



सत्यमेव जयते  
Government of India

Ministry of New & Renewable Energy



# DIREC 2010 REPORT

Road Map for Up Scaling and  
Mainstreaming Renewables





# **DIREC** **2010** **REPORT**

Road Map for Up Scaling and  
Mainstreaming Renewables

# DIREC 2010

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डा. फारुक अब्दुल्ला  
DR. FAROOQ ABDULLAH



मंत्री  
नवीन और नवीकरणीय ऊर्जा  
भारत सरकार  
MINISTER  
NEW AND RENEWABLE ENERGY  
GOVERNMENT OF INDIA

December 10, 2010

### MESSAGE

I am delighted to present the proceedings and outcomes of DIREC 2010. DIREC 2010 – the fourth global Ministerial level conference on Renewable Energy was organized in New Delhi from October 27 – 29, 2010. While more than 13,000 delegates participated in the main conference over 20,000 visitors visited the exhibition. 250 speakers and about 600 exhibitors from more than 70 countries made DIREC 2010 one of the biggest renewable energy events ever held in India.

The overwhelming response to DIREC-2010 has not only strengthened our commitment to renewable energy but also helped us to share and learn from the experiences of others. We are also happy to have held DIREC-2010 at a time when the sector is on a path-breaking journey.

Renewables have observed some of the most unprecedented strides in recent years. Less than half a decade ago, only 45 countries had one or the other policy target for renewables; today this number has jumped to over 85 countries. In fact, the changes in this sector, including its markets, investments, industries and policies have been so rapid in the recent years that they have surpassed even the most optimistic expectations and predications.

The publication is not only an attempt to record the proceedings of DIREC-2010 but also to spur and catalyze further developments in this sector. It is an attempt to strengthen the ongoing efforts of the international community and to provide a roadmap to catalyse future initiatives. I sincerely hope that it will strengthen the ongoing efforts of the international community to upscale mainstream renewables and that it will encourage collective action in this direction.

I hope that readers will find this publication meaningful.

(Farooq Abdullah)



# PREFACE

Government of India hosted Delhi International Renewable Energy Conference (DIREC) 2010, the fourth in the series of global Ministerial-level Conference on Renewable Energy from 27th to 29th October, 2010. The conference followed from the initiative taken at the 2002 World Summit on Sustainable Development in Johannesburg and also builds up on the initiatives taken in various IRECs held in Bonn (Renewables 2004), Beijing (BIREC 2005) and Washington (WIREC 2008) to highlight the significance of renewable energy.

DIREC 2010 was an effort to provide an important forum for international discourse on renewable energy. Accordingly, the conference was carefully divided into four major themes - Technology & Infrastructure, Policy, Finance and Renewable, Access & MDGs.

The overwhelming response received from the international community reiterated the significance of 'Up scaling and Mainstreaming Renewables for Energy Security, Climate Change and Economic Development', which was also the theme of the conference. It also showcased that the strides made in this sector have surpassed predictions.

We, the organisers, were indeed left humbled by the encouragement received from various stakeholders. Enthused by this response, we are pleased to bring out a Roadmap, which was deliberated threadbare by the participants of DIREC 2010, with a hope that this document will act like a guiding force for the continuing efforts and forthcoming IRECs.

**Deepak Gupta**

*Secretary*

Government of India

Ministry of New and Renewable Energy



# ACKNOWLEDGEMENT

DIREC 2010 turned out to be one of the most significant renewable energy events ever held in India. The ambitious and unprecedented effort required for the success of this event could not have been possible but for the charismatic and inspirational leadership of Dr. Farooq Abdullah, Hon'ble Minister of New and Renewable Energy (MNRE). The organizing team was equally guided and supported by Mr. Deepak Gupta, Secretary, MNRE, whose enthusiasm and fervour kept the team motivated.

The multifaceted International Advisory Committee members gave in their valuable advice and inputs for organising the event at every stage. The Renewable Energy Policy Network for the 21<sup>st</sup> Century (REN21) Secretariat especially Ms. Virginia Sonntag-O'Brien worked tirelessly with the Organising Committee in making this event a success. The support and facilitations extended by the Ministry of External Affairs, Indian Missions abroad and Diplomatic Missions in India ensured the participation of Ministries and delegations from countries across the globe.

An event like DIREC cannot happen overnight. The preparations started months ago. We were fortunate to be backed by a motivated and dedicated team, whose commitment, professionalism and tirelessness helped in setting the right tone for the organisation of the conference. We thank all those whose efforts contributed towards making the event a success:

## Core Organising Committee:

Mr. Rohit Kansal  
Mr. S. S. Madan  
Ms. Ritu Bharadwaj  
Mr. PNBV Chalapathi Rao  
Mr. K. P. Sukumaran

**MNRE officers and staff members,**  
who took on diverse tasks -  
coordination with Embassies,  
Session Coordination, organisation  
of parallel workshops and side  
events, management of logistics,  
venue arrangements and outreach of  
conference.

Dr. N. P. Singh  
Dr. B. Bandyopadhyay  
Dr. Sudhir Mohan  
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Dr. H. L. Sharma  
Dr. P. Saxena  
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Mr. A. K. Dussa

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Dr. P. C. Pant  
Mr. B. R. Mishra

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Mr. A. K. Joshi  
Mr. Prem Chand  
Mr. Bhanu Surender  
Mr. A. N. Narayanan  
Mr. B. K. Trikha  
Mr. B. Routh  
Mr. Suresh Kumar  
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Mr. Anil Kumar  
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Mr. Babu Ram Gupta  
Mr. S. S. Ahmed  
Mr. Sita Ram Meena  
Mr. Kshitij Tyagi  
Mr. Prabir Kumar Dash

Mr. A. Hari Bhaskaran  
 Mr. Arun Kumar  
 Mr. Tarun Singh  
 Mr. Karndhar Sanjay Gorelal  
 Mr. Shobhit Srivastava  
 Mr. Sanjay Prakash  
 Mr. Anindya Sundar Parira  
 Mr. Hiren Chandra Borah  
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 Mr. Rambir Singh  
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Mr. Bhupinder Neemesh  
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 Mr. Ajay Kumar  
 Mr. Rohit Sikriwal  
 Mr. Pammi  
 Mr. Ramvir Singh  
 Mr. Chatter Pal Singh  
 Mr. Bodh Raj  
 Mr. P. D. Nautiyal  
 Mr. Ramesh Kumar  
 Mr. P. S. Rawat  
 Mr. Rajkumar  
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 Mr. S. M. Siddesh  
 Dr. R. C. Sharma  
 Mr. S. L. Burman  
 Mr. Darpan Garg  
 Mr. Sapan Thapar  
 Mr. P. K. Pandey  
 Mr. K. P. Philip

Ms. Debjani Bhatia  
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 Mr. Karamvir  
 Ms. Prava Debal  
 Ms. Punnu Grover  
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We witnessed unprecedented response from stakeholders representing Ministerial delegates from over 70 countries, policy makers, academia, private sector, energy companies, technology providers and NGOs. We thank all of them for their participation and support that enabled us in coming out with a Political Declaration that will help in up-scaling renewables. We also thank all the eminent speakers, leading experts and exhibitors, whose participation and inputs supported us in our endeavour of mainstreaming renewables through DIREC 2010.

**Ms Gauri Singh**

*Joint Secretary*


Government of India

Ministry of New and Renewable Energy

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**UPSCALING AND  
MAINSTREAMING  
RENEWABLES FOR  
ENERGY SECURITY,  
CLIMATE CHANGE AND  
ECONOMIC DEVELOPMENT**

# CHAPTER 1

## Introduction

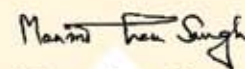


## Prime Minister MESSAGE

**I am happy** to know that the Ministry of New and Renewable Energy, Government of India is hosting the Delhi International Renewable Energy Conference (DIREC) during 27-29 October, 2010.

Our economy has been growing at a rapid and impressive pace, averaging over 8 per cent during last few years. Energy consumption has grown apace. A key factor in achieving these growth rates and sustaining them would be availability of adequate quantity and quality of power at affordable prices. The gap in the demand and supply of power has to be closed. India is making efforts to harness the potential of renewable energy resources such as biomass, solar, hydro, wind and geo-thermal energy. Renewable energy sources have emerged as a viable option to achieve the goal of socio-economic development while ensuring environmental protection. Scaling up harnessing of renewable energy resources and other low carbon technologies by providing a policy framework which facilitates investment in this sector and promotes increase in private and public spending on research and development, is critical

I wish the Delhi International Renewable Energy Conference, 2010 a grand success.

  
(Manmohan Singh)

New Delhi  
22 October, 2010



**DIREC  
2010**



# CHAPTER 1

## Introduction

### *Delhi International Renewable Energy Conference 2010*

*Up-scaling and Mainstreaming Renewables for Energy Security, Climate Change and Economic Development*

Recent years have shown unprecedented growth of renewable energy scenario, where despite the global financial crisis the sector has managed to hold its own. The resilience of the sector against all odds showcases that renewable energy is indeed the future and will play a major role in providing a clean, secure and sustainable energy economy. The potential is unquestionably large and the rapidly growing economies are determined to transform the economic crisis into an opportunity for greener growth. However, for the sector to grow significantly to meet world energy demands, it is imperative for the governments to provide support in making renewables cost competitive as compared with other energy sources and technologies.

The IEA's World Energy Outlook 2010 also reinforces that renewables will become increasingly competitive as fossil fuel prices rise and renewable technologies mature. But with an increase in renewables contribution to the world energy mix, the scale of government support will also increase. In 2009 this support amounted to USD 57 billion for both electricity from renewables and bio-fuels and is bound to grow exponentially in the coming years. In principle, such a support is even justified, especially in the context of long term economic and energy security and environmental

benefits. Against this backdrop, when energy has increasingly become an important input for economic development, Delhi International Renewable Energy Conference (DIREC) 2010 was organised in New Delhi for three days, from 27<sup>th</sup> October to 29<sup>th</sup> October 2010.

DIREC 2010 is the fourth in the series of Global Ministerial Level Conferences on renewable energy. These conferences were a natural progression of the initiative taken at the World Summit on Sustainable Development in Johannesburg in the year 2002. Accordingly, acknowledging the role of renewable energy in sustainable development, the first conference was held in the year 2004 in Bonn. Over the years, these conferences have evolved as an international platform for policy makers, corporates and civil society leaders to jointly address the goal of advancing renewable energy.

DIREC 2010 endeavoured to build upon the success and outcomes of the previous events in Washington in 2008, Beijing in 2005 and Bonn in 2004. With more than 13000 delegates participating in the conference, more than 20,000 visitors to the exhibition, over 250 speakers and about 600 exhibitors from more than 70 countries, DIREC will be looked upon as the most significant renewable energy event ever held in India.



## An Ode to Surya

*This supreme prayer is the best amongst auspicious verses, it will destroy all sins, dispel all doubts, alleviate worry and sorrow, anxiety and anguish, and increase the longevity of life. It is a guarantee of complete prosperity.*

*Worship the sun-god, the ruler of the worlds and lord of the universe, who is crowned with effulgent rays, who appears at the horizon and brings light, who is revered by all.*

*He is the very embodiment of all Gods. He is self-luminous and sustains all with his rays. He nourishes and energizes the inhabitants of all the worlds as well as the host of Gods and demons by his Rays.*

*He is Pitris (ancestors, manes), the eight Vasus, the Sadhyas, the twin Aswins (physicians of Gods), the Maruts, the Manu, Vayu (the wind God), Agni (the fire God), Prana (the Life breath of all beings), the maker of six seasons and the giver of light.*

# Aditya

## The Sun

*He is the Son of Aditi (the mother of creation), the Sun God who transverses the heavens, he is of brilliant golden color, the possessor of a myriad rays, by illuminating all directions he is the maker of daylight.*

*He is the all pervading, shining principle, the dispeller of darkness, exhibiting beautiful sight with golden hue.*

*He has seven horses yoked to his Chariot, shines with brilliant light having infinite rays, is the destroyer of darkness, the giver of happiness and prosperity, mitigator of the sufferings and is the infuser of life. He is the Omnipresent One who pervades all with immeasurable amount of rays.*

*He is Sisirastapana, the destroyer of the cold, snow and fog, illuminator, Ravi, bearer of the fire and conch, He is the remover of ignorance and giver of fame.*

*He is the Lord of the firmament and ruler of the sky, remover of darkness. He, whose form is circular and is colored in yellow and red hues, is intensely brilliant and energetic.*

*He is a giver of heat, the cause of all work, of life and death. He is the destroyer of all and is the Omniscient one sustaining the universe and all action.*

*From the Aditya Hridayam, - The Heart of Aditya (the Sun God)*





## IRECs A snapshot

Since the initiation of the first IREC in Bonn in 2004, this conference has achieved high-level international participation of stakeholders from policy, business, science and civil society. The Bonn “Renewables 2004” and the subsequent conferences in Beijing (BIREC 2005) and Washington (WIREC 2008) provided important fora for the international discourse on renewable energy.

The Bonn 2004 conference yielded a political declaration as one of its outcomes, which reflected shared political goals for an increased role of renewable energy and a joint vision of a sustainable energy future. At BIREC 2005, political declaration fostered the scaling up of renewables. WIREC 2008 focused on voluntary pledges. Six years on, DIREC 2010 is well placed to trigger further development and scale up of renewables through a political declaration/concrete plan of action.



energy technologies, especially in the context of developing countries. In particular, the conference enabled the participants to acquire a deeper understanding of:

- Policy efforts to encourage and enable renewable scale up
- Mobilising finance for renewable energy innovation and deployment
- Benefits of collaboration, synergies, and knowledge sharing at the international level to scale up renewable energy (RE)
- Link from Copenhagen to Cancun via DIREC

A Trade Show was also held at DIREC 2010, which turned out to be the largest exposition ever held on all-renewable energies in India. Spread over an area of 20,000 sq. mts, it was global in scope, hosting over 600 exhibitors from more than 70 countries from around the world. The Exhibition featured renewable energy technology suppliers, systems integrators, financiers, professional services firms, end-users, utility companies, energy companies, educational institutions, non-profit organizations, associations, government agencies, foreign governments and economic missions, and other exhibitors. Fifteen foreign countries which are leaders in the renewable energy field had national pavilions, including USA, Germany, Japan, Norway, Spain, and Sweden. More than 20,000 visitors stepped into the exhibition to witness the latest products, technologies and inventions in the Renewable Energy Sector.

## DIREC 2010: Renewables - The Need of the Hour

The theme of DIREC 2010 was up-scaling and mainstreaming renewables for energy security, climate change and economic development.

DIREC 2010 also showcased and became a launching pad for concrete initiatives undertaken by the public and private sectors to promote widespread adoption of cost-effective renewable

The world's energy supply is largely based on fossil fuels. It is estimated that by 2030, 80% of primary energy mix will be dominated by fossil fuels, where in oil will remain the dominant fuel and demand for coal will rise more than that of any other fuel in absolute terms. In such a scenario, the realisation that these sources of energy will not last forever and are also contributing

to environmental problems is what has made renewables a lucrative and sustainable option. This has also led the governments around the globe, along with industries, thinking seriously about alternative sources of energy, the need for which was further affirmed by the 1973 oil embargo and oil price shock of 2008, coupled with the ever increasing oil prices.

Recent studies<sup>1</sup> underscore that current global trends in energy supply and consumption are patently unsustainable – environmentally, economically and socially. It also went on to add that the situation can be changed if the supply of reliable and affordable energy is secured and a rapid transformation is made to a low-carbon, efficient and environmentally benign system of energy supply.

The urgent need to focus attention on the development of renewable energy sources and use of energy efficient technologies is what has led to initiatives like DIREC 2010. Now, more than ever, countries all over the world fully recognise the need to promote wide spread adoption of renewable energy into their country's energy sources, with the intention of promoting sustained economic growth, social development and environmental stewardship. It is also presumed that with increasing scope, scale, research and development, the cost of renewable energy technologies will come down; making them affordable and able to make a major contribution to electricity generation, heating, cooling and transport. Estimates highlight that renewable energy could contribute at least half of all the electric power in each of the large economies by 2050; even in countries where electricity demand is significantly high.

What's more, renewable energy not only has the capacity to provide millions of people with access to electricity; renewable energy equipment manufacturing and installation is highly labour-intensive, thus contributing not only to improved living conditions, but also leading to reduced

poverty. Renewables Global Status Report (2009 update) by REN21 also reiterates that the renewable energy sector offers an essential path for growth that can stimulate economic recovery and job creation without the burden of increasing carbon emissions.

Keeping up with the trend, Indian government focus is also on exploitation and development of various forms of energy and making energy available at affordable rates. The country's energy supply comes from different sources: coal, hydropower, oil and gas and various forms of non-conventional energy. Government of India has recently brought out an Integrated Energy Policy linked with sustainable development that covers all sources of energy and addresses all aspects of energy use and supply including energy security, access and availability, affordability and pricing, as well as efficiency and environmental concerns. This policy also underlines the importance of renewables in India's energy sector. The Policy states that solar power in particular could play an important role in helping country attain energy independence in the long run. With an increasingly favorable regulatory and policy environment, along with a growing number of enterprising entrepreneurs and project developers; India is ranked the third most attractive country to invest in renewable energy after USA and Germany<sup>2</sup>.

## DIREC 2010: A Catalyst for Scaling Up Renewable Energy

Renewable energy has significant potential to mitigate global climate change, address regional and local environmental concerns, reduce poverty and increase energy security. The challenge is to provide the right policy framework and financial tools to catalyse private sector investment at a scale that is adequate to undertake massive up-scaling of renewable energy. DIREC 2010 provided an apt platform for the policy-makers, thought leaders, corporate and civil society

<sup>1</sup> World Energy Outlook 2008, International Energy Agency.

<sup>2</sup> As per Ernst and Young Country attractiveness indices.

representatives to focus on creating enabling policy, legal and regulatory framework. It also helped them to deliberate on existing market barriers and risks, besides focusing on financial incentives to promote commercialisation and investment.

DIREC 2010 is an optimistic step in the direction of fostering:

- Enhanced political support and public awareness for renewable energy
- New and innovative actions to promote widespread adoption, and
- Advanced tools for collecting and disseminating best practices to the end users.

India too has come up with several initiatives for promoting renewable energy by mobilising large-scale private finance. DIREC 2010 therefore also provided an opportunity to highlight models that help in addressing challenges in mainstreaming renewable energy in the context of developing countries.

