



CANADA INDIA ENERGY FORUM

April 15–17, 2009

Conference Co-chairs

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Process Research ORTECH Inc.

Organized by



CANADA INDIA
FOUNDATION

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PROGRAM REPORT

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Attachment: CD containing presentations made at the Energy Forum

1. INTRODUCTION

The increasing importance of India as an emerging economic power with rapid growth in its current and projected energy consumption needs provides a great opportunity for Canada to address India's needs through its natural resources and expertise in the energy sector. This opportunity takes on additional significance against a backdrop of increasing concern on climate change. In this context, Canada India Foundation (CIF) organized an ambitious program in Toronto, on April 15-17, 2009, that brought together some of the most prominent players in the Canadian and Indian energy sectors to identify opportunities for energy cooperation between the two countries.

2. OBJECTIVES

The objectives of Canada India Energy Forum were to:

- Provide a platform for the exchange of energy sector specific knowledge and information
- Present current developments in the energy sectors of Canada and India
- Promote mutual business opportunities for Canadian and Indian energy companies
- Develop and publish a research paper on partnership between Canada and India in the field of energy cooperation

3 BACKGROUND

The importance of energy as the driving force for a nation's economic growth has always been well understood. The emergence of India as an economic power, with the resulting demand for a greater share of global energy, has put the focus on the security and independence of energy supply for both developing and developed nations alike. At the same time, Canada's continued strength in natural resources and experience in energy development makes it a natural partner for addressing India's energy needs.

It is against this backdrop that Canada India Foundation took the initiative to organize a first-of-its-kind event focusing on Canada India relations in the context of energy. Canada India Foundation is a national, non-profit, non-partisan, non-governmental organization established in 2007 to foster support for stronger bi-lateral relations between Canada and India; to educate Canadians on the changing face of India; and to increase the participation of Indo-Canadians in the public policy process in Canada.

The phenomenal thirst for energy in India to improve the quality of life for millions of Indians, including creation of jobs, economic opportunities and progress towards social equality needs to be balanced by the need to control and subsequently reduce the global carbon footprint. Canada, with its wealth of natural resources and experience in developing them, can be a strategic partner for India in its economic development and consequential secure energy needs.

The timing for the Canada India Energy Forum could not have been more appropriate. Major newsworthy initiatives have been in the news on a variety of energy options, with focus on Green Energy. There has been a great resurgence of interest in nuclear energy as a major source of electric power. India's signing of the 123 agreement with the US last year has signaled to the world the great potential that India offers for civil deployment of nuclear technology. The signing of civil nuclear cooperation has been followed by India with similar bilateral agreements between France and Russia. Areva of France and India are in discussion for two 1,000 MWe power plants in the state of Maharashtra. Russia is constructing two 1,000 MWe nuclear plants in Tamil Nadu, and is on course to set up another four 1,000 MWe nuclear plants at the same location. India has plans to increase its nuclear capacity 15-fold, to 63,000 megawatts by 2030, at an estimated cost of \$80 billion. Canada with its unique uranium deposits and advanced nuclear technology can supply end-to-end civil nuclear technology to India. Discussion between Canada and India in civil nuclear co-operation is currently in progress. The strong presence of the Canadian nuclear energy organizations in the Forum was an excellent indication of the high level of private sector interest in potential areas of cooperation between the two countries.

The Canada India Energy Forum also closely followed the recent announcement of the Green Energy Act by the Government of Ontario, which has taken on the challenge of reducing greenhouse gas emissions. Renewable energy is an area of great interest to Canada and federal/provincial governments are putting great emphasis on it. India has also been making major progress in this sector. Suzlon Energy made the headlines recently with its acquisition of RePower, thus becoming one of the largest wind power providers in the world. The Energy Forum also explored other renewable energy options such as solar, biomass and collaborative opportunities between the two countries. The importance given by the Government of India to Renewable Energy was underscored by the strong contingent from the Ministry of New and Renewable Energy participating in the Forum.

Even as we continue to look for Green Energy options, fossil fuels continue to be a major source of energy. It is not only important to understand our options in this area, but also to discuss options to minimize the carbon footprint bringing greater greenhouse efficiencies as well as governmental policies that will ensure that use of fossil fuels is consistent with our Green Energy objectives.

