this strategy could significantly lower greenhouse gas emissions from agriculture. Scaling this requires mass outreach effort to farmers in remote villages. Luckily India's mobile revolution is changing all that. With 17mn new users every month and handsets that cost as little as 35 Euros, the mobile is driving an inclusive community as no other can. Riding this wave TCS has developed a Mobile Agro Advisory System- mKrishi – Krishi means 'Farmer', in which the farmer receives soil and weather information and advice on crops through his mobile. This is being piloted in my own state and is an example of the kind of hybrid innovation that we will see more of in the future.

Towards energy efficiency, nine energy intensive sectors have been identified for which the Govt has set efficiency benchmarks, with an overall target of 20%

greater efficiency by 2012. This target is enforced through mandatory energy audits, and the future plan is to introduce trading of Energy Efficiency certificates.

Regulatory developments such as the one I just mentioned, only emphasize, our contention that countries and companies need to focus on ecological competitiveness for economic sustainability. This means focus on the ecological parameters of Land, Energy, Water, Waste, Air, and Carbon or as we call it LEWWAC. By doing this, energy intensive manufacturing companies can benefit by energy, water and waste efficiencies in their processes. India also launched an Energy Conservation Building Code (ECBC) in 2007 which encourages the design of 30% more energy efficient buildings.

Tata Group at the forefront

As a business group, the Tata Group is at the forefront of leading corporate India towards mitigating and adapting to climate change. It is an active member of the Global Leadership and Technology Exchange, a sharing platform for energy, transport and maritime technologies.

The Tata Group as you know conceptualized and built the 2000 dollar car – the Nano, which has become the game changer in the car market. Also from its stables has come a zero emissions car the Indica Vista electric car – which is being introduced to Europe. Indian markets are unfortunately not yet ready for this product.

Another example of the leadership of the Tata Group is evident in EKA Asia's fastest supercomputer with a peak performance of 170 Teraflops. It has a unique design feature. Normally rows of computer racks have alternating hot and cold aisles, cold air seeps through perforations through the floor, cooling the blades and coming out as hot air through the hot aisles, in the case of EKA, the racks were arranged in a circle with another concentric circle arrangement for coolers which blew cool air directly onto the blades and into the centre. The resultant hot air was sucked out from the ceiling. This way the cooling was far more efficient, used less power and the winning point was that the whole set up could fit into a 4000sq ft area. Simple but ingenious.

Sometimes our most simple requirements call for more than ingenuity. We take clean water for granted but when hit by natural disasters such as floods, pure drinking water could mean the difference between life and death. Having witnessed such situations during relief measures, the Tata team created a water purification system that does not need electricity, is portable and can easily be placed in homes at a cost equivalent of 17 Euros called -Tata Swach, Swach means 'Pure'. This breakthrough innovation uses natural ingredients like rise husk ash impregnated with nano-silver particles and has now become a game changer in the water purification market.

Within Tata Chemicals- a group company, the catalysis, green chemistry and biofuels vertical focuses on sustainable and green chemical transformations, the development of catalysts and catalytic transformation processes for clean fuels and chemicals and alternative energy.

These are examples of the green innovations that are coming out of the house of Tata's, innovations which we hope to take beyond India's shores.

IT - Technology for eco transformation

An area where India already has a leadership position is IT and as I said earlier the transition to a low carbon economy will be an IT enabled Eco-Transformation.

In TCS, our focus is along two broad areas: Green IT and IT for Green. Put simply green IT will drive the greening of the IT operations which currently contribute 2% of the world's emissions, growing at 6% a year. Thereafter, IT for green will drive the other 98% of emissions through efficiencies in the core processes of the company, as well as how it deals with its suppliers, and its customers.

Data centers account for nearly 2% of the total electricity consumption. It is estimated by GreenPeace that data centers around the world will consume more power than the countries France, Germany, Canada and Brazil combined. At TCS Innovation Labs, we are developing new software tools. Our tools enable the data center administrators to monitor the power consumption as well as the thermal conditions in the data center in real time and use this information to identify inefficiencies in the power usage. These inefficiencies could be in the IT

equipment (power guzzlers, idle servers that consume power without doing any useful work, and so on), or in the cooling infrastructure (hot spots, over cooled regions, etc.) Our tools use computational fluid dynamics (CFD) based modelling to understand the heat distribution in a data center and prescribe appropriate cooling measures.