Taking cognisance of the above-mentioned facts, the conference framework was also painstakingly designed in consultation with the DIREC International Advisory Committee and Renewable Energy Policy Network for the 21<sup>st</sup> Century (REN21) Secretariat. Accordingly, the conference agenda had both the breadth and depth necessary for international leaders to address energy security, environmental issues, and wealth creation in rural areas.

Building upon the outcomes of the previous conferences (Bonn, Beijing, and Washington), DIREC 2010 provided an inspiring road map for global renewable energy progress and an invaluable source of information on specific steps that can be taken to advance the uptake of renewable energy. This conference undoubtedly provided new vistas for governments and other major stakeholders to make even bolder pledges to develop and enact renewable energy policies that will tackle energy security, environment and economic challenges and mainstream renewables into a low-carbon development pathway.



## CHAPTER 2

### Inauguration of DIREC 2010



**DIREC**  
**2010**

DELHI INTERNATIONAL RENEWABLE ENERGY CONFERENCE



# CHAPTER 2

## Inauguration of DIREC 2010

The Delhi International Renewable Energy Conference 2010 (DIREC 2010) was inaugurated on the evening of 26<sup>th</sup> October 2010 in Vigyan Bhawan, New Delhi. The conference is one of the biggest renewable energy events that India has ever witnessed. Energy Ministers of more than 50 countries and official delegates of almost 70 countries participated in this three day conference and deliberated on the vital issues of renewables and energy security, climate change and economic development. These themes were explored in both the plenary sessions, as well as in ministerial, multi-stakeholder and CEO discussions, which followed four tracks: technology and infrastructure, policy, finance

and renewables access and the Millennium Development Goals (MDGs).

Parallel workshops were also hosted on various issues including: solar power, solar water heating systems, wind energy, sustainable habitats, bi-methanation, rural empowerment, smart grid technology, biofuels and clean lighting options. In addition, a renewable energy trade expo showcased latest renewable technologies.

Through 11 parallel sessions and 29 official side events spanned over three days, delegates and participants, deliberated and exchanged ideas on various issues and aspects related to renewable energy.



*DIREC 2010 pre-launch Press Conference*



*Dignitaries at the dais during Inaugural Session*

Several important documents and publications were released and shared at the DIREC 2010 platform, notable amongst which were a compendium of Case Studies 'Access to Clean Energy - A Glimpse of Off-Grid Projects in India' and the strategy paper of Ministry of New and Renewable Energy, Government of India, viz. 'Renewable Energy in India - Progress, Vision & Strategy'.

Welcoming the delegates, Mr. Deepak Gupta, Secretary, Ministry of New and Renewable Energy (MNRE), India informed the gathering that it is their participation that has made DIREC 2010 the biggest ever and a truly international multi-stakeholder conference. He stated that the time has come when it is being recognized that renewable energy is an important part of the solutions to provide clean energy to the world threatened by fossil fuels and to provide access to those who do not have it.

Inaugurating the conference, Dr. Farooq Abdullah, the Union Minister, New and Renewable Energy, Government of India, also welcomed the august gathering of ministers and delegates to New Delhi to address the goal of advancing the use of renewable energy. He underscored the importance of international cooperation in renewable energy research and development. This hand-holding, he stated, was essential to expedite the identification and development of solutions to meet world's ever augmenting demand for affordable and non-polluting, renewable energy. The inauguration was also graced by India's President, Smt. Pratibha Devisingh Patil, the Union Power Minister, Government of India, Shri Sushil Kumar Shinde, Union Minister of State for Science and Technology, Shri Prithvi Raj Chouhan, Deputy Chairman, Planning Commission, Dr. Montek Singh Ahluwalia and Chairman, Renewable Energy Policy Network for the 21st century (REN21), Dr. Mohamed El-Ashry.

The President in her inaugural address expressed confidence that DIREC 2010 will be able to build on the success of the previous events in Bonn (2004), Beijing (2005) and Washington (2008). She reminded the delegates that these are unprecedented times when energy security and climate change are among the issues defining global discourse. Though there was a time, mentions our ancient scriptures, where in Ekam Adityam or “one sun” was considered the source of inexhaustible energy and for ages the early man relied largely on natural sources like sun, wind and wood for energy. But it was the industrial era that led to a major shift to fossil fuel energy. With increasing dependency on fossil fuels; the issues of limited supply, depleting stocks and environmental pollution gained all the more importance.

The challenge, stressed the President, was to come up with a sustainable mix of energy and in a world where 1.4 billion people worldwide lack access

to electricity, renewable energy has immense potential. It was evident in the inaugural ceremony itself that the delegates were more than keen to share and deliberate the knowledge and experience to tap renewable energy sources on a large scale, to meet the ever growing energy requirements of the populace.

Dr. Montek Singh Ahluwalia, went on to add that renewable energy is already providing more than 18 percent of the total energy supply and it is believed that by 2009, non-hydro renewable power will constitute over 5 percent of the global power generation capacity. Keeping up with the trend, solar energy, wind power and other renewable technologies are also experiencing double-digit annual growth rates for more than a decade. Not to forget grid-connected solar photovoltaic the fastest growing energy technology in the world. Needless to say, these trends speak volumes about the immense potential of renewables.



*Delegates at the Inaugural Session*

Dr. Mohamed El-Ashry in his address said that DIREC 2010 has brought us together to show international leadership on renewable energy and we need strong leaders at all levels that have vision and want to invest in this great opportunity.

The delegates were made conversant with the fact that for India, energy security is a pre-dominant objective and translating this urgent need into a well-thought out plan of action, the country has put in place the transformational and historic initiatives like the National Action Plan on Climate Change and a new policy on the development of solar energy, which is essentially a part of the eight key national missions with the twin objective of contributing to India's long term energy security, as well as ecological security. Besides, the country is already on a low carbon growth path and considerable amount of work has already been done for the development and production of renewable energy technologies. Renewable power already contributes to around 10 percent of country's electric installed capacity. In addition, over 7000 remote and inaccessible villages and hamlets have been provided with basic electricity services through distributed renewable power systems.

In an effort to provide clean and efficient cooking energy in the villages, over 4 million family size biogas plants have been set up; almost 3.5 million square metre collector area solar thermal systems have been established to cater to the

needs of domestic, institutional and industrial establishments. Programmes such as biomass energy including biofuels; new technologies including hydrogen are under implementation. In wind energy, India has the 4<sup>th</sup> largest installed capacity. Besides enormous potential, a short gestation period in installing wind turbines makes it an attractive option for India. The Action plan for renewable energy by 2022 also aims to set up around 85 GW of renewable power, including 20 GW from solar energy.

The inaugural session also emphasised on the critical role of research and development and initiated the much needed thought process towards technological up-gradation, vibrant and active collaboration of industries with academic and research institutes, along with research partnerships between developed and developing countries to work towards cost-effective technological innovations. The speakers also emphasised on the importance of collective efforts of the international community to support and strengthen developing countries initiatives with financial resources and technology transfer.

The President of India also invited the delegates to include all the above-mentioned essential issues in meaningful discussions and effective outcomes of the discourse on renewable energies. The session concluded on an optimistic note hoping for fruitful and effective way forward and success in fostering partnerships to promote the use of renewable energy.

# Visiting Ministers and High Level Delegations from Participating Countries

**H.E. Mr. Wais Ahmad Barmak**

Deputy Minister  
Ministry of Rural Reconstruction  
and Development, Afghanistan

**H.E. Mr. Vladimir Shemashko**

First Dy. Prime Minister, Belarus

**H.E. Mr. Vahid Heco**

Federal Minister of Energy,  
Mining and Industry, Bosnia and  
Herzegovina

**H.E. Mr. Liu Qi**

Vice Administrator  
National Energy Administration  
(NEA), China

**H.E. Mr. Ivo Hlavac**

Deputy Minister of Environment,  
Czech Republic

**Mr. Kahisu Tadesse Yaebyo**

Director General, Ethiopian  
Alternative Energy Development &  
Promotion Centre, Ethiopia

**H.E. Mr. Aristide Ngari**

Director General of the Energy &  
Hydraulic Resources, Gabon

**H.E. Mr. Jurgen Becker**

State Secretary Federal Ministry  
for Environment, Nature  
Conservation and Nuclear Energy,  
Germany

**H.E. Dr. Hussein Al-Shahirstani**

Minister i/c Ministry of Electricity, Iraq

**H.E. Mr. Hiroshi Asahi**

Director General for Energy &  
Environmental Policy, Ministry of  
Economy, Trade & Industry, Japan

**H.E. Dr. Ahmed Rashid Beebeejaun, GCSK**

Deputy Prime Minister  
Minister of Energy and Public  
Utilities, Mauritius

**H.E. Dr. Irene**

**Freudenschuss-Reichel**

Director General for Development  
Cooperation, Ministry for European  
and International Affairs, Austria

**H.E. Ir. Moise Bucumi**

Minister of Energy and Mines,  
Burundi

**H.E. Mr. Carol Buckley**

Director General  
Natural Resources, Canada

**H.E. Mr. Nyembo Kitungwa Etienne**

Secretary, Ministry of Energy  
Congo Democratic Republic

**H.E. Mr. Hassan Younes**

Minister of Electricity & Energy,  
Egypt

**H.E. Mr. Paavo Väyrynen**

Minister of Foreign Trade and  
Development, Ministry for Foreign  
Affairs, Finland

**H.E. Dr. Mamadou Tangara**

Minister of Foreign Affairs,  
International Cooperation and  
Gambians Abroad, Gambia

**H.E. Mr. Wasna Papai Danfa**

Secretary of State for Energy,  
Guinea Bissau

**H.E. Eng. Behzad**

Deputy Minister for Electricity and  
Energy, Iran

**H.E. Mr. Lamissa Diabate**

Secretary General,  
Ministry of Energy & Water, Mali

**H.E. Mr. Trond Giske**

Minister of Trade and Industry,  
Norway

**H.E. Tawfiq-e-Elahi**

**Chowdhry, Bir Bikram**

Adviser to Hon'ble Prime Minister  
of Bangladesh

**H.E. Lyonpo Khandu Wangchuk**

Minister of Economic Affairs, Bhutan

**H.E. Mr. Jose Brito**

Minister for Foreign Affairs  
Cape Verde

**H.E. Mr. Antonis Paschalides**

Minister of Commerce, Industry  
and Tourism, Cyprus

**Mr. Getahun Moges Kifle**

General Director, Ethiopian  
Electricity Agency, Ethiopia

**Mr. Timoci Natuva**

Minister for Works, Transport and  
Public Utilities, Fiji

**Hon. Mambury Nijie**

Minister of Economic Planning  
and Industrial Development and  
Minister for Energy, Gambia

**H.E. Ms Katrin Juliusdottir**

Minister of Industry, Energy and  
Tourism, Iceland

**Hon'ble Mr. Roberto Menia**

Under Secretary (Minister of State)  
Ministry of Environment, Land and  
Sea, Italy

**H.E. Mr. Jean Rodolphe Ramanantsoa**

Minister of Energy, Madagascar

**H.E. Mr. Per Rune Henriksen**

State Secretary/Deputy Minister,  
Ministry of Petroleum and Energy,  
Norway

· **H.E. Mr. Halvard Ingebrigtsen**  
· State Secretary/Deputy Minister for  
· Trade and Industry, Norway

· **H.E. Dr. Mohammad Saleh  
Al-Sadar**  
· Minister of State for Industry and  
· Energy Affairs, Qatar

· **Hon'ble Pedro Luis Marin  
Uribe**  
· Minister of State for Energy,  
· Ministry of Industry, Tourism and  
· Trade, Spain

· **H.E. Mr. Eisa Bushra  
Mohamed**  
· Minister of Science & Technology,  
· Sudan

· **Dr. Walter Steinmann**  
· Secretary of State,  
· Department of the Environment,  
· Transport, Energy and  
· Communications, Switzerland

· **H.E. Dr. Sultan Ahmed Al  
Jaber**  
· CEO, MASDAR, Abu Dhabi and  
· Assistant Minister, Ministry of  
· Foreign Affairs, United Arab  
· Emirates

· **H.E. Mr. Kenneth Konga**  
· Minister of Energy and Water  
· Development, Zambia

· **H.E. Mohamed Abdullah  
Mohamed Al-Mohrooki**  
· Chairman of Electricity and  
· Water Public Authority, Oman

· **H.E. Mr. Jim Mather MSP**  
· Minister for Enterprise, Energy and  
· Tourism, Scotland

· **Hon. Patali Champika  
Ranawaka**  
· Minister of Power and Energy,  
· Sri Lanka

· **HRH Princess Tsandzile  
Dlamini**  
· Minister for Natural Resources and  
· Energy, Swaziland

· **H.E. Mr. Simon D'Ujanga**  
· Minister of State for Energy,  
· Ministry of energy and Mineral  
· Development, Uganda

· **H.E. Mr. Suresh Kumar**  
· Assistant Secretary,  
· Department of Commerce, USA

· **H.E. Jose Carlos das Does  
Zorrinho**  
· Secretary of State (MoS) for  
· Energy and Innovation, Portugal

· **H.E. Mr. Louis Seck**  
· Minister for Renewable Energies,  
· Senegal

· **H.E. Nr. Al-Sadig Mohamed  
Ali  
Al-Sheikh**  
· Minister of State, Ministry of  
· Electricity & Dams, Sudan

· **H.E. Ms. Maud Olofsson**  
· Minister of Energy, Sweden

· **H.E. Dr. Rashid Ahmad bin  
Fahad**  
· Minister of Environment & Water,  
· United Arab Emirates

· **H.E. Awadh al-Suqatri**  
· Minister of Electricity and Energy,  
· Yemen



# CHAPTER 3

## Plenary and Parallel Session

27  
28  
29  
OCTOBER  
2010



**DIREC  
2010**

DELHI INTERNATIONAL RENEWABLE ENERGY CONFERENCE



UPSCALING AND  
MAINSTREAMING  
RENEWABLES FOR  
ENERGY SECURITY,  
CLIMATE CHANGE AND  
ECONOMIC DEVELOPMENT



# CHAPTER 3

## Plenary and Parallel Session

### Day 1: The Plenary Session 27<sup>th</sup> October 2010

After registration in the morning, an august gathering of participants convened in the plenary sessions. The overwhelming response from participants, across the globe, in itself reiterated the importance of renewables and demonstrated the interest in the fundamental change in the world's energy system. Making the best possible use of this enthusiasm, the deliberations in this session revolved around following themes:

- The journey from Johannesburg to Delhi
- Scaling-up renewables for energy security, climate change and economic development
- The road to Cancun
- The green economy and the role of renewables
- Vision 2020 – the role of renewables for energy security, climate change and economic development

In the afternoon, three parallel sessions including ministerial and multi-stakeholder discussions, and a CEO roundtable were followed by a joint ministerial-multi-stakeholder-CEO 'Straight Talk'.

Welcoming the delegates to New Delhi, Farooq Abdullah, the Union Minister, New and Renewable Energy, India, underscored the significance of international cooperation in research targeted towards renewables. He set the tone of the discussion by pointing out that the research and development in renewables is necessary to expedite the identification of technological solutions, which can meet world's increasing demand for affordable and non-polluting renewable energy.

### Journey from Johannesburg to Delhi

In the morning, Mr. Michael Eckhart, President, American Council on Renewable Energy (ACORE) and Co-chairman, World Council for Renewable Energy (WCRE) moderated a panel on the International Renewable Energy Conference (IREC) concept and process. He drew the attention of delegates towards the contribution made by Mr. Hermann Scheer, the winner of the Alternative Nobel Prize and author of Germany's Renewable Energy Sources Act, who breathed his last on 14<sup>th</sup> October 2010. A moment of silence was held in his honor to pay respect to his immense contribution to renewable energy. He was responsible for establishing the European Association for Renewable Energy, World Council for Renewable Energy (WCRE), and was instrumental in the founding of International



*The dais observing a moment of silence for the recently departed renewable energy icon, Hermann Scheer*

Renewable Energy Agency (IRENA) and IREC conferences.

Mr. Eckhart stated that thanks to Mr. Scheer's efforts, exemplary progress has been made worldwide towards a green energy supply from renewable sources. It was his unwavering focus on accelerating the transformation of energy systems, that has help to advance renewables. His wealth of knowledge, his logical analysis and his ability to inspire and convince others of the importance of this energy system will not be forgotten.

Taking forward the conference from this sombre beginning, Mr. Jürgen Becker, State Secretary, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Germany, gave another dimension to the discussion by stating that renewable energy is pertinent for tackling climate change challenges and ensuring energy access and security. He reminded the delegates that time is ripe to press for change as global investment in renewables is at an all-time high and has increased five-fold since

2004. In addition, 83 countries have established national policies to promote renewable and there is a strong possibility to strengthen and enable partnerships between banks in the developed and developing countries with the help of Global Climate Partnership Fund.

Mr. Kadri Nassiep, CEO of South African National Energy Research Institute (SANERI), added momentum to the optimistic thought process by mentioning that even a country like South Africa has pledged to generate 4% of the country's energy from renewable sources by the year 2013. He also attracted the attention of the gathering towards the role of women and rural revitalisation and the overall importance of their upliftment and empowerment.

The next eminent speaker, Mr. Liu Qi, Vice Chairman, Vice Minister of China National Energy Administration, also stated that renewable energy is not just a source of energy; it is an alternative that represents an important choice for humanity to make a pragmatic leap towards sustainable

and green energy options. He called for an international road map to develop renewable energy according to countries' conditions and resources and stressed on the role of education and training.

Unfolding the efforts made by US legislation on clean and renewable energy, Dr. Arun Majumdar, Director, Advanced Research Projects Agency-Energy (ARPA-E), US Department of Energy, stressed on the role of innovative solutions and basic science. He mentioned how US is going out of its way to make unprecedented investments to the tune of \$29 bn in Energy Efficiency, \$21 bn in Renewable Energy, \$10 bn in Grid Modernisation, \$6 bn in Advanced Battery Manufacturing and Biofuels, \$3 bn in Green Innovation and Job Training and \$2 bn in Clean Energy Manufacturing Tax Credits. He highlighted how the US, taking forward the country's commitment towards renewables has organised an ARPA-E-sponsored energy innovation summit to be held in February-March 2011 in the US.

### The DIREC Theme: Up-scaling and mainstreaming renewables for energy security, climate change and economic development.