The full picture on energy would not be complete without discussing the non-technology aspects of developing energy options. These include, but are not limited to, public and private sector policies relating the development of appropriate energy solutions, infrastructure aspects such as Engineering, Procurement and Construction, financing energy solutions, including new technologies, investment strategies including cross border mergers and acquisitions. The Canada India Energy Forum was able to attract some of the brightest minds from both countries to participate in sessions dedicated to Policy as well as Cross Border M&A and Investment.

The sessions on various aspects of energy concluded with a final panel discussion on the go forward strategy for Canada and India.

A summary of the speeches and presentations made by the eminent participants in the Energy Forum is provided in the following section.

4 CONFERENCE SUMMARY

(i) April 16, 2009 - Plenary session

(a) Keynote Address: Dr. A.P.J. Abdul Kalam (Former President of India)

Dr. Kalam set the tone for the Forum, while addressing the Forum participants via video link from New Delhi. Here is a summary of what he said:

When we analyze the critical problems facing the planet earth today, three important issues come to our minds:

- 1) The continuous depletion of fossil-material-derived oil, gas and coal reserves as predicted by World Energy Forum.
- 2) The continuous degradation of environment primarily due to extensive use of fossil materials for generating energy.
- 3) The continuous fluctuations in the price of crude oil. In the past six years, From under \$25 per barrel in September 2003, the price of crude went up to \$147 per barrel in 2008 and, at this point, has come down to \$50. These fluctuations bring in lot of uncertainty for the industrial sector and also for the people. We have to find an alternative method to contain the problem. The solution to these problems is achieving energy independence.

Based on the developmental profile and progress visualized in India for the next two decades, India's power generating capacity should increase to 400,000 MW by the year 2030 from the current 150,000 MW in India. This takes into consideration the energy economies planned and the design and production of energy efficient equipment and systems. Energy independence can be achieved through three different sources, namely renewable energy (solar, wind as well as hydro power), electrical power from nuclear energy and bio-fuels (for the transportation sector).

The incremental energy production profile could be as follows: The hydroelectric capacity generated through normal water sources and inter-linking of rivers is expected to contribute an additional 50,000 MW. Large scale solar energy farms with capacities in the hundreds of megawatts could contribute around 55,000 MW. Planned nuclear power plants could have a target capacity of 50,000 MW of power. An additional 64,000 MW of electrical power should come from wind energy. The balance has to be generated through conventional thermal plants using coal and gas and other renewable sources of energy such as Biomass, Power through municipal waste and small-medium scale solar thermal power.

The energy scene in the 21st century is going to see a major shift. Oil and gas energy sources are expected to approach their finite limits in this century. Therefore energy researchers in India and Canada should re-align their research and development contribution for generating commercially viable technologies for solar energy, Wind energy, Nuclear energy power plants and production of Bio-fuels (both ethanol and bio-diesel) sufficient to substitute at least 20% of the fossil fuel in the initial phase. Work is also required for developing emulsified fuels, which could enable further substitution of 25% to 40% fossil fuel.

Canada India Energy Forum should submit comprehensive recommendations for the two nations to become energy independent within next 2 decades. Focused research needs to be carried out to have a fossil fuel free energy system for planet earth.

(b) Plenary Address by Hon. Lisa Raitt (Minister of Natural Resources, Government of Canada):

Dr. Kalam's video talk was followed by a formal Plenary Session, featuring Plenary Addresses by the senior representatives of the Canadian and Indian Governments, Hon. Lisa Raitt and Hon, Montek Singh Ahluwalia respectively. A summary of Hon. Lisa Raitt's address is provided below:

Hon. Raitt highlighted Canada's accomplishments on the economic front, for example, the lowest Debt-to-GDP ratio among G7 nations, sound economic policies and strong banking sector. She reminded the participants about Canada's abundant energy resources as a result of which, Canadians enjoy a lifestyle second to none.. As a responsible global citizen, Canada has set targets to cut greenhouse gas emissions to 25 per cent below 1990 levels by 2020 and 80 per cent below 1990 levels by 2050. Towards this, Government of Canada has set up a \$1 billion Clean Energy Fund. The federal government will also provide \$1 billion over five years for a Green Infrastructure Fund.

Hon. Raitt referred to the agreement for Scientific and Technological Cooperation that Canada and India signed in November 2005 She said that the two countries are eager to enhance cooperation in the energy and environment sector. One such example of cooperation was the Canada India Environment Forum being organized by Environment Canada later this year. Canadian industries can supply the needs of Indian civil nuclear industry. She also highlighted Canada's leadership in carbon capture and storage technology and the opportunity for technology collaboration in this area with India, two-thirds of whose power is generated from coal. She asserted that a secure reliable supply of energy was vital, and a secure reliable supply of cleaner energy was even more vital and predicted greater cooperation between Canada and India in the future, as both countries were eager.