According to GeSI, which is a joint initiative established by the worldís leading ICT organizations with the objective of improving sustainability in the ICT sector, by 2020, buildings would emit 11.7 GtCO2e (billion metric tonnes of CO2 equivalent), a shocking figure by any means. Along the “IT for Greening” front, TCS Innovation Lab is developing IT frameworks that help facility managers reduce the carbon footprint of buildings. Our tools offer insights over and beyond what the ‘meters’ and ‘building management systems’ provide. Using heat gain models, our tools are able to benchmark the operational efficiency of buildings quite accurately. In addition, our tools also prescribe “optimal energy purchase plans” that allows a facility manager to procure cost effective carbon free energy for a building.With these measures, we were able to reduce the energy bills of TCS data centers and campus facilities by more than 20% and reduction of carbon footprint by 5%.

Building on our green IT experience, we looked at offering our services to others. In October 2009, we set up a new vertical called the Eco-Sustainability Unit. TCS developed green IT services for customers, looking at their data centres and IT operations to make them more carbon efficient and then even beyond into their business operations and processes. For instance one of our subsidiaries CMC is working on embedded, sensor based technologies that would measure and enable green eco friendly process control and SCADA systems used in implementing green technologies. CMC is currently engaged with leading automotive and transportation electronics companies, industrial process control systems companies, and telecom-hi tech companies in joint R&D programs. Together with the supercomputing group, CMC will enable green cloud computing services to various customers in India.

In terms of security of bio-diversity, TCS has developed a GIS based forest management system called GeoVun, Vun means ‘Forest’. GIS and Satellite

Imagery can be effectively used to monitor, protect and enhance forest cover. Intelligent systems such as wind forecasting, sun-tracking, and smart grids will ensure that existing renewable technologies are being used at optimal and most efficient levels. These are but a few examples of how pervasive IT technologies have become and how crucial a role they will play as the low carbon economy becomes more the norm than an exception.

Green Valuation

So far, I have shared with you the view from India, however we need a transformation of global proportions. With economy and ecology converging we need a mindset change in evaluating performance of countries and companies. Today, I would like to propose a new meaning of wealth creation – Green Valuation, a disruptive valuation and reward model which goes beyond GDP and NPV as growth indicators.

Green Valuation is built around 5 fundamentals – environmental capital, human capital, manufacturing capital, credit capital, and social and organizational capital. While it may sound simple, green valuation is actually quite complicated. For example, calculation of the water imbalance of a corporation would require calculating the cost of raw water, cost of treating water, and the cost of effluent treatment. Measurement systems for waste and air may be even more complicated. TCS will be adopting the Green Valuation model within the next few months, and will be offering the same to countries and corporations

Ecological parameters must now become part of the standard valuation and reward model. Which means that countries and companies can drive valuations much higher if they are ecologically neutral or positive BUT valuations would be negatively impacted if neutrality is not maintained. Economies like Norway, Maldives, Germany, Costa Rica and Guyana are already leading the way and EU is taking leadership in this and defining a quantifiable ecological framework for its member countries.

Organisations like Google, focusing on low carbon IT operations, Nokia, focusing on green value chain, Deutsche Bank introducing sustainability financial

products, and Syracuse University having a state of the art carbon neutral data centre, are driving this change in the non-governmental sector.

In India, the Ministry of Environment and Forest is the nodal agency to create the environmental governance structure. In keeping with the increased thrust on sustainable development, a new National Environment Protection Authority or NEPA is being created to regulate and enforce policy. For example environmental clearance is mandatory for several development activities we have coastal regulation zones where activities are restricted. NEPA will ensure enforcement and compliance. TCS is a member of the working group of the Ministry of Environment and Forests on NEPA. TCS is providing insights on compliance management at a structural, functional and governance level.

Conclusion

The intent of my talk has been to share with you how a country like India, is carving its own path towards a greener model of development and a low carbon economy. As someone who has spent over 35 years in building the Indian IT industry, and having seen the Y2K revolution, the exponential Internet growth, the convergence and embracing of technology into our lives, I am convinced that for IT – Green is the next big frontier.

Technology will be the game changer in Sustainable solutions, across countries, across governments and across industries. With a thrust towards technology and with the green valuation model, I am optimistic that we can control the environmental damage of the past decades and even perhaps dare to reverse the trend in the future.

Thank you.