The session was mainly designed as a recap of the strides made by the world in the direction of renewables. Hence, Dr. Mohamed El-Ashry,

Chairman, Renewable Energy Policy Network for the 21<sup>st</sup> Century (REN21), reminded the delegates about the progress made in general in renewable energy since the WIREC in 2008. He drew everyone's attention towards enhanced political commitment to renewables from both the developed and developing countries. He noted that despite the economic recession, renewables growth has not been significantly hampered and hoped that it will continue to be driven by climate change and the need for energy security and energy access. He called on the delegates to come forward to radically change the world's energy system, not just for today, but for the sake of future generations.

Taking the recap of Dr. El-Ashry to a futuristic and optimistic note, Mr. Deepak Gupta, Secretary, Ministry of New and Renewable Energy (MNRE), India, urged the governments and other stakeholders to come forward to sign the Delhi International Action Program; besides pledging commitments for renewable energy. He reminded the delegates that the total commitments pledged in DIREC will be an indication of DIREC's success.

### Road to Cancun

In the wake of the next climate summit in Cancun, Mexico, this December, the session reiterated the importance of revisiting



*Mr. Deepak Gupta,  
Secretary, Ministry of New and Renewable Energy*



*Dr. Kamdeh K. Yumkella,  
Director General, UNIDO*



*Dr. R.K. Pachauri,  
Director General, TERI and Chair of the IPCC*

commitments towards renewables. In line with the theme of the session, Dr. Kandeh K. Yumkella, Director General, UN Industrial Development Organisation (UNIDO), stated that neither climate change, nor the requirement of meeting the ever-important Millennium Development Goals (MDGs) can be met without an energy revolution. He listed that at this point of time, to make universal energy a possibility, the world has two most important goals: to reduce energy intensity to 40% by 2030 and to double the energy efficiency.

Reflecting on different dimensions of renewables, Dr. Rajendra K Pachauri, Director General, The Energy and Resources Institute (TERI) and Chair, Intergovernmental Panel on Climate Change (IPCC), said that for the 16<sup>th</sup> session of the Conference of Parties (COP16) of the UN Framework Convention on Climate Change (UNFCCC), setting an appropriate price for carbon and focusing on adaptation and impacts to human health are important policy areas. He listed the multiple benefits of using renewables that included energy security and access, reduced air pollution, and higher agricultural productivity and employment.

## Green Economy and the Role of Renewables

This session focused on the need for increasing the share of renewable energy sources in the total energy production and consumption. Accordingly, emphasis was on describing the initiatives taken and the challenges addressed, or to be addressed by the respective countries in order to increase the share of renewables.

H.E. Ms. Maud Olofsson, Minister for Energy and Enterprise, Sweden, shared her country's experience in enhancing the usage of renewables. She stated that Sweden was able to dramatically reduce carbon emissions because of renewables and endeavoured to increase the share of renewable energy sources to 50 percent of the total energy consumption by 2020, along with increasing the share of renewables to 44 percent of the total GDP.

She informed the delegates that in order to achieve the above-mentioned targets, Sweden had to address the challenges of reducing the dependency of the transportation sector on fossil fuels, providing subsidies for renewable electricity, reducing and lowering the administrative burden of renewable energy sources, along with promoting research (on new and renewable energy sources).

**"Free transport from the consumption of fossil fuel"**

**H.E. Ms. Maud Olofsson, Minister for Energy and Enterprise, Sweden**

She pointed out to the delegates that enhancing the use of renewables is a two-way process, which also involves fundamental changes in people's lifestyles, for if there is no demand, supply will automatically be affected. She stated that this pertinent realisation needs to be duly considered while attempting to increase the share of renewables in the total energy consumption of any country.

Dr. Montek Singh Ahluwalia, Deputy Chairman, Planning Commission, Government of India, described India's energy situation and stated that India is an energy deficit country with about 70 percent of country's energy needs being met through imports. He expressed concern that India's demand for energy is outpacing the rate of discovery of coal and oil reserves.

He informed the gathering that India has an action plan on energy that emphasises on:

- Adapting new and renewable energy sources.
- Reducing the percentage of carbon emissions and
- Mitigating the carbon foot print of the country.

He also shared that government of India has already set-up eight national missions under the Prime Minister's National Action Plan on Climate Change (NAPCC) that include National solar mission and Green India Mission to name a few.

Talking about the challenges, he stated that India has limited scope for wind energy, but huge scope for solar energy. However, the application of solar energy is not fully exploited owing to the cost involved in setting up solar technologies. He felt that while promoting these technologies, one has to keep in mind the economics of these sources, but a country like India can't wait

until the costs come down, so by 2020, India is planning to generate 20,000 megawatts (MW) grid connected solar energy using solar photo-voltaic technology.

Dr. Ahluwalia concluded his presentation by saying that India is planning to reduce the emission intensity of its economy by 20 – 25 percent by the year 2020 and intends to provide by 2050 almost 500,000 MW of clean energy by using thorium based nuclear energy.

Ms. Sylvie Lemmet, Director of UNEP's Division of Technology, Industry and Economics (DTIE) was the moderator of this interesting session. She summed up the session highlights on an optimistic note stating that all over the world many countries are taking initiatives to increase the share of renewables. She said that as a result of these efforts, around 60 to 70 million households across the globe installed solar water heating systems. In Germany alone, more than 300,000 people depend on renewable energy sector for employment. Though this sector is growing exceedingly well, there is still an urgent need to build strong institutions, not only to provide economic incentives in terms of tariff subsidies, tax subsidies and fuel subsidies etc., but also to maintain standardisation and certification of equipments to ensure reliability of equipment and technologies, besides bringing down the cost.



*Dr. Montek Singh Ahluwalia,  
Deputy Chairman, Planning Commission, India*



*H.E. Ms. Maud Olofsson,  
Minister for Energy and Enterprise, Sweden*

She reiterated the need to look into the financial aspects of renewables, for example, bringing down transaction costs and risks for the private sector and helping the pioneers in the private sector to move towards renewables. She suggested that countries need to move towards adopting energy policies for which respective ministries have to take the responsibility.

### Vision 2020: Role of Renewables for energy security, climate change, and economic development.

This session focused on what is being envisaged as the future of renewables. Setting the tone of discussion, the moderator Mr. Shyam Saran, former Special Envoy to Prime Minister, India, on Climate Change emphasised that it is necessary to focus on what is required to be done in the short time period up to 2020. He also pointed out that demand for energy is mounting in many fast developing economies like India, Brazil and South Africa. While working towards the reduction of carbon emissions, these countries must also ensure economic development as energy plays an important role in economic development.

"The 450ppm target outlined in the International Energy Agency (IEA) World Energy Outlook 2009 requires investment of US\$ 5 trillion between 2010 and 2030".

**H.E Mr. Roberto Menia**, Minister of State, Ministry of Environment, Land and Sea, Italy.

The H.E. Mr. Roberto Menia, Minister of State, Ministry of Environment, Land and Sea, Italy, stated that according to the World Energy Outlook 2009, an investment to the tune of 5 trillion US dollars is required between 2010-2030 to meet the target of 450 ppm carbon emissions. He specified, this means that the next 10 years will be crucial and investments will need to be made specifically in the areas of research and capacity development.

He further added that the European Union is committed to achieving the target of 20 percent share of renewables by 2020 as the institutional



framework necessary to achieve this target is well in place. Already, all the member countries have included renewables in their respective macro-economic plans. He admitted that in order to increase the share of renewables, the cost, especially of solar and wind needs to be more competitive; while the cost has already been reduced drastically due to improved technologies and better materials, a lot still needs to be achieved. So he suggested the option of technology transfer to developing countries like Brazil, China and India.

While concluding his speech Mr. Roberto Menia said that his country (Italy) expects that renewables will meet 60% of the gross internal consumption by 2020.

**"Renewables will be the foundation of future energy systems."**

**Dr. Arthouros Zervos**, President, European Wind Energy Association (EWEA) and European Renewable Energy Council (EREC).

Dr. Arthouros Zervos, President, European Wind Energy Association (EWEA) and European Renewable Energy Council (EREC), in line with the theme of the session assured the delegates that the European Union is committed to achieving 20 to 25 percent share of renewables by 2020. He expressed hope that renewables, from being an alternative source of energy, will soon become a mainstream energy source. Talking about the inter-link between renewables and climate change, he echoed the sentiments of many delegates by mentioning that the developed countries have failed to arrive at an agreement on climate change, which will affect the progress of renewables. But at the same time, he also expressed hope that with continued efforts, the world may reach a global agreement on climate change.

In this connection he mentioned that the use of renewables will not only reduce risk to the climate and environment, but also reduce the dependency on fossil fuels, which in turn will lead to a fall in oil prices owing to reduced demand. Acknowledging some of the constraints of using renewables, he mentioned that countries like India have problems in adopting solar energy due to its high cost and also due to intermittancy caused by fluctuating radiation.

A.S. Sambo, Director General, Energy Commission of Nigeria, briefed the delegates about the energy situation of Nigeria. He mentioned that though Nigeria's energy consumption is one of the lowest in the world, the demand for energy is still growing rapidly. To add to the woes, efficient energy utilisation is very poor resulting in deforestation, and pollution.

In order to improve the manner in which energy is utilised in the country and to increase the use of renewables, energy research centers have been set up in Nigeria. Though abundant in oil, natural gas reserves and renewables, Nigeria unfortunately still suffers from energy poverty. He emphasised the need for financing, called for strengthening policy and modernising the regulation frameworks for the energy sector,



*Panelists at the Ministerial Discussion session*



*Delegates at the Plenary Session*

especially in partnership with the other developing and developed countries.

Ambassador Richard H. Jones, Deputy Executive Director, International Energy Agency (IEA), stressed on the need to define “sustainable energy”. He also emphasised the need to set realistic targets for 2050, like 35 percent reduction in carbon emissions, achieving 50 percent share of renewables, reducing the carbon based electricity by a 90 percent etc. This, he said, can be achieved by two pronged approach: namely through policy framework and technology. In policies he specifically mentioned that nations must work on framing policies that provide transparent and predictable incentives. Whereas on the technology front, investments need to be made in smart grids and CSP technologies. He stressed on the point that it may take a long time for the energy revolution to happen, but the action must start right now and for that climate change negotiations are very crucial.

With the end of this session, the conference laid the foundation of deliberations, which were then followed in three sessions.

## Day 1: Parallel Sessions

In the afternoon of the first day, three parallel sessions were organised. These sessions provided separate platforms for various categories of thought leaders, ranging from ministers and multi-stakeholders to CEOs, to discuss renewable energy from different perspectives.

### Ministerial Discussion

Energy ministers from Iceland, Mauritius, Japan, Iran, Portugal, India, the US, Finland, Uganda, Norway, Spain, Scotland, Bangladesh, Bhutan, Sri Lanka and a representative of the Asian Development Bank participated in a moderated Ministerial Panel Discussion. The session, as mentioned in the introduction of the proceedings, focused on the role of renewable energy in climate change mitigation, energy security and providing energy access to the poor.

Facilitated by Vikram Chandra, CEO, NDTV, the panellists deliberated on the challenges that the governments face to streamline global action on energy; to find speedy, apt and effective solutions and to comprehend whether

technology can enable renewables to make a valuable contribution and even dominate the energy industry. Many ministers even suggested that the time is ripe to stress on the necessity to cooperate and collaborate and for that countries will have to look beyond borders. Despite these suggestions, the ministers had different degrees of optimism about the growth of renewables.

Taking forward the discussion, Hiroshi Asahi, Director General, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, Japan, mentioned that the effective way forward was to increase competition and demand, which are in many ways inter-related, but overall provide an effective remedy to ensure growth of any sector.

Agreeing with the thought process of Mr. Asahi and adding further, Mr. Suresh Kumar, Assistant Secretary, US Department of Commerce, and Jim Mather, Minister for Enterprise, Energy and Tourism, Scotland, UK, stated that there is a need to push for increased reliance on renewables. However, this quest for enhanced energy independence should be coupled with knowledge sharing and development of international cooperation as quick growth can't be compartmentalised in specific knowledge centres and needs to be effectively disseminated to guarantee results.

Both the developing, as well as the developed countries, showed concerns for the cost-

effectiveness of renewable technology. Accordingly, three of the ministers including Pedro Luis Marin Uribe, Secretary-General for Energy, Ministry of Industry, Tourism and Trade, Spain, Dr. Ahmed Rashid Beebeejaun, Deputy Prime Minister, Minister of Energy and Public Utilities, Mauritius, and Dr. Farooq Abdullah, Union Minister for New and Renewable Energy, India, stated that the cost of renewable technology at times acts as a restrictive factor in effective market penetration.

Mr. Lyonpo Khandu Wangchuk, Minister of Economic Affairs, Bhutan, and Paavo Väyrynen, Minister of Foreign Trade and Development, Ministry of Foreign Affairs, Finland, acknowledged the challenges mentioned by other ministers and highlighted the need to bring synergies between various stakeholders of this sector.

Mr. Xiaoyu Zhao, Vice President, ADB, at this juncture mentioned that to ensure smooth availability of finances, regional cooperation between bank members is the key to success. He also announced to a jubilant crowd that ADB will double its lending for climate change mitigation to US\$ 2 billion.

Along with the above-mentioned interesting, and essential discussions to make renewables the energy of future; the session also touched on the importance of combining renewable technologies and the role of women in the successful implementation of this sector.



*Panelists at the Ministerial Discussion*



*Panelists at the Multi-stakeholder Discussion*

## Multi-Stakeholder Discussion

In another parallel discussion supporters of the RE sector shared their thoughts on the theme of DIREC 2010. Accordingly panellists from industry, civil society, academia, local policy makers, media and NGOs deliberated on the role of renewable energy in climate change mitigation, energy security and providing energy services for the poor.

Moderating the session, Mr. David Hales, President, College of the Atlantic, noted that although significant in-roads have been made in renewables, the industry is still in the stage of infancy.

Mr. Mark Radka, Chief of the Energy Branch, UNEP, threw light on another significant aspect that was important for the growth of the sector. He mentioned that there is an urgent need to invest in human capital. Increased investment in this aspect of business will actually yield greatest gains, apart from strengthening the hands of the industry.

Dr. David S Renné, President, International Solar Energy Society, and Principal Project Leader, U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL), spoke at length on the role played by his organisation in helping the stakeholders make an informed choice. He said that his organisation ensures that the sector stakeholders are always informed about the latest breakthrough in solar and other renewable technologies.

Echoing the sentiments of many entrepreneurs like him, Dr. Harish Hande, the co-founder and Managing Director of Selco Solar India, a social enterprise spoke from his experience and stressed on the need to provide energy access to poor and this, he said, can't be delayed any further by the policy makers as the cost of inaction, at this juncture, outweighs the marginal costs of efforts made towards providing decentralised renewable energy over and above the grid energy.

Speaking from their experience in the industry both, Dr. Jeremy Leggett, Founder and Chairman, Solarcentury, and Mr. Probir Ghosh,

President, invEST, emphasised on prudence and mentioned that with dwindling oil reserves, peak in the prices of oil is imminent. The looming catastrophe all the more increases the importance of clean energy industry, which will soon become a US\$40 to US\$50 trillion industry in the next 20 years.

Adding on to the caution, Vijay Mahajan, Chairman, BASIX, highlighted another major concern of the industry players. He mentioned that the need of the hour is to strengthen marketing and establish distribution networks, as this is the major challenge being faced by the manufacturers.

Ed Norrena, Head BBM Division, Cleantech, Dept. of Foreign Affairs & International Trade, Ottawa, stated that governments will have to play a major role, almost acting as the front runner in the development of renewables. Similarly, Hugo Lucas, Director for Policy, Capacity Building and Outreach, International Renewable Energy Agency (IRENA), added on to the thoughts of Mr. Norrena by stating that there is a need to bring synergies in policy goals as the development is not just of a single stand-alone sector; the increased in renewables will also be able to effectively address the imperative issues of mitigation, employment, security and energy access, to name a few, all of which improve simultaneously.

André Aranha Corrêa do Lago, Director, Department of Energy, Ministry of External Relations, Brazil, drew the attention of the gathering to another urgent aspect that needs immediate intervention, which includes addressing the unsustainable patterns of production and consumption. Adding another dimension to this discussion was another stalwart of the sector, Sunita Narain, Director, Centre for Science and Environment. Speaking from her years of experience in the sector, she emphasised on the need to come up with business models that lay emphasis in bringing renewables to the poorest of the poor, for whom it still matters the most and who, in any ways, will tend to benefit the most from this source of energy.

## CEO Roundtable

Akin to the title of the session, it drew an impressive gathering and the most well-known names of the sector attended the session to provide an excellent opportunity for an in-depth sharing of thoughts, challenges, solutions and the way forward. Moderator of the session was Steve Sawyer, Secretary General, Global Wind Energy Council (GWEC), who led the discussion to its conclusion with ease. Panellists too undoubtedly were the who's who of the sector and included Alf Bjørseth, Chairman and CEO, SCATEC Solar; Rakesh Bakshi, Chairman and Managing Director, RRB Energy; Gary D Conley, CEO, B2U Solar; Fabrice Didier, CEO, Saint-Gobain Solar; Wu Gang, CEO, Goldwind; Kishore Jayaraman, President and CEO, GE Energy India; Huang Ming, President, Himin Solar Energy Group; K. Subramanya, CEO, Tata BP Solar; Sean Sutton, President, Vestas Asia Pacific; and Harish Mehta, Director of Suzlon.

Panellists explained the objectives and goals of their organisations in the field of renewable

energy. Huang Ming shared the plans to build a "solar city," and Rakesh Bakshi called on the governments to strengthen the hands of the industry by providing clear and uniform policy guidelines. Many participants even suggested putting in place country-specific national renewable energy strategies that will set the momentum for the sector. K. Subramanya highlighted the importance of strategies like Jawaharlal Nehru National Solar Mission of India, but also cautioned in the same tone that to curb migration of rural populace to cities, rural access to electricity needs to be improved.

Similarly, Fabrice Didier expressed his conviction that it is not far off that the cost of solar and wind energy will become extremely competitive and is not actually dependent on factors like carbon pricing. Acknowledging Mr. Didier's observation, even Sean Sutton also pointed out how simply by focusing on research and development, cost of renewable can be easily brought down.