(c) **Plenary Address by Dr. Montek Singh Ahluwalia (Deputy Chairman, Planning Commission, Government of India):**

Dr. Ahluwalia acknowledged that trade between India and Canada was currently less than it should be, but pointed out that this was changing. He reiterated Canada's exceptional status as an energy superpower and welcomed Canada's policies aimed at increasing economic trade. He stated that this was a relationship India wanted to strengthen and nurture as evidenced by the fact that a free trade agreement between India and Canada was in the process of being worked out.

Dr. Ahluwalia presented some impressive numbers on India's growth following the economic reforms in 1991. In the last five years, India had grown at the rate of 8.6% per annum. Even the relatively lower growth rate of 6.5-7.0% in 2008-2009 was impressive by world standards. He believed that India has the capacity to grow at 9% per annum after economic recovery. In order to achieve this figure, India's energy requirements will have to grow at the rate of 6.0% per annum. He reconfirmed the need for energy security for India, particularly in light of the fact that oil prices have destabilized. He highlighted India's potential to generate 500,000-600,000 MW of power from nuclear reactors based on Thorium, an element India has huge reserves of. The challenge for India was that thorium is not fissile, and needs plutonium and uranium to make it fissile. According to him, a successful outcome of the current bi-lateral nuclear negotiations will remove restrictions on the sale of Uranium to India, and as a result, will avoid burning a large amount of coal to generate power. Currently, 80% of India's coal consumption goes towards power generation. Dr. Ahluwalia said that India greatly welcomes investment in its energy sector and that foreign investment was now allowed in captive mines. From less than 10% of today's coal coming from captive mines, almost 30% of the coal was expected to be produced from captive mines in 2016. In addition, a number of private investments were also being attracted to this sector. He concluded by saying that, in a broader context, India was eager to do everything possible to promote economic cooperation between the two countries and energy had a high priority in this regard.

(d) **Plenary Session Presentations by:**

Mr. Patrick Daniel (CEO, Enbridge, Canada),

Dr. Mrityunjay Athreya (Athreya Management Systems, India),

Mr. Duncan Hawthorne (CEO, Bruce Power, Canada) and

Mr. Deepak Gupta (Secretary, Ministry of New and Renewable Energy, Government of India)

The Plenary Session addresses were followed by presentations by senior energy sector representatives and observers from both countries. Mr. Patrick Daniel referred to the major initiative by Reliance, with support from Enbridge, to lay a 1400 km long pipeline enabling natural gas from India's east coast to be moved to its west coast. Dr. Athreya provided a concise perspective of India's energy needs and Canada's capabilities, identified areas for possible match, including civil nuclear cooperation, affordable renewable and financial collaboration. Mr. Duncan Hawthorne discussed some of the challenges faced in the past in moving forward with plans for energy sector partnership.

Mr. Deepak Gupta presented an informative overview of India's energy profile, including achievements to-date and targets, strategies and areas of possible collaboration between India and Canada. Some of the key points made during the presentations and subsequent discussions were as follows:

India is on a high growth path, and needs energy for industry, energy for agriculture, and energy for consumption by growing population, creating a huge energy gap. Canada has awesome capabilities in energy sector, especially in the nuclear sector. There are currently 444 nuclear reactors worldwide, out of which 126 reactors are in North America. These reactors either need to be replaced or refurbished. The nuclear reactor technology implemented in the two countries is the same and there is potential for sharing the expertise. India's currently low per capita energy consumption (639 kWh/ capita in 2008) and current power generation capacity (160,000 MW) only underscores the impressive projected growth to 800,000 MW of power generation in the next 2 decades, for a sustained +8% economic growth.

(ii) April 16, 2009 - Lunch Session

**Lunch Address by Hon. George Smitherman
(Deputy Premier, Minister for Energy & Infrastructure, Ontario)**

The Lunch Session on the first day of the Forum featured a special address by Hon. George Smitherman, who spoke of the great opportunity for Canada and India to build on the existing relationship. He referred to the generous support provided by Government of Ontario for this Forum as an investment in growing this relationship. Ontario had a lot to offer India in the area of Energy, with its extraordinary expertise and diversified knowledge in Energy. He recognized India's burgeoning middle class, whose energy needs could be addressed through partnership with Canada.

He referred to Ontario's emphasis on generating electricity from emission-free sources, such as hydro and nuclear, with more than 75% of the electricity coming from these sources, 50% from nuclear alone. However, Ontario also required quite an amount of work to keep the nuclear reactors going, including refurbishment of large variety of assets. In 2003, Ontario had made a decision to eliminate all coal fired power plants, and by 2014 four of five coal fired power plants will be eliminated completely. Ontario had thus undertaken the largest single climate challenge initiative in North America. He talked about the range of opportunities in Ontario for enhancement of renewable energy, particularly wind energy. Last year on windy days, Ontario drew more power from wind than from coal. Ontario was also switching from coal-fired power to biomass-derived power. A 220 MW capacity biomass power plant had been tested in Northern Ontario recently. Two days prior to the Energy Forum, a new 12.5 MW hydro plant was inaugurated in Ears Falls with 25% ownership by local community. This facility uses the water that has historically been spilled past the existing Ear Falls Generating station.

Hon. Smitherman then briefly discussed the Ontario Green Energy Act, which was tabled in the Ontario legislature on Feb 23, 2009 and excerpts from which were provided to

participants. The Act provides for shortened timeframe to get implementation permits in place as well as guaranteed approval time to bring green energy projects to life. He saw an extraordinary opportunity for Ontario to work together with India and look at India as an elder sister with so much for us to learn from her experience.

iii) April 16, 2009 - Panel Sessions

The afternoon of April 16 was dedicated to focused panel sessions on specific components of the energy sector. Each panel session featured senior government representatives from Canada and India, as well as eminent Public and Private sector experts on the energy industry from the two countries. Key messages from each of the panel sessions are provided in this report. A copy of the actual presentations made is included in the enclosed CD.

a) Renewable Energy session

Moderator: Dr. V.I. Lakshmanan (Vice-Chairman and CEO, Process Research ORTECH)

Panelists:

Mr. Bharat Bhargava (Senior Scientist, Ministry of New/Renewable Energy – India)

Mr. Terry McIntyre (Senior Science Advisor– Environment Canada)

Mr. M.S. Unnikrishnan (Managing Director, Thermax – India)

Mr. Sam Sampath (Senior Fellow, Pratt & Whitney – Canada)

Mr. Nairn McQueen (Vice-President, Hydro-One – Canada)

Ms. Linda Bertoldi (Partner, Energy Practice, Borden Ladner Gervais – Canada)

Mr. Debashis Majumdar (Chairman and MD, IREDA – India)

Mr. Alan Polak (Principal, Genuity Capital Markets– Canada)

-Renewable energy business in India is ~ \$4 billion. Two million households are using solar light in India. Solar water heaters and solar cooking systems are also becoming popular.

-Canada and India can cooperate in training, capacity building and a whole range of activities such as research work in solar, hydrogen and biomass.

-By 2010, 5% of ground transportation will use bio-fuel in Canada. The issue is compatibility of bio-fuels with existing petrochemical infrastructure.

-Global energy consumption is 15 TW. Potentially available solar power is 86,000 TW, and solar energy has the potential to fulfill the world energy demand.

-Solar heating technology includes flat plate for heating needs up to 50⁰ C, vacuum tube for heating needs up to 85⁰ C, and concentrators for heating needs in the range of 100-700⁰ C.

-Indian Renewable Energy Development Agency Limited (IREDA) is financing projects in the areas of solar energy, wind energy, hydro energy, biomass cogeneration, biomass power generation, waste to energy and energy efficiency.

-There was significant investing activity in cleantech globally with a record \$8.4 billion in investments in 2008. Solar outpaced other renewable energy technologies among venture investors with \$3.3 billion in investment.

-We must dramatically reduce CO₂ emissions, and the largest source of CO₂ emission is energy production from fossil fuels. Reduction in fossil fuel contribution to total energy production can be achieved by cleaner production of energy from nuclear, solar and wind.

-We must use less energy, produce energy efficiently and produce energy from green sources.

-Renewable energy is clearly the choice for rural India.

-Ontario has tabled the Green Energy Act in the house in February 2009, because it is the right thing to do, and it is intended to promote economic growth and create jobs.

-Ontario does not restrict FDI in renewable energy and has positioned itself to be a leader in the area of renewable energy.