While discussing cost, the problem of subsidies was also mentioned. Viewpoints were divided



*Panelists at CEO Roundtable*

on this aspect as some felt that reduction in subsidies will not give impetus to the sector and is not necessarily the best possible approach. However, many others felt that having a standard price of carbon will not help renewables and will add to the financial woes. Whereas many others felt that the “commercialisation” of carbon and placing focus on carbon emissions will not boost the sector. One participant also pointed out that the solar market is primarily driven by a small number of countries, mostly through feed-in tariffs, but in many cases the cost of photovoltaic energy is competitive with peak load production costs. Adding to the discussion, Rakesh Bakshi noted that grid conditions dictate renewables’ design.

### Joint Ministerial-Multi-stakeholder-CEO ‘Straight Talk’

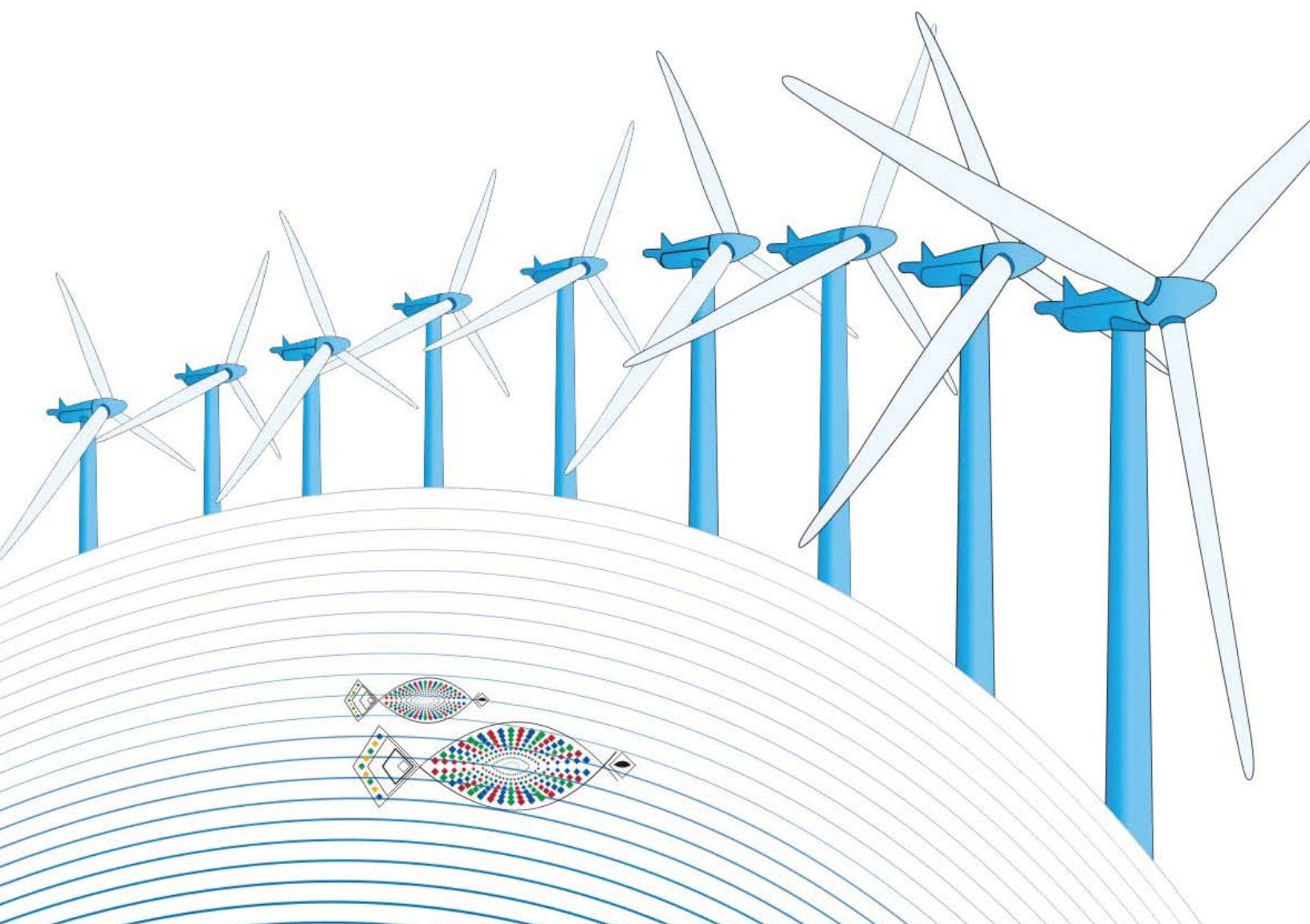
In this small session the outcomes of the deliberations held earlier in the day were shared with a wider audience to bring consensus in the suggestions, thoughts and the way forward. Accordingly, summing up the discussion and reporting on the ministerial discussion, Virginia Sonntag-O’Brien, REN21, reiterated that the discussions highlighted the importance of working together and pointed more towards collaborations and partnerships. She said that ministers had stated that there is indeed a need to bring down the cost of renewables, but that cost will also automatically reduce as and when

the renewables achieve economies of scale. Similarly, on energy access for rural areas, she underscored that it is being increasingly recognised that decentralised power generation is often cheaper than constructing a grid.

Ms. Sonntag O’Brien also spoke on the importance of working together towards eliminating tariffs for renewables and mentioned that a sustainable Energy Free Trade Agreement is being proposed to the G20.

Multi-Stakeholder discussion moderator David Hales pointed out the diverse views reflected by the panel. He mentioned that in this session, discussions revolved around the need for a renewable revolution in a broader context. A fundamental disconnect was felt in general like gap between rich and poor. He stated that these challenges and problems need to be addressed in order to attain a revolution, and noted that other speakers felt that the problem would be automatically taken care of when the renewable revolution is finally achieved.

On the other hand, the CEO roundtable moderator Steve Sawyer stated that discussions in his session pointed towards the need to reduce the costs of renewable energy in order to make them more competitive; the need to scale up wind and solar energy; the requirement to assist the industry to reach maturity; ensuring sending clear government signals to markets regarding renewable and fossil fuels; and addressing the issue of subsidies, besides developing domestic renewable energy markets.



# CHAPTER 4

Thematic Session, Track I: Technology & Infrastructure



# Tidal Power



# High on Efficiency

LIGHT  
LONG  
LASTING

## SOLAR CELLS

Solar cells are used in solar-powered products such as solar calculators, watches, radio, etc. that are already popular in the market.

Manufactured and processed in a similar fashion as computer memory devices that use sunlight to produce electricity.

Solar cells provide more energy than other conventional sources with an additional advantage of being light to install, the use of solar cells demands very little maintenance in their upkeep. Apart from being noiseless and non-polluting, they have good efficiency and are very long lasting.



Hydropower that generates electricity is often called the clean energy. It is a renewable source of energy. It is a very clean energy.

The tidal power due to the flow of water and the tide is a particularly interesting source of energy. It is a very clean energy. It is a very clean energy.

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# the future is Windy

## Transmitting the Power

Large-scale wind farms are connected to the electric power transmission network, smaller facilities are used to provide electricity to isolated locations. Utility companies increasingly buy back surplus electricity produced by small domestic turbines. Wind energy, as an alternative to fossil fuels, is plentiful, renewable, widely distributed, clean, and produces no greenhouse gas emissions during operation.

Wind power is non-dispatchable, meaning that for economic operation, all of the available output must be taken when it is available. Other resources, such as hydropower, and load management techniques must be used to match supply with demand. The intermittency of wind seldom creates problems when using wind power to supply a low proportion of total demand, but as the proportion rises, problems are created such as increased costs, the need to upgrade the grid, and a lowered ability to supplant conventional production. Power management techniques such as exporting excess power to neighboring areas or reducing demand when wind production is low, can mitigate these problems.



# CHAPTER 4

## Thematic Session, Track I: Technology & Infrastructure

### Day 2: Thematic Sessions 28<sup>th</sup> October 2010

The second day of the conference convened around four thematic sessions organised around a) technology and infrastructure; b) policy; c) finance; and d) renewables access and the Millenium Development Goals (MDGs). Parallel workshops also took place on bio-fuels and promoting rural entrepreneurship for enhancing access to clean lighting options. Meanwhile side-by-side, the renewable energy exposition and the trade show continued.

### Track I: Technology and Infrastructure

Track I gave a platform to discuss the challenges related to Technology and Infrastructure-the key aspects in advancing the adoption of renewable energy in the other sectors. This track was further divided into various sessions, each of which focused on diverse yet important aspects of renewables.

#### Session I: Power Technology and Infrastructure

Estimates show that power from renewable energy sources has been undergoing a silent revolution

and has now reached an estimated 4800 GW (in 2009), which accounts for almost a quarter of global power generation capacity that takes care of approximately 18% of the global electricity production. The positive aspect of this power generation is the incentive of emission reduction and generation of green jobs. Specifically for the developing world, the challenge lies in ensuring electricity access to the poor as it is essential for their economic and social development and also involves ensuring that the high-carbon technologies are not restricted to only a few.

This session focused on the aspects of scaling up the development and transfer of renewable energy-based power technology, the role of private investment, the value of liberalisation in the power sector and its effects, along with policy prescriptions for different scale of operations. Since innovation and research and development (R&D) are equally important for power technology and infrastructure development, the session underscored how cooperation could be promoted in R&D for current, new and innovative technologies.

The main topics of discussion in this session were:

- 6 Scaling up the development and transfer of RE power technology.

- Role of private investment
- Value of liberalisation in the Power Sector and its effects.
- Policy prescriptions for different scale of operations.
- Smart and resilient transmission and distribution infrastructure.
- Cooperation in R&D for current, new and innovative technologies.
- **Grid integration of RE:** political framework and stakeholder landscape.

Dr. Jeremy Leggett set the stage for the discussion by briefly familiarising the delegates with the topics of discussion (given above). Moderating a discussion on the up-scaling of renewable energy and grid integration of renewable energy he mentioned that renewables have the potential to improve the quality of life of the majority of populace and unlike conventional sources of energy, renewables encourage community participation, thus breaking the monopoly of few actors.

Emphasising on the importance of energy efficiency, Dr. Marianne Moscoso-Osterkorn, Director, Renewable Energy and Energy Efficiency Partnership (REEEP), informed the gathering that even now more than 90 percent of the ownership of the power sector is with the government, who are powerful and also have the potential to divert their investments and thus bring in reforms. She also added that unlike conventional power systems, the renewable energy sector works better with decentralised generation and distribution as it provides energy security, generates jobs and also a more reliable system in some areas when compared to the centralised system.

Mr. Hans Arild Bredesen, Manager, Econ Póryr, in his brief presentation emphasised that when developing plans and policies for power technologies, the larger picture has to be kept in mind. The framework has to be drawn taking into consideration the benefits and welfare of all the stakeholders like suppliers and end users. He also noted that like any other power sector,

distribution grids in renewables too require up-grades and planning to accommodate renewable energy feed-ins from small-power producers.

Inviting the industry and other players to invest in renewable, Ms. Natalia Kulichenko-Lotz, Senior Energy specialist, Sustainable Energy department, World Bank, stated that the investment on renewables will go up to 50 percent by 2020. She also mentioned that the World Bank encourages private sector, as well as the developing country governments to invest in renewables, irrespective of the size and scale of the project, along with supporting transmission and distribution.

“Bank programs are aimed towards incentivising developing country governments to invest in renewable energy”.

**Natalia Kulichenko-Lotz**, Senior Energy specialist, Sustainable Energy department, World Bank.

In the same session, Dr. Ravi Prasher, US Department of Energy ARPA-E or Advanced Research Projects Agency-Energy, briefly introduced ARPA-E and stated that it has been modelled after Defence Advanced Research Projects Agency and that it was set up to promote and fund research and development of advanced energy technologies. He mentioned that in order to make renewable storage cheaper, the transmission technologies have to be highly competitive. ARPA-E funds research projects in these areas of even small companies and has set up energy research labs modelled after Bell labs and HP labs to work on scaling- up of technologies.

The session also saw lot of deliberations on issues like adapting a balanced approach and having the right mix of renewables and fossil fuels; viability of solar energy as a reliable alternative to conventional energy sources; impact of impasse on climate change and on the progress of

renewable energy sources; importance of green bonds and carbon trading; developing hybrid grid technologies which can be fed by electricity generated by more than one type of source.

## Session II: Heating and Cooling Technologies

Heating and cooling in the industrial, commercial and domestic sectors account for around half of the total global energy demand. Biomass, solar and geothermal energy currently supplies the heating and cooling requirements of millions of buildings worldwide, and renewable energy heating and cooling (REHC) has been described as the “sleeping giant” in terms of its potential from a global perspective. Appropriate strategies are needed to promote scaling-up of RE technologies for heating and cooling and to foster international cooperation to allow replication of effective policies.

Topics discussed in this session were:

- State of the art of Heating & Cooling technologies.
- Combining different technologies to provide heating & cooling services.
- Addressing the existing barriers.
- Making REHC cost effective.

- Successful policy initiatives and case studies that have catalysed the uptake.
- Heating and cooling for different scale of operation.

Eminent panellists of this sector deliberated to find answers for the following key questions:

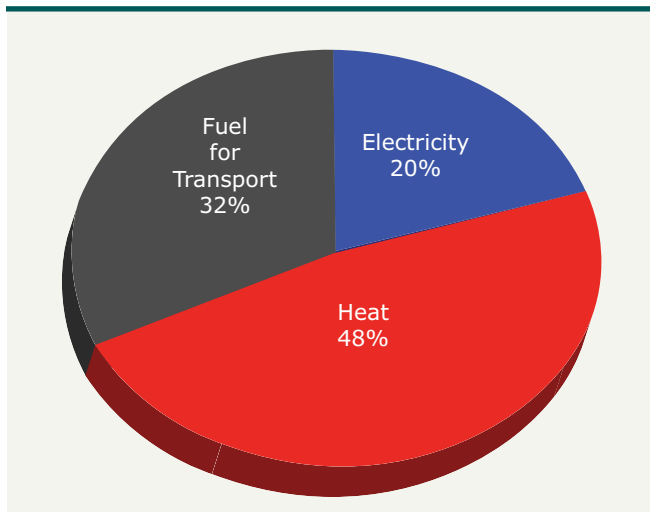
- What are the main future trends you expect to see in the renewable heating & cooling sector?
- How do you see the future of renewable cooling? What can be done to bring the cost down?
- What are the main instruments to achieve sustainable growth of renewable heating & cooling? Can you share some best-practice examples with us?
- Your message to the political decision makers here at DIREC to awaken the sleeping giant?

Introducing the session, Gerhard Stryi-Hipp, Head of Energy Policy and Group Leader, Thermal Collectors and Applications, Fraunhofer ISE, drew the attention of the delegates towards the fact that in most of the countries, energy demand is predominantly for heating and cooling, hence there is lot of market potential for solar cooling and heating pumps.



*Panelists at Heating and Cooling Technologies Session*

**Figure 1:** Final Energy Consumption Europe 2009



**Source:** JRC 2010

He also stated that the full replacement of fossil and nuclear power for heating & cooling is possible by a mixture of:

- Increased Efficiency
- Biomass
- Geothermal
- Solar Thermal
- Combined Heat and Power with RES
- Heat Pumps with RES electricity

Whereas, Ralph Sims, Director, Centre for Energy Research, mentioned that world is replete with examples of successful policies and frameworks that have been implemented worldwide for renewable heating and cooling, and recommended that other countries should draw lessons from these.

Mr. Ravi Khanna, Director, Scatec Solar and Dr. Gudni A. Jóhannesson, Director General, Iceland National Energy Authority were of the view that practical and attractive applications of renewable heating and cooling are required to encourage industry growth and emphasised that pragmatic energy choices need to be taken to avoid system inefficiencies.

Underlining the importance of developing new products based on market research, Mr. Olivier

Drücke, President, European Solar Thermal Industry Federation (ESTIF), circulated the idea of mass deployment. Adding another dimension to the thought process of Mr. Drücke; Prof. Huang Ming, President, Himin Solar Energy Group, stressed on the requirement of branding. He supported the suggestion with the example of the success of renewable manufacturers in China's Solar Valley and R.R. Sonde, Thermax. These manufacturers, he mentioned, provide consumers with complete renewable energy solutions for their energy service needs.

### Session III: Buildings

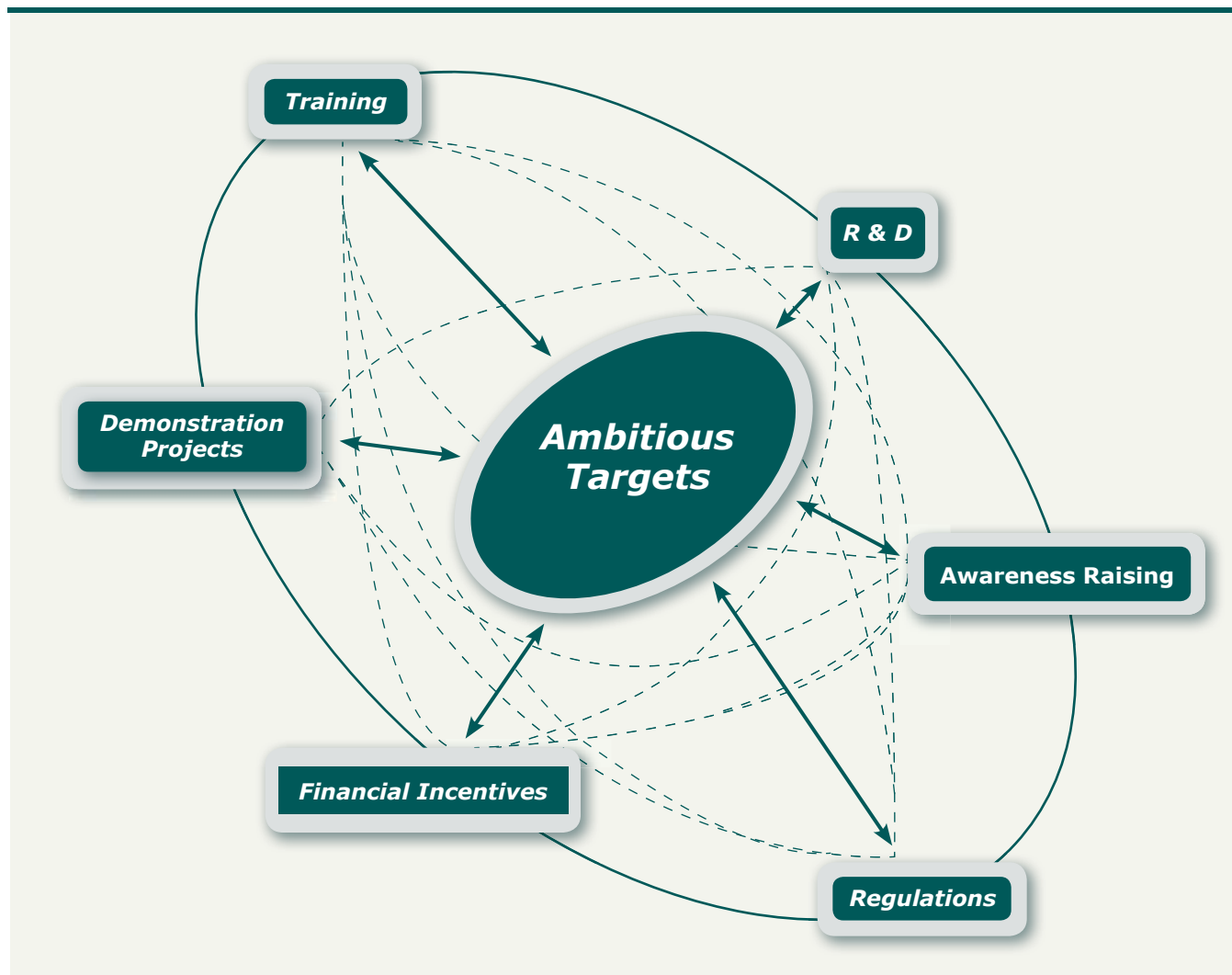
Buildings alone are responsible for 38% of all human-caused greenhouse gas emissions (20% residential, 18% commercial) and are the largest GHG source in many countries. The increasing number of buildings in the developing countries require the spread and scaling up of renewable and energy efficiency technologies, as well as effective regulation to correct market failures. A specific session focusing on promoting renewable energy and energy efficiency in buildings covered energy conservation building code, solar passive architecture, buildings envelope and green rating that can facilitate the uptake of renewable energy technologies.

The objective of the session was to deliberate on following key issues:

- Green building initiatives (for existing and new constructions) in different countries and how they could help ongoing initiatives of the Government of India.
- Strategies, action plan and implementation challenges
- Barriers faced by various stakeholders and experiences towards slating a way forward
- Information on future needs for technological up-upgrades and financial mechanisms that may be adopted

Dr. Ajay Mathur, Director General, Bureau of Energy Efficiency, Government of India, moderated this

**Figure 2:** Coherent Policy Framework for RES Heating and Cooling



session. He discussed the use of renewables in green buildings and emphasised the importance of design to reduce energy consumption.

Taking the discussion forward, Shri Deepak Gupta, Secretary, Ministry of New and Renewable Energy, Government of India, informed the delegates about the efforts India has made in the direction of constructing certified green government buildings.

Whereas, Dr. Rick Duke, Deputy Assistant Secretary for Climate Policy, United States Department of Energy, informed the delegates about the partnerships that US and India have

on clean energy. He said this hand-holding involves knowledge sharing on energy building codes and establishing the India Green Building Council. Other panellists like Mr. Andreas Thermann, Senior Project Manager, KfW German Development Bank and Mr. Robert Angioletti, Senior Consultant, French Agency for the Environment and Energy Management (ADEME) discussed the application of energy efficiency measurements for building subsidies.

Taking note of the above-mentioned efforts, Mr. Manit Rastogi, Managing Director, Morphogenesis, encouraged the delegates to push for a paradigm shift to eliminate and reduce

the impacts of new construction of non-green buildings. Such an effort, he felt will also give a boost to locally appropriate technology. Prof. Alastair Adair, Pro. Vice Chancellor, University of Ulster, UK, shared with delegates the efforts made by Northern Ireland to reduce emissions. He mentioned that recent research clearly indicated how green buildings are yielding higher returns. S Padmanaban, USAID, encouraged participants to come up with more projects that showcase integration of renewable technology into green building design.

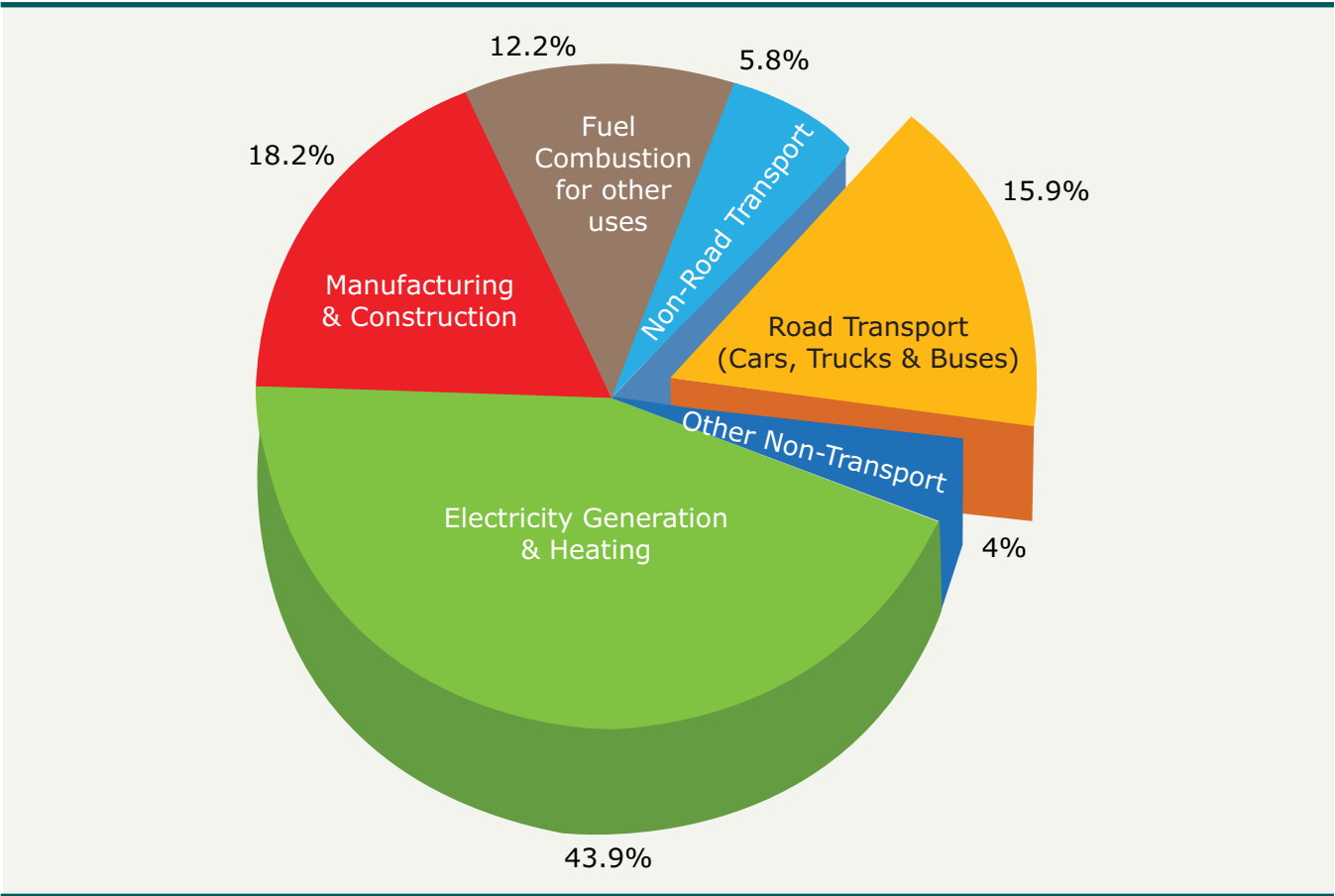
Session IV: Transport

Increasing urbanisation and industrialisation have led to a phenomenal growth in transportation demand worldwide, coupled with a concentration of vehicles in metropolitan cities with subsequent impact on:

- Environment due to the emission of both greenhouse gases and local pollutants,
- Economy due to mounting fossil fuel import bill for many countries and depleting fossil fuel resources.

The sector certainly needs a transformation and a revolution in technology, infrastructure, transport concepts and political framework. Accordingly, it was decided to discuss the role that alternative forms of energy, as well as alternate power packs can play in reducing dependence on fossil fuels. How it can help us to achieve greater energy security and reduce noxious emissions. The session also discussed 2<sup>nd</sup> and 3<sup>rd</sup> generation bio-fuels and new feed stocks for bio-ethanol production. In addition, a parallel workshop was also organised to specifically focus on the status and development of bio-fuels in India, including the transport sector.

Figure 3: Contribution of Road Transport to Carbon Dioxide



Setting the tone of the discussion, Mr. Tomoya Ichimura, Director General, Smart Community Department, New Energy and Industrial, Japan, shared with the participants how in Japan more than 20% of total carbon-dioxide emissions are from transport sector and though this share has remained constant, but the absolute value has grown substantially. Taking forward the discussion from this example he reiterated how reform of the transport sector is one of the biggest challenges to be realised in a society aiming towards low carbon society. He also mentioned how Japan has already identified 21 key technologies to attain this objective.

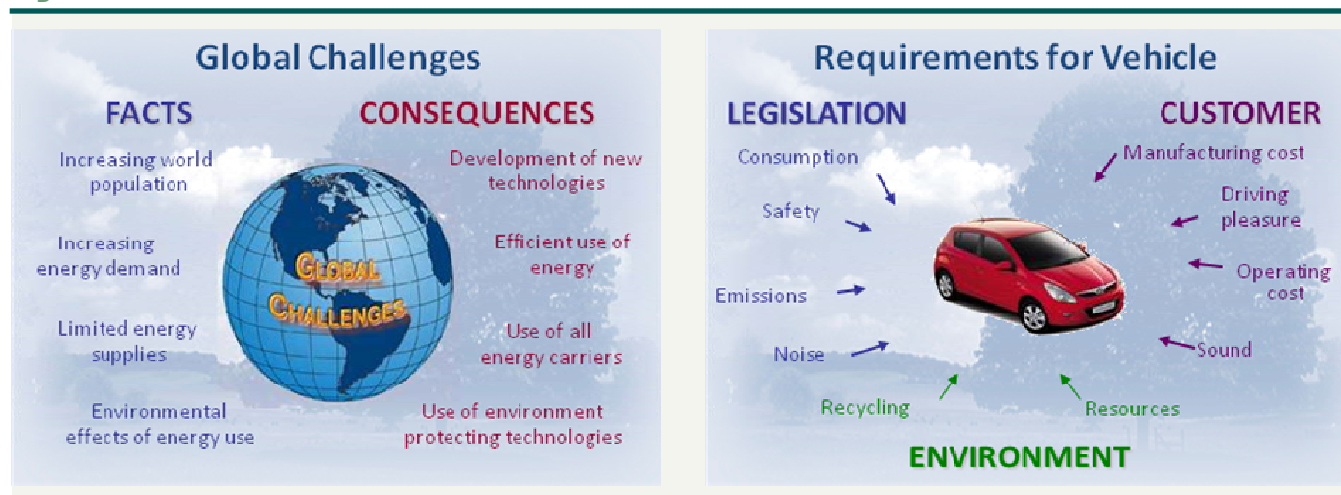
The other eminent panellists: Mr. Dilip Chenoy, Chief Executive Officer & Managing Director, National Skill Development Corporation; Dr. Tomas Kaberger, Director General, Swedish Energy Agency and Mr. Yasuyuki Sando, Chief Engineer and Senior Manager, R&D, Honda Motors, also discussed the importance of technological improvements, skill identification and development of manpower, and the overarching importance of finances for product development and technological advancements.

Dr. Mathew Abraham, General Manager, Alternate Fuel Technology, Mahindra & Mahindra, explained the global challenges and requirements faced by the transport sector and how current sources of oil is not sufficient enough to meet the growing demands. He showed the impact growing transport sector has on climate change and went on to discuss the alternate fuel and propulsion technologies available at disposal.

Session Coordinator, Dr. A.R. Shukla, Advisor, MNRE, GoI, spoke at length on Alternate Fuels for Surface Transportation (AFST) programme of the GoI, the objective of which is to promote Battery Operated Vehicles (BOV), which are non-polluting and quiet in operation, conserve petroleum products and curb environmental pollution, along with getting feedback on the performance of BOVs in operating conditions.

This interesting mix of country-specific examples acted as an eye-opener for the delegates, who were further enriched by participating in many other side events and parallel workshops along the main ministerial conference at DIREC.

**Figure 4:** Transport Sector: Global Challenges & Requirements





सत्यमेव जयते

Government of India  
Ministry of New and  
Renewable Energy



**DIREC  
2010**

# renewable energy village



India is growing at an impressive growth rate. However, more than 40% of the population has little or no commercial energy access for their living and livelihoods especially in the rural areas. And it is in this context that the role of renewable energy assumes significance. It is now no longer 'alternate energy' has emerged as a key part of energy solutions in rural areas. Pioneering efforts have been made for promoting renewable energy methods such as biogas plants, solar energy based heating, cooking and lighting devices, biomass gasifiers, etc. on a large scale in rural areas. In order to depict these wide ranging energy solutions that can be adopted in rural areas, a 'Model Village' was demonstrated at the venue of DIREC in an area of about 1000 square meters. The model village tried to epitomise the manner in which agricultural and forestry residues, cattle dung and biomass generated at village level can be utilised to provide a sustainable solution to meet the energy needs for domestic and productive applications.

The live model of biomass gasifier installed in the village provided electricity for various requirements in the model village. Similarly, biogas plant provided clean cooking fuel for small eateries operating inside the village. Small biomass pellet and briquetting units were also demonstrated along with other viable renewable energy technologies such as solar photovoltaic system for lighting, solar cookers, solar driers & solar water heating systems and improved & efficient cooking devices.

In order to show life style of villages, and demonstrate practical application of renewable energy technologies at domestic and enterprise level, a few village level small commercial activities and cultural events were also planned. Further, a speakers' corner was also organised where representatives of NGOs, civil societies, entrepreneurs, etc. talked informally about the path-breaking efforts that were undertaken by them to match the needs of villagers, small businesses, local residents with available local resources, at an affordable price & green technology and culminating towards safeguarding the environment. The participants freely interacted with these speakers to understand how their model could be replicated in other areas.

The impact of the technologies demonstrated at model village was such that almost all models and technologies were sold out at DIREC itself. The concept of Model Village delivered through DIREC to the various stakeholders will go a long way in demonstrating to the developing world that development, particularly rural development, can perhaps go hand-in-hand with environmental conservation.





# CHAPTER 5

Thematic Session, Track II: Policy





# CHAPTER 5

## Thematic Session, Track II: Policy

### Track II: Policy

The world has only tapped a small percentage of its vast renewable energy resources of which there is immense scope. Policy efforts need to be strengthened in order to encourage a massive scale-up of renewable technologies so as to build a long term, stable, low-carbon economy. Currently around hundred countries across the globe have at least some kind of renewable energy policy targets or promotion policies. However, there is wide variation in the level of pro-active and sound national energy policies that give priority to spending on sustainable energy as part of national investment and development priorities.

Realising the need of the hour, DIREC 2010 proposed to come up with strategies to support countries in developing stronger institutional frameworks to undertake reforms in the energy sector, to strengthen their institutions and build their capacity to increase the share of renewable energy in the overall energy mix.

The main ministerial conference at DIREC was designed in such a way that the various stakeholders, besides having an opportunity to delve deeper into various issues, would also be able to share with the participants of other forums the outcomes of their session's deliberations in

a joint session summarising the fundamental questions raised and responses offered on the need of coherent, consistent and enabling policy, legal & regulatory frameworks needed to mainstream renewable energy.

### Session I: Renewable Energy Scenario

The discussion centered on alternative scenarios for the future and the challenges posed by the dramatic growth of renewable energy. The session primarily focused on the following key questions:

- How much renewables can be realistically expected (or intend) for the long-term (2025-2050)? What are the most important technologies?
- What are appropriate time frames for much greater renewables penetration?
- What growth rates are possible? Does development happen in stages or just continuously? Is sequencing important?
- What is the role of distributed generation and energy storage in a renewables-rich future? Which DG and storage technologies will be most important first, in the shorter-run? and Why?
- How much of contribution can we expect from biomass and biofuels? Will

the resource be exhausted before the “long-run”?

- What is the appropriate mix of renewables, carbon-capture and storage, and nuclear power for constraining future carbon emissions to the levels deemed necessary to avert serious climate change?

Panellists mentioned that fossil fuels are still the major contributor to global electricity supply and renewables account for only 19 percent of which the major contribution comes from traditional biomass, followed by hydro power, solar and geothermal.

However, the future looks very promising for renewables. As per the global scenario for Renewable Energy:

- International Energy Agency “Blue Map” scenario (2008) shows 50% of electricity from renewables by 2050.
- Greenpeace advanced “revolution” scenario (2008) shows that renewables will account for 77% of electricity by 2050.
- Global Wind Energy Council (GWEC) advanced scenario shows that wind power will provide 20-25% of global electricity by 2030, which is on the basis of growth rates much less than the current growth.
- Distributed generation (DG), including solar PV, biomass and biogas power, is not seen as playing a large role in most scenarios, but one group of European experts estimated 30% of total electricity in the EU from DG by 2020.
- Distributed solar PV will provide for 30% of global electricity beyond 2040. Some analysts have constructed scenarios based on radical cost reduction in solar PV technology.

To translate these optimistic outlooks into a workable vision, this session discussed about low-carbon transport and linked it with a new paradigm: the integration of smart power grid technologies with energy storage technologies and electric vehicles to make renewable energy cheaper and

viable at large scales. The five key trends identified in support of this paradigm were:

- Emergence of energy storage technologies, which are still costly, but prices are expected to decline with economies of scale and technology improvement.
- The evolution of power systems, from centralised to distributed and from dumb to smart.
- The paradigm-changing concept that “load follows supply” on a power grid.
- The institutional and technical interconnection of the electric power and transport systems.
- Changing institutional and managerial role of (local) power distribution companies.

## Session II: Supporting policies (On-Grid)

The current policy environment has yielded significant results in creating a large and diverse renewable energy market. However, policy efforts need to be taken to the next level to encourage a massive scale-up of renewable technologies. To increase the share of RE in the overall energy mix, many countries have adopted feed-in laws as an effective way to stimulate the expansion of RE based power. The Renewable Portfolio Standard (RPS) has also been tried out by several countries and states. It is essential to understand as to how effective these policies have been, and how they could be improved upon in the medium and long term to bring more renewable generated power to the grid.