-In June 2008, Government of India released India's first National Action Plan on Climate Change ("NAPCC"). NAPCC aims to promote the development and use of solar energy for power generation and other uses

-Government of India intends to increase the total amount of power derived from renewable energy in India from 8 percent to 10 percent of installed capacity by 2015, which would result in an additional 7,000 MW in capacity.

-In September 2008, the Government of India established new policies to speed the adoption of second generation bio-fuels from non-food crops, which included calls for elimination of tax and duties on bio-diesel.

b) Fossil Fuels session

Moderator: Mr. Manoj Pundit (Partner and Lawyer, Borden, Ladner Gervais)

Panelists:

Dr. S.C. Sharma (OSD (Petroleum), Planning Commission- Govt. of India)

Mr. Krish Krishnamoorthy (Former Exec. Vice-President, SNC-Lavalin – Canada)

Mr. Smarajit Chakrabarti (CMD, Eastern Coalfields Limited – India)

Mr. Alan O'Brien (Managing Director, Hatch Energy – Canada)

Mr. Sunil Jain (Joint Secretary, Ministry of Petroleum & Natural Gas – India)

Dr. Muralidhar Gupta (CANMET, Natural Resources Canada)
Mr. Bruce Lawrence (Partner, Borden Ladner Gervais – Canada).

-Coal is the largest source of fossil fuel and is regaining its position in the energy markets proven reserves are spread amongst many countries but 79% is concentrated in USA (27.1%), Russia (17.3%), South Africa (5.6%), Australia (8.6%), China (12.6%) and India (10.2%).

-The world has proven coal reserves of 204 years, oil for 41 years and gas for 61 years. Underground combustion technology could increase reserves and clean coal technology has the potential to make it environmentally acceptable.

-Currently, three quarters of all coal produced is converted into electricity in coal fired generating plants. This figure is likely to rise over the next 20 years with the introduction of new coal fired plants in China, India and the USA.

-India is the 3rd largest coal producing country with abundance of coal resources compared to oil & gas. Indian energy supply is largely dependent on coal with more than 65% electricity generation capacities being coal based.

-Coal production in India will increase from 460 MMTPA in 2007 to 680 MMTPA in 2012, while the demand of coal is expected at 731 MMTPA by 2011-12. 198 coal blocks have been awarded as captive blocks and 2 coal blocks awarded for Coal to Liquid

-Domestic gas production in India is set to double from 92 MMSCMD to 173 MMSCMD. Demand of gas to reach 280 MMSCMD by 2011-12, 800 kms of national gas grid has been planned in India and work is being taken up in phases.

-India is a major oil importer and concerned with the costs of imports. Opportunities in India exist for oil & gas field service companies in heavy oil production technology, enhanced oil recovery, clean coal technology, carbon capture & storage, coal to liquid technology, gas hydrate production technology and training and development in oil & gas and other energy sources. Most likely oil shale deposits are located in Assam in North Eastern India.

-Alberta's Oil sands contain 173 billion barrels of recoverable oil and represent secure source of energy supply to the North American continent. Oil sands projects have been a principal driver of Canada's economic growth in the past decade.

-Technology solutions are imperative for carbon capture and other environmental issues. Research has been undertaken in carbon capture and sequestration technology as well as recovery of metals from tailings.

-India has large coal reserves, but high ash content poses challenges that can be met with specific technologies. Coal-to-liquid (CTL) projects are well proven in other countries. Government of India has placed a high priority on CTL development and allocated coal blocks.

c) Policy session

Moderator: Prof. Ashok Kapur (Retd. Professor, University of Waterloo)

Panelists:

Mr. Kirit Parikh (Member, Planning Commission – Govt. of India)

Ms. Milena Sejnoha (Director, Natural Resources Canada)

Dr. Jatin Nathwani (Professor, University of Waterloo – Canada)

Dr. Janusz Kozinski (Dean of Engg, Univ. of Saskatchewan – Canada)

Mr. Saurabh Kumar (Secretary, Bureau of Energy Efficiency, Govt. of India)

Mr. Joseph Odhiambo (Senior Policy Analyst, Environment Canada)

-India needs to sustain 9% growth in GDP to achieve poverty reduction and inclusiveness. Increased energy efficiency means primary energy requirement will grow at 5.8% per year, while commercial energy requirement will grow at 6.8% per year.

-Promoting energy efficiency may require setting appropriate energy efficiency standards.