Though effective policies for renewable energy depends on the status and maturity of the technology in the respective country, international cooperation and the sharing of best practices on regulatory and policy approaches can accelerate the scale up of RE technologies. Taking forward this discussion, the session focused on the following topics:

- Embedding RE policy in energy and infrastructure policy.
- Learning from past policies to promote RE power.

- Risks and barriers facing large scale deployment of RE power.
- The role of Regulators.
- Feed-in tariffs/Renewable Portfolio Standards.
- Innovative policy & regulatory instruments.

Moderators of the session were Dr. Pramod Deo, Chairperson and Chief Executive, Central Electricity Regulatory Commission, India, along with Dr. Dan Arvizu, Director and Chief Executive, National Renewable Energy Laboratory (NREL), USA. Dr. Deo suggested the use of a holistic approach in calculating the cost of renewables. In this regard, he mentioned in his opening remarks that the externalities such as GHG emissions also have to be taken into consideration while working out the costs of renewable energy. To ensure the growth of renewables, he mentioned that government support, both at the policy and fiscal level, is important. Various policy mechanisms such as tax incentives and regulatory measures such as feed-in tariffs have to be extended to the market players in order to attract the private sector.

Almost echoing the suggestions made by Dr. Deo, Prof. Li Junfeng, Deputy Director General of Energy Research Institute & Secretary General of China Renewable Energy Industries Association, also urged the removal of trade barriers, a measure that would reduce the cost of renewable energy technologies. Whereas, Mr. Christopher Flavin, President, Worldwatch Institute suggested that for the creation of sustainable markets (for renewables); a combination of policies, inclusive of rules for grid access may be apt.

To showcase best practices, some panellists even highlighted national experiences promoting renewable energy. For example, Dr. Tetsunari Iida, Executive Director, ISEP, explained the status of renewables in Japan. He informed the delegates how prior to 1998, Japan's RE industry suffered owing to grid related problems, poor regulations, poor supporting policies and due to lack of societal acceptance. However the situation is fast changing. Since 2009, the new government is promoting renewables by introducing feed in

tariff as in METI (Ministry of Economy, Trade and Industry) document. Presently Japan is focusing on PVC market.

Similarly, Mr. Tulsi R. Tanti, Chairman and Managing Director, Suzlon, stated that if India wants to increase the portfolio of renewables, strong policy frameworks at national level is a must. Even tariff based mechanisms have to be worked out; reforms have to be made in issuing permits and funding the renewables.

Appreciating the efforts made by different countries; Prof. Li Junfeng, Deputy Director General of Energy Research Institute & Secretary General of China Renewable Energy Industries Association, in his talk expressed the need to learn from each other's experience. He mentioned that Germany was the first country to install wind power and it has good policy framework for renewables on tariffs, providing subsidies and also for encouraging research and development. He went on to add that Germany's market for renewables is also very good. In comparison to Germany, China has a good market for wind power but solar still has to be developed.

While talking about the growth of renewables over the years, Mr. Christopher Flavin, President, Worldwatch Institute, said that there was a time in 2004 when many countries did not even have any policy for renewables. However today 41 developed and 42 developing countries have their policies in place. Some countries like Germany with mediocre renewable sources have also developed a good market and achieved grid convertible renewables. In fact, Germany took lessons from California way back in 1990; similarly other countries also have to learn from each other. He expressed the need to devise policies that govern grid access as it is very important for the promotion of decentralised, variable output. New and flexible portfolio standards have to be worked out. He said that solar energy is going to be the dominant and dynamic energy of the future.

Mr. Rainer Hinrichs-Rahlwes, President, European Renewable Energy Federation, gave the

suggestion that the best way to reduce reliance on coal and nuclear energy is to harvest domestic renewable energy sources as the former have adverse impact on health and environment. He explained that even the cost of PV has reduced and PV along with wind power has the potential to share maximum energy load. He added that wind energy can both be centralised as well as decentralised, whereas solar energy is a decentralised system. He also urged that society accept the advantages and benefits of renewables and support government policies.

### Session III: Supporting Policies (off-Grid)

A sizeable market for renewable energy is for off-grid and decentralised applications both in urban and rural settings. DIREC provided a platform to strategise on the development of policies to support off-grid renewables, especially those addressing the high cost of renewable technologies, lack of awareness, need for strong Operation & Maintenance (O&M) infrastructure and market based delivery models. The role of renewable energy based Decentralised Distributed Generation (DDG) systems in addressing the issue of energy security was also discussed. Focus was on policies that encourage

its possible convergence with the grid expansion programme in developing countries. Accordingly, the major areas of discussion were:

- The role of renewable energy in addressing energy access.
- RE for rural development.
- Public-private partnership for the development of renewable energy based products/services.
- Decentralised RE power and its convergence with grid expansion plans.
- Barriers for mainstreaming small scale RE applications.
- Sustainability issues of RE based DDG systems.

Moderated by Mr. Hemant Lamba, Chief, AuroRE and Ms. Akanksha Chaurey, Director, TERI, the session focused on the renewable energy situation in rural areas. Mr. Lamba introduced the panellists to the audience and explained the structure of the session stating that to begin with panellists will share their thought process with the delegates in various presentations. This part of the session broadly focused on two aspects of RE namely: the lessons learnt and the road map, before inviting a round of discussion.



*Panelists at Supporting Policies (off-Grid) Session*

Ms Chaurey commended the involvement of Indian institutions and NGOs in renewables, and Dr. Alf Bjørseth, Chairman and CEO, Scatec Solar, gave a brief profile of his company, outlining details about its operations in various developing countries. Describing the experience and expertise of his company, Dr. Bjørseth mentioned that due to the proactive policies of many a government's, considerable investment has been made in off-grid technologies. Consequently, Scatec has projects in India, China, Africa and USA, where it has commissioned various rural electrification projects in collaboration with different NGOs. The delegates also learnt that Scatec solar is even into mini grids, financing of solar projects and setting up of solar energy centres.

"Removing trade barriers will reduce the cost of renewable energy technologies".

**Li Junfeng**, China Renewable Energy Industries Association.

Similarly, Dr. B.C. Jain, Managing Director, Ankur Scientific Ltd., also shared the experience of his company in rural electrification using biomass. He mentioned that while working in rural areas one has to work with too many stakeholders like village community, local officials, district and state government agencies etc., and this adversely hampers the growth of the project primarily because of the lack of accountability and excessive interference.

Dr. S.P. Gon Chaudhuri, Managing Director, West Bengal Green Energy Development Corporation Limited, gave a different dimension to the discussion by giving the perspective of West Bengal and described the initiatives undertaken under Rajeev Gandhi Gramen Vidyuteekarn Yojana (Rajeev Gandhi Rural Electrification Scheme). Under this scheme, he explained, the villagers now get grid quality electricity for almost 10 to 12 hrs. The challenges faced in this supply are gradation problems, lack of appropriate tariff structure and lack of business

model, which urgently need to be addressed for the sustainability of these projects.

Similarly, Dr. Kinsuk Mitra, President, Winrock International India, spoke at length from the experience of his organisation in implementing rural electrification projects using Jatropa oil. He referred extensively to a project undertaken by Winrock International India in Ranidhera and informed the delegates that in India some villages are in areas too remote to be connected by the grid supply. So off-grid is the only option available for them. He also added that commissioning such projects has its share of difficulties as it requires the active participation of all the stakeholders. Unless there is synergy between grid expansion and DDG (Decentralised Distributed Generation) projects, nurturing and sustaining these projects becomes an uphill task and it takes so long to implement the project that even the villagers lose interest. In the case of biomass electrification, feed stock supply is very important. Besides, local communities have to be trained to manage the plants by themselves as too much of hand holding is not good for the success of the project in the long run.

At the end of the session all the panellists agreed that issues like - long term policies both for lighting and electrification; creating awareness among people; standardisation of technologies, material, equipment; proper structuring of programs and projects have to be taken into consideration for the promotion and sustainability of the off-grid projects.

## Session IV: State and Local Governments

Local governments can play multiple roles for mainstreaming renewable energy as decision makers, planners, management of municipal infrastructure and role model for citizens and businesses. DIREC 2010 provided an opportunity to the state and local governments from around the world to interact and share details of policies that can promote renewable energy. Accordingly the discussion revolved around following topics:

- Best-practice policies at state & local level to promote renewables
- City & spatial planning
- Role of micro-finance and consumer credit for promoting renewables
- Capacity-building to develop local skills to produce, market, install, operate and maintain sustainable energy technologies.

The session was moderated by Mr. Griffin Thompson, Manager Energy and Climate Programs, US State Department, and introduced by Mr. Emani Kumar, Executive Director, ICLEI South Asia. Mr. Kumar introduced the panellists and briefly explained the working pattern of ICLEI in India, along with the initiatives taken by the organisation to promote renewables. He also read out the message sent by Mr. Prithvi Raj Sawhney, Mayor of Delhi, who was not able to attend the conference due to ill health. In his message, Mr. Sawhney described the initiatives taken by the Municipal Corporation of Delhi to promote renewables like the mandatory green building norms for government buildings and solar street lighting, etc.

Panellists like Mr. Wolfgang Jung, Vice Managing Director and Head of Project Group on Future energies at Science Park, Gelsenkirchen, and H.E. Jose Carlos das Dores Zorrinho, Secretary of State for Energy and Innovation, Portugal, spoke at length based on the experience of their organisation; whereas in general, the panellists emphasised on the importance of local leadership in promoting the use of renewable energy.

Mr. Ray Morgan, Chief Executive of Working Borough Council, UK, suggested reducing the demand for thermal energy (used for room heating) by using appropriate spatial planning. He also stated that local policies have to encompass all the dimensions taking into consideration the requirements of all the stakeholders as renewables cut across various disciplines and fields. It was suggested that though it is recommended to have a Master plan for town and city planning, provisions can always be made for up-scaling and incremental

development, which can also be promoted by public private partnerships.

Mr. S.K. Shukla, Director, Chhattisgarh Renewable Energy Development Agency (CREDA), Chhattisgarh, India, described CREDA's initiatives in promoting renewables in the state. He said that the organisation not only works as a facilitating agency, but also undertakes the responsibility of operations. Accordingly village clusters have been formed and youngsters have been trained to work like a technician. These technicians are responsible for the operation and maintenance of energy plants installed in respective villages. Thus CREDA has successfully linked service provision with income generation option for the rural people. Renewables like PV's, biomass gasifiers are used for water heating, street light, household lighting etc. In fact all the hotels in Chhattisgarh have solar water heating systems. He also pointed out that 1400 villages in Chhattisgarh are getting electricity for lighting through solar based mini grids.

Giving another dimension to the discussion, Mr. R.A. Rajiv, Municipal Commissioner, Thane Municipal Corporation, Mumbai, explained to the participants that Thane is part of Mumbai metropolitan area and has a unique problem. Rate of migration is very high in this area; hence demand for energy grows proportionately. In order to cope up with the growing demand, alternative development strategies for energy have been devised such as mass transport system operated on renewables, devising green building norms and solar air conditioning etc.

In USA there are organisations like ICLEI that undertake activities like data collection, developing plans of cities and towns, conducting social, economic and environmental studies etc. Explaining how ICLEI works, Mr. Mosi Kitwana, Deputy Director, ICLEI, USA, mentioned that besides undertaking all the above-mentioned activities, his organisation also collaborates with various stakeholders and provides technical consultancy for promoting renewables.



# CHAPTER 6

## Thematic Session, Track III: Finance





# CHAPTER 6

## Thematic Session, Track III: Finance

### Track III: Finance

Renewable energy technologies have long been recognised as an important part of the solution to address energy security concerns and ensure economic growth in an environment friendly manner. However, despite efforts and the proactive stance taken by many countries, renewable energy is yet to be fully regarded as an economically viable alternative energy source. Several barriers impede commercialisation of renewable energy and the development of commercially viable small-and-medium scale enterprises that harness these technologies. The major barriers include: limited financing to defray high up-front costs associated with developing renewable energy projects; entrepreneurs' lack of familiarity with structuring commercially viable businesses; strong competition from subsidised conventional energy sources and market penetration costs. Past experiences indicate that while there is a perceptible growth in demand, institutionalisation of market mechanisms, especially that of investment mechanisms is yet to take root. DIREC 2010 took the initiative of exploring strategies to help address these barriers and stimulate enhanced financing for the deployment of renewable energy.

### Session I: Financing innovation-projects, businesses and technologies

Financing innovations is the need of the hour as it is extremely important to not just develop new financial products, but also to adjust these products to customers' requirements. Financing innovation from technology and business development through transfer and early deployment require new forms of risk capital provision. Although the market potential for renewables is significant in most of the countries, it is difficult to get financing for new and innovative projects due to the elevated risks and associated first-mover costs. As a result, new approaches and mechanisms to finance innovation are needed, some of which may be an outcome of new forms of public and private partnerships.

The main focus of the session was on following topics:

- Where are the frontiers of innovation and how can they be financed?
- What are the Costs and Rewards of being a first mover?
- What are the roles for public finance in supporting innovation.

The session was chaired by Mr. Xiaoyu Zhao, Vice President, Asian Development Bank and moderated by Mr. Eric Usher, Manager, Seed Capital Programmes, UNEP.

Panellists of the session were:

- Dr. Vivek Tandon, Founder, Aloe Private Equity.
- Ms. Christine Eibs-Singer, Co-Founder and Chief Executive Officer, E+Co.
- Mr. Ethan Zindler, Head of Policy Analysis, Bloomberg New Energy Finance.
- Ms. Anita George, Director- Infrastructure, International Finance Corporation (IFC).
- Mr. Debashish Majumdar, Chairman cum Managing Director, Indian Renewable Energy Development Agency Limited (IREDA).

- Mr. Don Purka, Senior Investment Specialist, Private Sector Operations Department, ADB.

The panellists viewed RE development in three segments – technology development, supply chain and product development. The panellists unanimously agreed that though the market potential for renewable is significant in most countries, early projects are hard to finance due to higher risks and this is where the public sector needs to come in to bring down risks and transaction costs in order to catalyse private capital.

Moderator Mr. Eric Usher, UNEP, began the session with his experienced observation that for public finance institutions the challenge is choosing how to exit sectors that have successfully scaled



up to make way for private sector finance and to identify the way forward.

Assessing the reasons to get capital into this space, the panellists explained that typically conventional power sector projects have development costs of 3–5%; whereas the ‘first mover’ low carbon projects have development costs of 6 – 10%. In addition to this cost, development cycles of these projects are typically 2–3 times longer. There is also a different risk and return paradigm, from that of conventional energy which makes the risk perception of this sector much higher.

Dr. Vivek Tandon, Aloe Private Equity, said that with carbon credits so far have been of great help in India, and that now it is necessary to improve yields. Whereas, Anita George, International Finance Corporation (IFC), spoke at length about

various issues like the difficulty of matching innovations of smaller companies with that of large investors. Problems are due to the lack of regulatory frameworks in emerging sectors and adapting technology to new markets, or as per the requirements of the existing markets.

2008 Milestone: For the first time all the renewables (incl. large hydro) attracted more power sector investment (~\$140bn) than fossil-fueled technologies (~\$110bn)

The Panel deliberated on the role of public finance in supporting innovation and rewards for first movers. They pointed out that while established players are just entering business, many a small entrepreneurs and industries are already involved with RE. Taking forward this aspect of the discussion, Ms. Christine Eibs-Singer, E+Co, mentioned that this is what makes it imperative to help small entrepreneurs de-risk, especially keeping in mind the replication potential and cataloguing lessons learned.

Representatives of some of the banks and financing institutions like Yes Bank. E+ Co, ADB and IFC described their respective financing policies. For instance, IFC’s that emphasis is on portfolio approach and providing debt financing through various lines of credit. E+ Co also stated following a portfolio approach, but for SMEs with the prime focus on “S”. In fact, E+ Cos investment in East and West Africa focuses on de-risking the investments of small entrepreneurs, whose projects have a replication potential; Yes bank also finances business and people rather than technology.

Mr. Vivek Mehra, YES Bank, too reflected on the requirement of reliable finance models to support such initiatives, while Don Purka, ADB, highlighted the need to fund projects focusing on adapting technologies to the new markets and designing insurance policies for the same to reduce risk. Almost echoing the same concerns, Ethan Zindler, Bloomberg New Energy Finance, said that investment in emerging technology start-ups has not taken off and hence it is important to reinforce public finance.



*Panelists at Financing Innovation – Projects, Businesses and Technologies Session*



## Session II: Financing deployment at scale

To achieve large-scale deployment of technologies that have been commercially proven requires large-scale investment. Weak financial markets create not only a problem of access to finance, but also introduce a bias towards investment in fossil fuel based technologies. Many renewable energy technologies are still relatively new to the market so the commercial chains, networks, marketing and financial links and other institutional structures that service traditional energy technologies are not completely in place. In low-income countries government intervention and development finance is necessary to unlock and scale-up investment in RE technologies (cover incremental costs, share risks, provide underlying finance in LDC). But to achieve large-scale deployment, a large share of financing needs to come from the private sector.

The following topics were identified:

- Risks and barriers facing the large scale deployment of renewable energy technologies.

- Role of financial institutions in catalysing commercial investment.

The session was chaired by Mr. Rashad Kaldany, Vice President, IFC for Asia, Eastern Europe, Middle East and North Africa. It was moderated and introduced by Ms. Kirsty Hamilton, Associate Fellow, Chatham House, and coordinated by Mr. K. S. Popli Director (Technical), IREDA. The panellists of the session were as follows:

- Mr. Clifford Polycarp, Senior Associate, World Resources Institute - WRI.
- Mr. Nick Robins, Head, Climate Change Centre of Excellence, HSBC.
- Mr. Craig O'Connor, Director, Office of Renewable Energy & Environmental Exports, Exim Bank, USA.
- Mr. Peter T. Gutman, Global Head, Renewable Energy & Environmental Finance, Standard Chartered Bank.
- Mr. Satish Mandhana, Managing Director, IDFC Private Equity.

The panel gave an overview of financing renewables from 2004 until today. It was

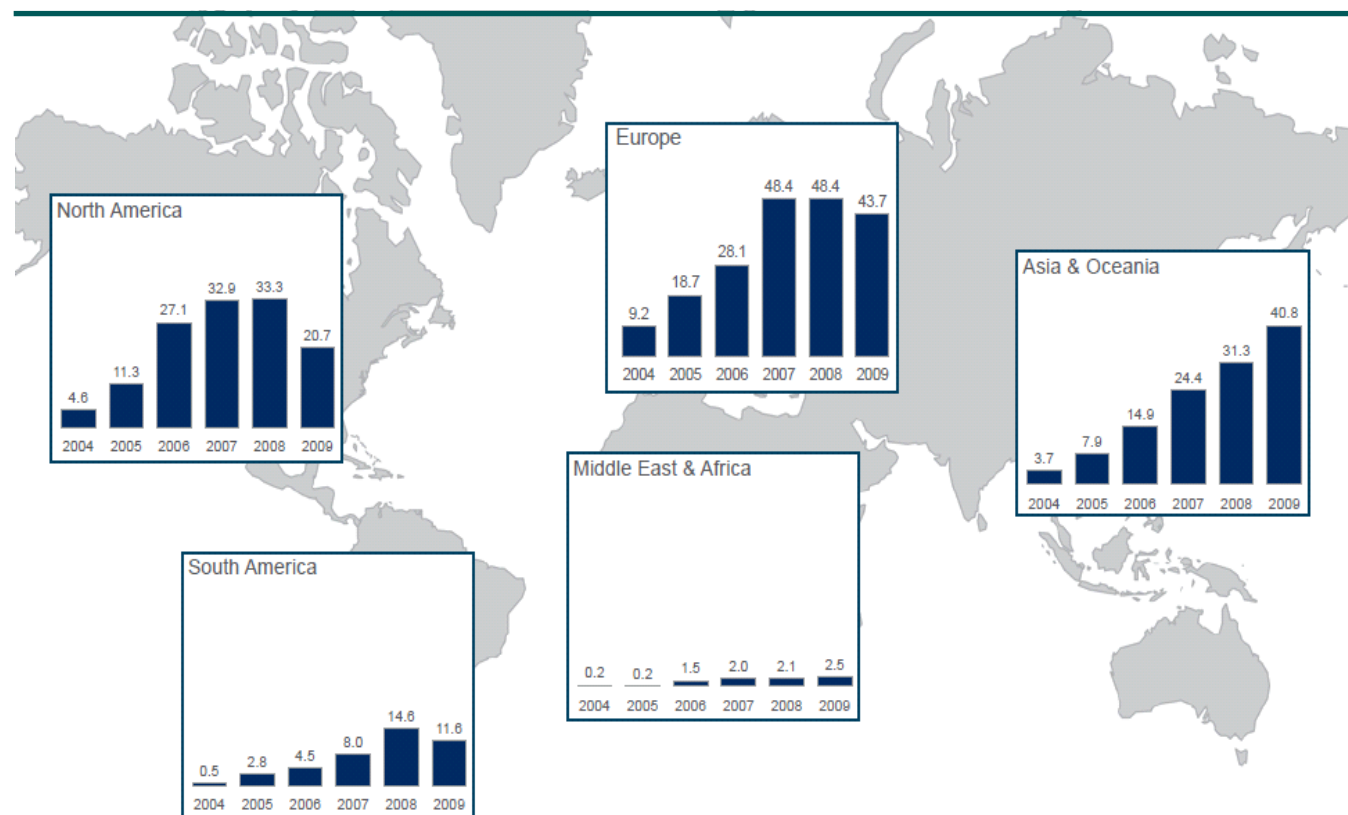


Panelists at Financing deployment at scale Session

mentioned that investments in renewables constitute one fourth of the total energy investments and majority of these are in hydro. To reduce the capital costs and to encourage innovative financing; technical assistance should be provided to the governments and local banks in order for them to be able to assess the risks involved with RE. Standardising systems is also necessary for RE as in the case of biomass, as there was a time when the initial cost of biomass used to be taken as low but with experience the cost of biomass has been reconsidered.

Accordingly, Mr. Kaldany mentioned the challenges for renewable energy growth, which he said included nascent stages of growth, inadequacy of grid infrastructure, unpredictability of government support and lack of funding in local currencies. Adding to the discussion, Mr. Mandhana said that countries like India need to strengthen law implementation to enabling scaling-up.

**Figure 5:** Financial investment by region 2004–2009 (\$bn).



**Source:** Global Trends in Sustainable Energy Investment 2010, UNEP/Bloomberg New Energy Finance.

Panellists in general felt that innovation is required both in technology as well as in business models; similarly grid parity is also important especially in countries where tariff structure varies with the type of RE source and consumer. It was also noted that scaling up is also dependent on issues like innovation in financing, inter connectivity, uncertainty of converting to firm power and effective bankability.

The panellists felt that clean technology fund needs to be developed not only at the global level, but also at national level, both in direct, as well as indirect mechanisms.

Mr. Craig O'Connor from Exim Bank mentioned that competition is a recipe to reduce loan costs; Peter Gutman said RE projects are more about debt than equity so it is very essential to carefully structure as well as support these projects.

Mr. Nick Robins of HSBC underscored the importance of investment related energy transitions that result from financial regulation

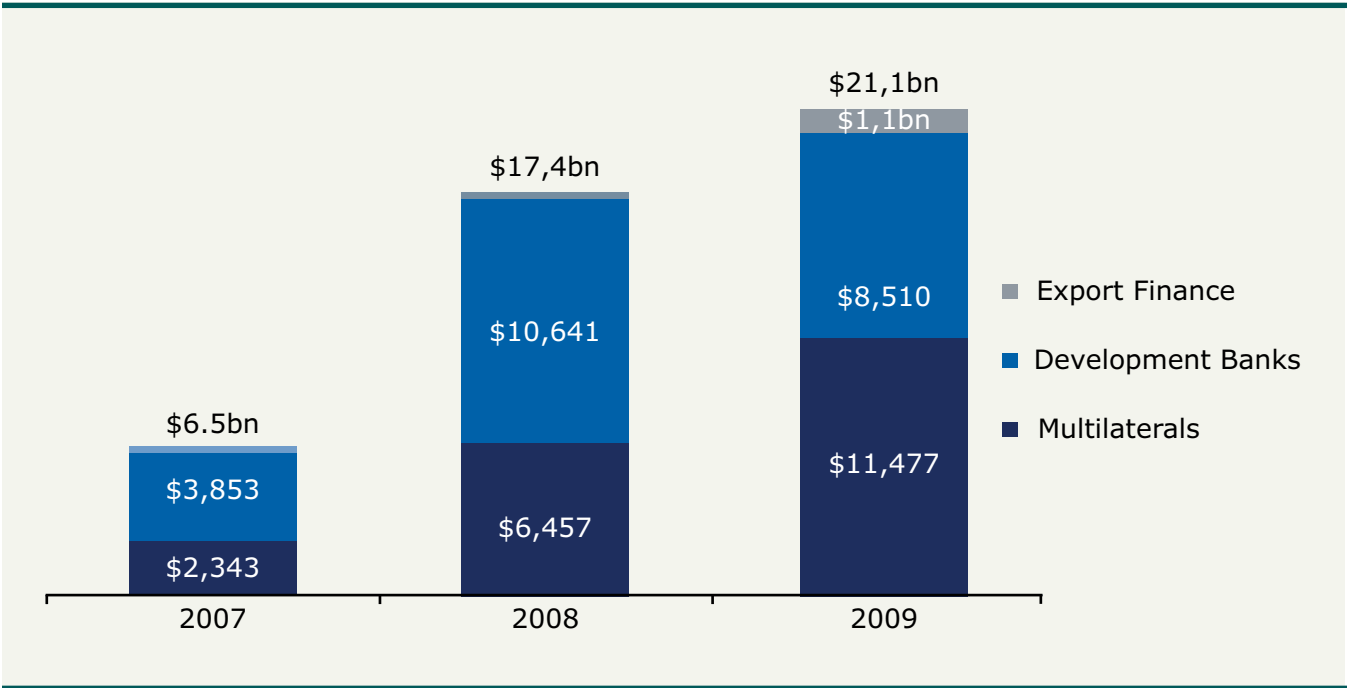
reforms. He emphasised the need to focus on a shift from developed to emerging markets.

### Session III: Financing for small businesses and end-users

To start a new business activity/project and to develop a new technology, an entrepreneur (at different stages) needs various sources of capital and business-development support. Given the nascent stages of the renewables industry, there is limited availability of investment capital to finance the high up-front cost associated with these projects, especially at the initial stages of development. Due to various barriers and market failures that inhibit financier engagement in (particularly off-grid) RE markets, there are many financial and non-financial gaps. These gaps make it difficult to launch new businesses, or even expand the existing and proven ones.

Taking into consideration the above-mentioned facts, the session revolved around following topics of discussions:

**Figure 6:** Public Finance in Sustainable Energy.



**Source:** Bloomberg New Energy Finance.

- Enterprise Development Services for Clean Energy SMEs.
- Scaling up access to Early Stage/Seed Capital for RE projects.
- Approaches for softening loan financing: interest rate reductions, green mortgages, guarantee facilities.
- Importance of microfinance.
- Development of new end-user finance products by local banks/MFIs.
- Leveraging existing networks, building new market linkages.
- Creation of opportunities for incoming generating activities.

The session was moderated and introduced by Ms. Richenda Van Leeuwen, Senior Director, UN Foundation, coordinated by Dr. D.K. Khare, Director, MNRE and the panellists were:

- Mr. Daniel Magallon, Managing Director, Basel Agency for Sustainable Energy.
- Mr. Eric Usher, Manager, Seed Capital Programmes, UNEP.
- Mr. Patricio Boyd, Director Rural Operations, Emprenda, Argentina.
- Mr. Charan Singh, Chairman, Aryavart Gramin Bank

The panellists in general shared their experiences in financing SME's and mentioned that what their institutions look for while assessing their financial needs the business model, maintenance and sustainability aspects and loan recovery potential of a project.

Speaking from the experience of his bank, Mr. Singh mentioned that approximately 500 million people in India's countryside still have no access to electricity. So realising that India has a solar energy potential of 5000 trillion kwh per year, his bank decided to support the most feasible solution of decentralised renewable energy systems, which includes local energy generation and dissemination systems. Fortunately, the bank has not looked back since then.

## Session IV: Initiatives to catalyse and scale-up investment in renewable energy

The session focused on a number of recent initiatives designed to catalyse investment in renewable energy. These included:

- Scaling Up Renewable Energy in Low Income Countries (SREP).
- Global Energy Transfer Feed-in Tariff (GET FiT).
- Global Climate Partnership Fund.
- The Critical Mass project.
- Global Renewables Investment Plan - GRIP.

Moderator of the session was Ms. Virginia Sonntag-O'Brien, Executive Secretary, REN21, who also introduced the session; while the session coordinator was Mr. K. S. Popli, Director (Technical), IREDA. The panellists were as follows:

- Mr. Jonathan Maxwell, Founding Partner & Chief Executive Officer, Sustainable Development Capital LLP.
- Dr. Klaus Peter Pischke, Energy Sector and Policy Division, KfW Development Bank
- Ms. Natalia Kulichenko-Lotz, Senior Energy Specialist, Sustainable Energy Department, World Bank.
- Dr. Martin Schoepe, Head of Division International and EU Affairs of Renewable Energy, German Federal Ministry for the Environment.

The panellists presented different programs and funds available to finance RE projects. Mr. Jonathan Maxwell explained the Critical Mass project that promoted public-private partnerships and looked at ways to allocate risk and report on lessons learned to improve capital efficiency. He also spoke about the proposed Climate Public-Private Partnership (CP3) fund that will focus on providing private equity for low carbon and resource efficient infrastructure in Asia.

Taking the discussion further, Dr. Martin Schoepe stated that the Global Renewable Investment Plan (GRIP) is an initiative to quantify economic benefits, understand effectiveness of policy schemes and stimulate investment through increased international cooperation. Ms. Natalia Kulichenko-Lotz made the delegates aware of the World Bank's Strategic Climate Fund and Clean Technology Fund as well as the Scaling-Up of Renewable Energy Program, which primarily focuses on pilot projects in selected low-income countries.

Dr. Klaus Peter described the Global Climate Partnership Fund that provides financial and

technical assistance to developing countries financial institutions. Similarly, Mr. Mark Dominik gave details of Deutsche Bank's Global Energy Transfer Feed-in Tariff (GET FiT) program. In his presentation he mentioned that GET FiT has a lot of flexibility and can help to overcome problems of cost competitiveness and technical, financial and project development constraints of the projects being implemented in the developing countries.

On the other hand Mr. Clifford Polycarp explained the working of World Resources Institute and also cautioned about starting too many initiatives.



# CHAPTER 7

Thematic Session, Track IV: Renewables, Access  
and MDGs



Spinning of Wood by Rural Women

**Benefits of Solar Charkha**

- The use of Solar Powered Charkha in villages about three times more efficient than conventional Charkha.
- It is a good source of additional income generation.
- The quality of wood & silk is better than that of conventional Charkha.
- Introduction of new improved technology for enhancing the use of renewable energy in villages.

**Components of Solar Charkha**

- Single speed Charkha with 100% speed regulation.
- 24 Watt Solar PV Panel with a controller.
- Charge Controller for charging.
- 12 Volt 40 AH tubular plate battery.
- Wire from panel to battery and battery to Charkha.



**GAS SCRUBBING & GAS CONDITIONING SYSTEMS**

• High efficiency & low maintenance.

• Suitable for industrial & domestic use.

• Easy to operate & maintain.

• High safety & reliability.

• High quality & low cost.



# CHAPTER 7

## Thematic Session, Track IV: Renewables, Access and MDGs

### Track IV: Renewables, Access and MDGs

This track endeavoured to foresee how renewables could address the Millennium Development Goals and lead to development by improving social and economic conditions in the world's poorest countries. Much like other tracks, this one was also divided into four sessions as given below:

#### Session I: Renewables, Access & MDG

Almost 2-3 billion people living in the developing countries lack access to affordable and clean energy services for both consumption and productive uses. Lack of access to clean, sustainable and affordable energy has been recognised as a key constraint in the attainment of the Millennium Development Goals (MDGs), particularly in terms of creating the economic conditions necessary for reducing poverty. To understand the role renewable can play in this direction and how to improve the scenario, the session focused on following key topics:

- Development of a global partnership for energy access.
- Development of an effective communication/media campaign focusing on building support for achieving energy access.

- Mobilising resources to achieve access to clean energy.
- Engagement of all stakeholders.
- Energy justice.

The session was chaired by Dr. Kandeh K. Yumkella, DG, UNIDO; coordinated by Dr. P.C. Maithani, Director, MNRE, Government of India and the panellists were as follows:

- Dr. Manfred Konukiewitz, German Federal Ministry for Economic Cooperation and Development (BMZ).
- Mr. Kadri Nassiep, Chief Executive Officer, South African National Energy Research Institute (SANERI).
- Ms. Veerle Vandeweerd, Director, Environment and Energy Group, Bureau for Development Policy, United Nations Development Programme (UNDP).
- Ms. Rachel Kyte, Vice President, IFC.
- Mr. Deepak Gupta, Secretary, MNRE, Government of India.
- Ms. Sylvie Lemmet, Director, Division of Technology, Industry and Economics (DTIE), United Nations Environment Programme (UNEP).

The panellists were unanimous in accepting that energy access has the potential to play a major

role in achieving the MDGs goals. Facilitating the discussion, Kandeh Yumkella spoke why and how energy access can help to achieve the MDGs and the role that improved energy access can play in this aspect. Taking forward the discussion, Mr Deepak Gupta said that the world is replete with examples that showcase how poverty reduction depends on energy access and how improvements in lighting and rural electrification enhance education, health, and livelihoods. He invited the delegates to work towards an international commitment, possibly through creation of a new energy access fund that would help in ensuring energy access and security, particularly in the rural pockets.

Adding to the thought process of Mr Gupta, Kadri Nassiep mentioned that energy opens doors to many a knowledge opportunities like internet access, which is a vital source of educational opportunity. He mentioned that energy access also has significant emphasise on improving the living conditions and livelihoods of people.

Veerle Vandeweerd gave another dimension to the discussion by emphasising on an all inclusive approach to energy services, such as providing lighting, battery and mechanical power simultaneously. Whereas, Rachel Kyte mentioned the role private sector can play to make the policy makers aware of sector requirements like establishing appropriate investment incentives at national and international levels. She reminded that it is necessary to ensure that the poor don't end up paying the price of carbon accordingly RE business should be oriented towards 'saving cost' rather than making profits and in such a scenario initial subsidies can help the businesses to establish quickly and move into new markets with ease. However, Manfred Konukiewicz stated that it will help to treat the customers as the "first funding mechanism."

## Session II: Capacity Building

Capacity Building on energy policy making, energy regulations, energy planning and project financing, as well as in the latest

technologies and best practices available for improving the efficiency of energy use, and for increasing the use of renewable energies are needed to increase access to energy. Priority needs to be given to those initiatives which are focused on tackling the poverty agenda through the provision of sustainable energy services for lighting, communications, water pumping, education, health and wealth creating activities.

The session revolved around following topics:

- Availability of information and education of rural population.
- Enhancing communication and awareness raising among key stakeholders and decision makers about the potential of RE sources and the potential of these sources to provide a sustainable form of energy supply.
- How to increase the understanding of environmental issues and their implications at all levels, from local to the global, and to influence opinion and policy in ways that promote sustainable forms of development.
- How to motivate industry, investors, researchers and government agencies to continuously share information that will facilitate dissemination of RETs.
- Creation of opportunities for incoming generating activities.
- Developing innovative and decentralised approaches to poverty reduction by harnessing solar energy.
- Training and networking for energy policy makers, regulators, and planners.
- Strengthening existing Energy Centres, Agencies and Industry Associations.

The session was moderated and introduced by Dr. Leena Srivastava, Executive Director, TERI, coordinated by Mr. P.C. Pant, Director, MNRE, GoI and the panellists were:

- Dr. Joe Madiath, Executive Director, Gram Vikas.

- Mr. Berthold Breid, Chief Executive Officer, Renewables Academy AG (RENAC).
- Mr. Ryan Glenn Anderson, Advisor and Team Leader, Renewable Energy Finance, Norwegian Agency for Development Cooperation Norway.
- Mr. Mark Radka, Chief of the Energy Branch, United Nations Environment Programme (UNEP).
- Mr. Hugo Lucas, Director for Policy, Capacity Building and Outreach, International Renewable Energy Agency (IRENA).
- Mr. Bunker Roy, Director, The Barefoot College.