-Key areas of research and innovation priorities for Canada are in carbon capture and storage (CCS), bio-energy and clean electricity generation by increasing the share of renewables in our energy mix and developing next generation nuclear energy systems.

-Low-cost renewable energy is critical, and solar energy is part of the answer. New technologies will make solar energy more affordable. Breakthrough research in materials and device technology is necessary for practical realization of high performance PV devices.

-Climate change challenge can not be addressed without Canada and India

-Energy security is important for India.

iv) April 16 - Dinner Session

Dinner Address by Hon. Sandra Pupatello

(Minister, International Trade and Investment, Govt. of Ontario)

Hon. Sandra Pupatello described how Ontario's Green Energy Act, tabled in the Legislature, earlier this year, has pegged Ontario as a leader in green energy. The Act provides for feed-in tariffs guaranteed for 20 years and guaranteed access to the grid. She shared, with the help of visuals, her very positive experience as member of the trade

mission to India on behalf of the Government of Ontario. She reinforced the general message from Forum participants that while trade between India and Canada has grown significantly (180% in past five years) there is so much more to do to generate more trade. Premier McGuinty led a delegation of 180 people to India in 2008. The visit focused on education, information and communication technology and life sciences... Giving the example of the power train part for Tata Nano automobile, which was being supplied by an Ontario-based company, she stated that when Indian companies work with Ontario companies, trust is almost automatic. She saw a great opportunity on all parts of the energy sector for Ontario and India to do business, citing Ontario's leadership in nuclear energy in North America, its \$1.5 billion investment fund for clean green energy and its stated focus on infrastructure development in India.

v) April 17 – Panel Sessions

The panel sessions on the next day followed the same format as the earlier panel sessions. Key messages from each of the panel sessions are provided below. A copy of the actual presentations made is included in the enclosed CD.

a) Nuclear session

Moderator: Dr. V.I. Lakshmanan (Vice-Chairman and CEO, Process Research ORTECH)

Panelists:

Mr. Kirit Parikh (Planning Commission, Government of India)

Mr. Pierre Charlebois (COO, Ontario Power Generation)

Mr. Gerald Grandey (CEO, Cameco, Canada)

Mr. Ron Denom (President, SNC-Lavalin International)

Mr. Ali Alizadeh (Vice President, AECL, Canada)

Mr. Neil Alexander (President, Org. of Candu Industries, Canada)

-India would like to collaborate with Canada in the field of civil nuclear technology. There has been some misunderstanding with Canada in the past, but Dr. Parikh submitted that India has never violated any international commitment.

-India needs to secure long term Uranium supplies, which is good news for Canada as it has some of the world's largest of Uranium reserves. Canada has high grade deposits of 21% ore grade; while for rest of the world, the average grade is 0.1% uranium.

-The recent opening of the Indian market has created a unique opportunity for Canada and the Canadian Nuclear industry to position itself as a long-term strategic partner in this emerging market. The current nuclear infrastructure in India is based on CANDU technology. NPCIL is operating heavy water reactors similar to Douglas Point 220 MW and Pickering 540MW units. Major Indian nuclear manufacturers have developed full capability in manufacturing CANDU nuclear and non-nuclear components.

-The bi-lateral agreement with the US, the so-called 123 agreement, has led to the conclusion of nuclear cooperation agreements with Russia, France, the United States and the United Kingdom. These agreements have allowed India to commit to the purchase of light water reactors from these countries.

-Canada is currently negotiating its own agreements with India. Following the agreements with India, cooperation in harmonization of the PHWR technologies including the introduction of Gen III ACR-1000 technology in India is expected to start. Familiarity with the CANDU technology in India will allow extensive localization of any new CANDU project in India resulting in the most economic nuclear power option.

-Currently, there are 41 CANDU/Pressure Heavy Water Reactor Units in Operation globally, producing 23,492 MWe. Canada has 6 units at 540Mwe, 6 units at 850Mwe, 4 units at 935Mwe and 2 units at 700Mwe. India has 1 unit at 100Mwe, 1 unit at 200Mwe, 10 units at 220Mwe and 2 units at 540Mwe.

-In addition, R&D in advanced fuel cycles such as thorium and recovered uranium is currently underway in both India and Canada. Cooperation in this area will further advance the fuel cycle advantages of CANDU reactors in India and in the international markets. India can also benefit from safety and operational advances in the CANDU technology to improve the performance of its current fleet of PHWR reactors.

-The combined expertise of India and Canada can create the ability to deliver a high performance, low risk option that can be deployed in global markets. Together, they can develop new designs for safer, efficient and affordable nuclear energy.

b) Cross Border M &A and Investment session

Moderator: Mr. Manoj Pundit (Partner and Lawyer, Borden Ladner Gervais)

Panelists:

Mr. Chandra Shekhar Jain (Executive Director, ONGC – India)

Mr. Prashant Pathak (Managing Partner, ReichmannHauer Capital Partners – Canada)

Mr. S. Padmanabhan (Executive Director, Operations, Tata Power – India)

Mr. Larry Galajda (Vice-President, Stantec – Canada)

Mr. Tony Loria (Lead Analyst, Genuity Capital Markets – Canada)

Mr. Ungad Chadda (Vice-President, Toronto Stock Exchange – Canada)

Mr. Krish Krishnamoorthy (Former Exec. Vice-President, SNC-Lavalin – Canada)

-ONGC Videsh Limited (OVL) has 44 projects in 18 countries. OVL is looking forward to opportunities in Canada such as its oil sands. OVL is also looking for technological partnership with tech-savvy companies.

-Total costs of ownership often are not fully transparent at the outset.

-Flexibility and adaptability of transaction structure is key to success in energy related capital intensive and long life cycle sectors.

-Some level of protectionism is expected to exist in the near term. Energy, utilities and related sectors are seen as serving the “public good” in both countries.

-Tata Power has generation capacity of 2783 MW, out of which thermal power is 2179 MW, hydro 447 MW and wind 157 MW. Tata Power wants to buy minority stakes in uranium mines and nuclear plants to prepare for private sector participation in production of civil nuclear energy, which may be allowed by Government of India in 5-8 years.

-Stantec has teamed up with Simon Carves India Ltd. To pursue industrial projects including refineries, pipelines, power plants, and infrastructure.

-Canada is the largest exporter of crude oil to the U.S. With logistics being developed to access Canada’s West coast, the Alberta oil sands are becoming important to Pan-Pacific destinations. The growing significance of the oil sands is evidenced by the entry of all the world-class super-majors and majors.

-Investment banks are reacting to the cluster of Clean Technology companies on TSX and TSX-V by providing strong analyst coverage, which supports liquidity and a company’s ability to raise capital from the markets.

-Prior to 2000, SNC Lavalin performed Engineering & Procurement in Canada with very little Indian content. In 2000, SNC Lavalin successfully completed major petrochemical plants in Baroda, Gujarat and Jubail, Saudi Arabia, using Indian engineering & procurement and realized the potential of the strategy to win international contracts using Indian talent.

vi) April 17, 2009 - Lunch Session
Lunch Address by Dr. Montek Singh Ahluwalia,
(Deputy Chairman, Planning Commission – India)

This was Dr. Ahluwalia’s first visit to Toronto and he expressed great appreciation for the city and the hospitality he had received during his visit. He acknowledged that not enough attention has been paid so far to Renewable Energy, however this was changing. Renewable energy was clearly an area for emphasis and, provided the right stimulus, it will be hugely beneficial. He cited the example of. Suzlon which acquired control of the German company, REpower and will be setting up a 950 MW wind power assembly facility in Quebec. Dr. Ahluwalia also stated that there was a lot of scope for potential research and technical collaboration in the area of solar energy and bio-fuels, however, it was necessary to resolve Intellectual Property rights with satisfactory distribution of these rights before this can take place. India has produced a national action plan on renewable energy and is developing a policy framework to generate more domestic capacity in the area of solar energy. India is also interested in clean coal technology since half of India’s

demand for energy will be met by coal firing reactors. He looked forward to resumption of collaboration between India and Canada in the area of nuclear power for civil use, particularly with India's great demand for Uranium and Canada's ability to meet this demand with its abundant supply. Discussions between the two countries were progressing in this regard. India's Tata Power is interested in taking a minority stake in the Canadian nuclear sector to prepare for a larger role in India later. He assured Canadians, wanting to invest in meeting India's energy requirements, of an investment friendly environment in India. He suggested that the Canada India Foundation may want to sum up the conference proceedings in a report to carry forward the momentum and recommended that CIF should prepare such a report sector by sector and also identify potential areas for collaboration. He hoped that such a report would be made available in the near future and submitted to both governments and would form the basis for a roadmap for future collaboration between India and Canada.

vii) The Way Forward Session

The Way Forward session sought to encapsulate the thoughts expressed during the two days of the Forum and offer recommendations for going forward with plans for energy collaboration between Canada and India. The key comments and recommendations by the panelists are provided below:

Moderator: Mr. Manoj Pundit (Partner and Lawyer, Borden Ladner Gervais)

Moderator: Dr. V.I. Lakshmanan (Vice-Chairman and CEO, Process Research ORTECH)

Panelists:

Mr. Kirit Parikh (Member, Planning Commission – Govt. of India)

Mr. Louis Levesque (Deputy Minister, DFAIT, Govt. of Canada)

Mr. Tulsi Tanti (Chairman, Suzlon Energy – India)

Mr. Gerald Grandey (CEO, Cameco – Canada)

Mr. David Kassie (Founder and CEO, Genuity Capital Markets – Canada)

Mr. Gerald Offet (COO, Enterprise Saskatchewan – Canada)

-Canadian companies are increasing their presence in India. It is the job of private sector companies to seize the opportunity and the job of the government to set the policy framework to facilitate this.

-India is looking to meet the energy demand without increasing the GHG emissions. Canada is rich in energy and that creates tremendous opportunities for both countries.

-Canada can develop a partnership with India not only at a federal level but also at provincial level.

-Potential opportunities in nuclear energy collaboration range from exploration, mining milling (including yellow cake production), refining, reactor technology for power production and spent fuel waste management and applied research and technology development.

-Get bilateral agreement between India and Canada for civil nuclear cooperation completed. It is absolutely essential for long term supply agreement.

-There is potential business opportunity of \$175 billion over 20 years in India in the field of nuclear energy.

-Energy and minerals form the cornerstone of the Saskatchewan economy. Saskatchewan accounts for 100% of uranium production of Canada, and it is also the largest potash producer. Saskatchewan is looking for partnerships and collaborations in secondary oil recovery. Clean coal is another priority. Future opportunities are abundant in Saskatchewan with a population of just 1 million.

-There is great opportunity in Canada for renewable energy, which can create new manufacturing jobs.

-We see great opportunity flowing both ways. We need to identify the barriers and government will look at practical solutions.

The Forum concluded with the organizers thanking the participants for taking time off their busy schedule to come together for this milestone event in Canada-India relations.

5. STRATEGY FOR WAY FORWARD

The recommended strategy for collaboration in the energy sector between Canada and India is to combine the rich human capital of India and the natural resource capital of Canada to achieve sustainable growth for both countries, recognizing India's growing energy needs, understanding of knowledge and service economies and Canada's ability to provide an end-to-end solution for most energy options.

6. ACTION PLAN

- i) Establish a joint Canada India Energy Collaboration Task Force. The task force would comprise representatives from:
 - a. Government of Canada
 - b. Government of Ontario and other Provinces and Territories
 - c. Government of India.
 - d. Canadian private energy sector
 - e. Indian private energy sector
 - f. An Indian NGO with focus on energy and environment, and
 - g. Canada India Foundation (CIF)
- ii) Develop a viable plan within six months for energy collaboration between the two countries.

- iii) Identify and prioritize implementation of energy options in the context of the Going Forward strategy stated above, including but not limited to:
 - a) Renewable energy (solar, wind, biomass)
 - b) Nuclear (urge Governments of Canada and India to expedite the signing of bilateral agreement for civil nuclear cooperation, given India's expressed needs for Uranium supply to meet its civilian nuclear energy needs, and Canada's ability to provide end-to-end solutions from exploration to energy production)
 - c) Cleaner use of fossil fuels.
 - d) Identify opportunities for service sector entities such as engineering, finance, legal and investment banking firms.
 - e) Identify opportunities to deploy Canadian expertise for exploration, mining and milling, transmission and infrastructure development.
 - f) Develop a strategy for capital formation for efficient project development and execution through the Canadian capital markets.
- iv) Prepare a macro level perspective and recommendation on joint India-Canada sustainable technology development in the energy sector.
- v) Recommend potential opportunities for bilateral investment as well as collaborative investment in third countries
- vi) Work closely at the policy level with both Canadian and Indian governments, towards establishment of a level playing field for technology development, technology migration and conversion of technology to commerce. Identify and make recommendations to address any barriers/challenges.
- vii) Examine existing links formed by Canadian universities with Indian partners and recommend areas where university/private sector government partnerships could expand Canada/India linkages.

7. ACKNOWLEDGMENT

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