Panellists discussed how capacity building for energy access, especially in the area of renewable energy, needs to be all encompassing and carried out at all the levels, right from politicians to donors and bureaucrats, to educators, NGOs and students in both the developed and the developing countries. For such extensive training programmes, it was felt that it is essential to develop communication tools needed to elucidate the co-benefits of providing energy access and its importance for the MDGs

The discussions also identified financial institutions as another key stakeholder in the energy access programme, whose capacity too needs to be developed for designing appropriate financial instruments for lending. Even the importance of carefully identifying target groups for capacity enhancement; so as to achieve the purpose of enhanced energy access in a sustainable manner was stressed. In the context of capacity building, the Government of India's initiatives through investment in educational institutes attracted a lot of attention and interest.

From sustainability point of view, the session advocated the need to develop entrepreneurs at the local level, who could support the renewable energy based products and services identified as critical; along with the need for identifying and building replicable models on-the-ground and addressing the challenge of scaling up was

identified as paramount for the success of RE programmes and projects.

### Session III: Women Empowerment

Women are the mainstream users and producers of energy and they have, in a number of cases, demonstrated their interest by taking active roles in renewable energy projects that produce real benefits towards their empowerment: that improve their quality of life, reduce their workload, reduce health hazards associated with indoor burning of firewood or provide them with opportunities to increase their income. Women are already playing diverse roles in some renewable energy activities as energy consumers and beneficiaries, as micro entrepreneurs, as extension workers and caretakers and as leaders, networkers and lobbyists.

This session accordingly focused on:

- How to incorporate gender sensitivity in national policy making?
- What are the necessary steps to involve women in different stages of project development?
- How to provide incentives for women and women's organisations to overcome the barriers often faced in obtaining credit?
- Renewable energy for improving the households' quality of life
- Income generation activities for women in energy service delivery
- Separate resources for dealing with women's energy poverty issues

The session was moderated and introduced by Dr. Veena Joshi, Senior Advisor, SDC and the session coordinator was Mr. K.P. Sukumaran, MNRE-UNDP ACE Project. Besides the panellists were:

- Mr. Dipal Chandra Barua, Founder & Chairman, Bright Green Energy Foundation
- Dr. Nandita Mongia, Principal Advisor, South Asia Regional Initiative - Energy
- Ms. Jayshree Vyas, MD, SEWA Bank



- Ms. Adeola Eleri, Nigeria, Senior Scientific Officer, Renewable Energy Department, Energy Commission of Nigeria

The session was organised in the backdrop of the fact that women are the mainstream users of energy and by taking active role in renewable energy projects, they are empowered. There is also remarkable improvement in their quality of life besides there is significant reduction in their work load, along with mitigation of health hazards associated with indoor air pollution arising out of fire wood/biomass burning for cooking.

The moderator Dr. Veena Joshi highlighted the importance of clean energy access to rural households, which would directly contribute to the empowerment of women. Dr. Nandita Mongia highlighted the need for energy services equitability for women, creating awareness amongst women as a measure of their capacity building in order to select appropriate energy sources, which could be

beneficial for women, and their families and the need to design energy projects with significant general component. She also cited examples of successful projects with active involvement of women in India and other countries and suggested that the details of such projects should be collated for wider dissemination. It was informed that the Government of Kerala in India has initiated a Women Institute for sustainable development with direct association of the Energy Management Centre, Government of Kerala. She is actively involved in the functioning of this institute and suggested that this is an example worth emulating.

The speakers highlighted the role of energy for increasing the productivity, reduction in drudgery, increasing the standard of life of rural people, particularly rural women. It was suggested that project developers should have first-hand information about the use of energy by women in their daily life and such interaction



*Panelists at Women Empowerment Session*

should be collected by visiting the homes of women in order to find out the energy use and the systems being used by them in order to suggest solutions for improving their living conditions. Need for providing micro financing to acquire energy efficient devices was also highlighted.

The relevance of improved cook stoves and biogas plants for providing clean cooking energy services was also discussed. The speakers suggested that energy audit in the women's home may be carried out in order to suggest measures for energy conservation, as well as the installation of appropriate energy devices for improving the quality of life. Ms. Adeola Eleri and Mr. Barua presented the details of the projects being implemented in Nigeria and Bangladesh respectively for providing access of clean energy to women and called for integration of gender sensitivity in the renewable energy projects, particularly for rural energy services.

The session was followed by active discussion, which was participated by a number of delegates. The suggestions made therein included; integration of fuel policy in the public nutrition programme, use of solar energy products for water pumping and solar powered refrigeration which could specifically benefit rural women, to consider women as not only a consumer of energy but also to empower them as energy entrepreneurs or business partners, the need for creating a portal of clean energy system for creating awareness, introduction of clean energy devices which could reduce the long working hours of women, to consider women's participation in the relevant programmes not only as end-users but also as an integral part in the supply chain. It was highlighted that the technology per se is not the critically important issue, rather providing access to clean energy services should be the primary objective of the projects.

The session was well attended by a cross-section of delegates from India and other participating countries and was extremely interactive.

## Session IV: Renewable Energy in India

The development and utilisation of renewable energy has been accorded high priority by the Government of India. The current policy environment in India, undoubtedly, has yielded significant results. India is ranked fifth globally for installed wind capacity and second for biogas generation and runs one of the most diverse and biggest renewable energy programmes in the world. The Government policy has been successful in creating a fairly large and diversified manufacturing base, and an infrastructure to support Renewable Energy Technology (RET) design, development, testing and deployment. So far, an aggregate capacity of over 17,000 MW has been installed, based on renewable energy technologies. The topics that were covered during this session were:

- Status of renewable energy deployment in India.
- Barriers to mainstreaming RE in India.
- Role of RE in addressing energy security.

- RE as a driver for rural development.
- Role of R&D and technology development.
- Policy, regulatory and fiscal measures to promote RE deployment.

The key speakers during this session were:

- Chairperson: Dr. Farooq Abdullah, Union Minister for New & Renewable Energy, Government of India.
- Moderator: Mr. Suresh Prabhu, Chairman, Council for Energy, Environment and Water, India.
- Introduction: Mr. Deepak Gupta, Secretary, MNRE, Government of India.

Panellists:

- Dr. Pramod Deo, Chairperson and Chief Executive, Central Electricity Regulatory Commission, India.
- Mr. Darryl D'Monte, Chairman, Forum of Environmental Journalists of India.
- Mr. Jens Burgtorf, Director, Indo-German Energy Programme (IGEN), GTZ.

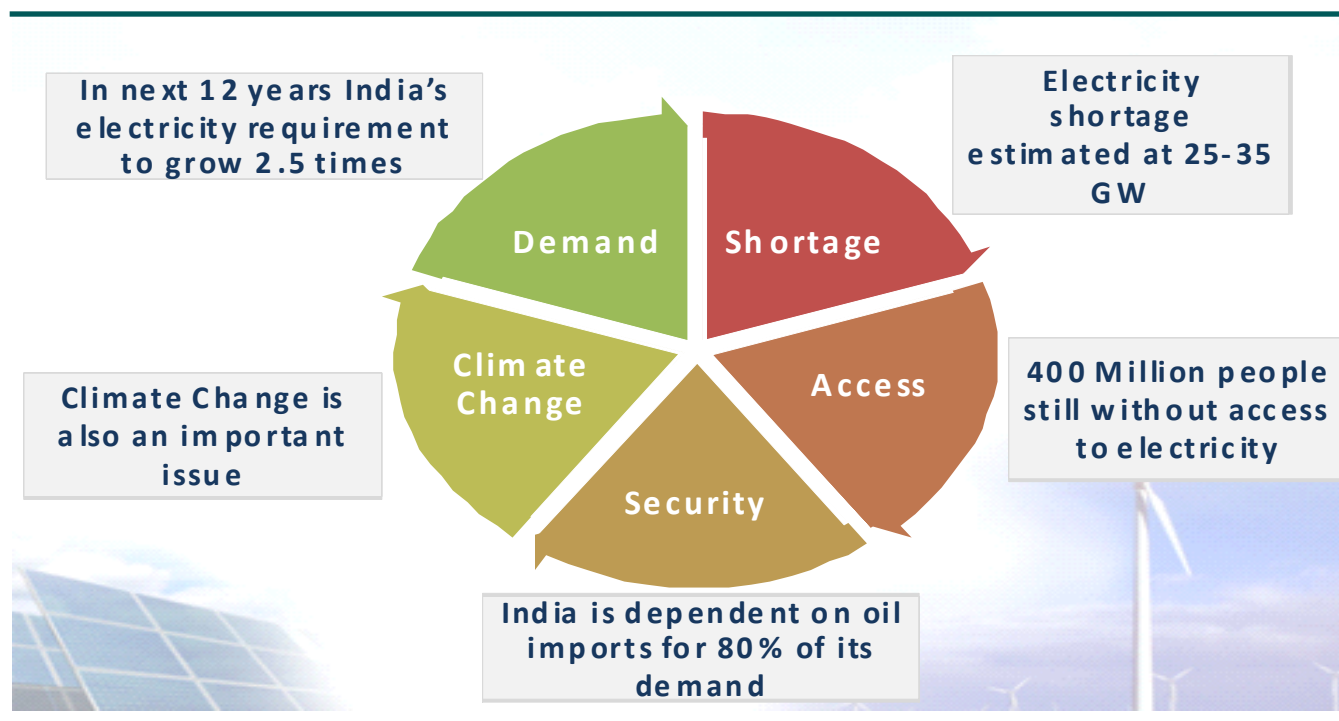
- Dr. Shonali Pachauri, Deputy Program Leader of the Population and Climate Change (PCC) program, International Institute for Applied Systems Analysis (IIASA).

- Dr. Jyoti Parikh, Executive Director, IRADe

Mr. Deepak Gupta set the stage for discussion during the session. He mentioned that renewable grid capacity in India has increased more than five times, from around 2% to around 11% in only eight years, and is contributing about 4.13% to electricity generation mix. He added that in the larger perspective of grid power, a new area of renewable power plant at the tail end of grid is being experimented in India to reduce transmission losses, and improve both voltage and frequency at the tail end. Hundreds of such plants are expected to come up in the next few years, thus improving the transmission infrastructure in the country.

In the context of off grid renewable power program, he mentioned that Indian renewable energy priorities are different from that of the

**Figure 7:** India's Energy Challenge





*Panelists at Renewable Energy in India Session*

developed countries, firstly, because it provides energy access to large rural populations including those in inaccessible areas and meeting the unmet demand in many other areas. Secondly, because in one way or the other, they replace fossil fuels and can make a significant contribution to reduction in their consumption, which is important from the point of view of energy security.

Quoting a few successful initiatives of the Ministry, he said that Solarization through 150,000 solarized telecom towers will result in savings of 450 million litres of diesel annually, daytime mitigation of diesel consumption in Industry through solar applications will result in savings of 400 million litres diesel, rice-husk gasification in the rice mills in Eastern India through 2000 plants totalling 200 MW will result in savings of 100 million litres of diesel and 35 Million litres annual savings of kerosene is proposed

to be achieved by 2015 through usage of rural solar lighting in 5 million rural households. The session proceedings were then handed over to the distinguished panellists of the session by the moderator.

Dr. Pramod Deo mentioned that facilitating private sector investment in renewable energy is a key objective of the regulatory framework in India and several regulatory mechanisms have been put in place to promote renewable energy development in the country such as cost plus return based tariff, or preferential tariffs, renewable purchase obligations (20 states in India have already announced these targets) and new grid code and connectivity regulations comprising facilitative provisions for grid connectivity and integration of renewable energy projects has been announced. He stated that there is a need to move from the cost plus return based tariff regime to a market

based mechanism to promote such resources and suggested that it is necessary to mobilize funds from the clean energy fund to incentivize acceptability of market based mechanisms for greater acceptability among the end users.

Adding another dimension to the discussion, Mr. Darryl D'Monte spoke about the 'power to choose' and focussed his discussion on traditional fuel based cooking and the harmful effects of the same on the health of women. He urged the international community to accept the proposition of improving traditional cook stoves in developing countries as an attractive business opportunity and invited help in alleviating this critical problem.

Mr. Jens Burtgrof brought to the discussion the German experience of renewable energy development. He emphasised the important role that feed-in-tariffs has played in promoting

technologies such as wind and solar PV in the country. He made a critical point that the scale of development of technologies such as solar PV have been possible in Germany primarily on account of cost reduction, which can also be the case for India as it embarks on a journey of promoting large scale deployment of solar power.

Dr. Shonali Pachauri spoke about renewable energy and household energy access in India. She discussed in detail the health effects, environmental impact and socio- economic impact of biomass usage, particularly in cooking; whereas, Dr. Jyoti Parikh emphasised on the key buzz words of integration, consolidation and convergence in the field of renewable energy development in India.

To conclude, this session focused on the potential of renewable industry in India, the challenges faced and the importance of household energy access.



# CHAPTER 8

## Closing Plenary

DAY 3  
OCTOBER 29



**DIREC  
2010**

**09h00-10h30**

**PLENARY**

KEY FINDINGS FROM ALL SESSIONS

**Track 1**

TECHNOLOGY AND INFRASTRUCTURE

Prof. Ralph Sims, Director, Centre for Energy Research

**Track 2**

POLICY

Dr. Eric Martinot, Senior Research Director, Institute for Sustainable Energy Policies (ISEP)

**Track 3**

FINANCE

Mr. Eric Unher, Manager, Seed Capital Programmes, UNEP

**Track 4**

RENEWABLES, ACCESS AND MDG

Mr. Suresh Prabhu, Chairman, Council for Energy, Environment and Water, India

**10h30-11h00**

**Tea Break**

**11h00-12h30**

**Plenary: Concluding Session**

Chairperson : Dr. Mohamed El-Ashry, Chairman, REN21

Initial Statement - Mr. Thomas Friedmann

Address by H.E. Mr. Trond Giske, Minister of Trade and Industry, Norway

Political Declaration - Dr. Farooq Abdullah, Union Minister for New & Renewable Energy, Government of India

Invitation to host next International Renewable Energy Conference

H.E. Dr. Sultan Ahmed Al Jaber, Assistant Minister of Foreign Affairs, and Special Envoy for Energy and Climate Change, United Arab Emirates (UAE)

Delhi International Action Programme - Award

Ms. Virginia Sonntag-O'Brien, Executive Secretary, REN21

Close of the DIREC 2010

Mr. Deepak Gupta, Secretary, MRE, Govt

**12h30-14h00**

**Official Side Events**

Session Coordinator  
Ms. Ritu Bhargava, Winrock International India





# CHAPTER 8

## Closing Plenary

### Day 3: Plenary on Key Findings from all Sessions

29<sup>th</sup> October 2010

On Friday morning, the third and the last day of the conference, key outcomes from the four tracks were presented to the delegates in the plenary.

- ☞ **Track I:** Technology and Infrastructure  
Prof. Ralph Sims, Director, Centre for Energy Research, Massey University
- ☞ **Track II:** Policy - Dr. Eric Martinot, Senior Research Director, Institute for Sustainable Energy Policies and Mr. Ernesto Macías, Alliance for Rural Electrification
- ☞ **Track III:** Finance - Mr. Eric Usher, Manager, Seed Capital Programmes, UNEP
- ☞ **Track IV:** Renewables, Access and MDG - Mr. Suresh Prabhu, Chairman, Council for Energy, Environment and Water, India

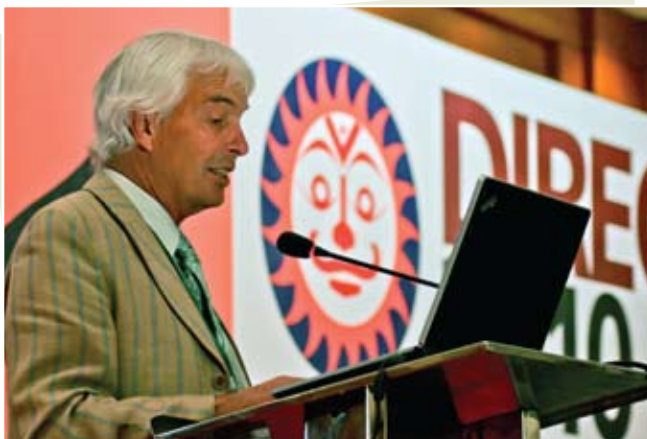
Summing up the discussion on technology and infrastructure, Prof. Ralph Sims applauded the efforts of different countries in the direction of renewables and mentioned that substantial progress has been made in renewable technology in the past 20 years. However, he also cautioned that according to the IEA World Energy Outlook 2009, the goal of limiting greenhouse

gas concentrations to 450ppm will require considerable efforts.

While underlining the importance of smart grids to scale up renewables, he reminded the participants that while the world is undertaking great efforts in this direction, fossil fuels will continue to play an important role in this transition phase. He added that participants highlighted the benefits of renewables for heating and cooling, and emphasised on the need to manufacture and market quality renewable energy products. He noted that the need of the hour was to convert our buildings into net energy generators through green building design and the need to educate more and more green building professionals.

In transport there is still a long way to go as the sector requires significant spending to switch from the fleet of light vehicles to advanced renewable fuel and storage technologies. Prof. Sims noted that an array of renewable technology solutions will need to be combined and promoted aggressively through government institutional and infrastructural planning to make this a reality.

Dr. Eric Martinot and Mr. Ernesto Macías summarised the policy track and stated that though the ideal scenario of 50-100% renewable



*Prof. Ralph Sims, Director,  
Centre for Energy Research, Massey University*



*Dr. Eric Martinot, Senior Research Director,  
Institute for Sustainable Energy Policies*

energy use sounds very challenging, it is indeed feasible both technically and financially. Dr. Martinot explained that while the delegates did raise concerns about the overall cost of renewables, the more overarching issue is that of distribution of products within society. To overcome this barrier, he noted, new and better scenarios involving low energy price volatility, employment benefits etc. are needed. He also emphasised the need for countries to learn from one another's policy successes to be able to effectively design the energy grids of the future—an effort that requires policy, as well as technological innovations.

Mr. Ernesto Macias focused on the need to develop effective off-grid systems and the role of systems NGOs, especially for countries like India. He also added that these systems need to be flexible and focus more on increasing capacity and performance, which the session concluded is essential if we want to eventually move from off-grid to "grid" systems.

Sharing the conclusion of the renewable access and MDGs session, Mr. Suresh Prabhu said that addressing gender inequality and access to energy are critical to reducing poverty, as often women are the ones burdened with collecting fuel for domestic use. It was also acknowledged that the world is replete with examples showing that gender inequality exacerbates poverty and that access to energy enables participation in productive activities.

On Millennium Development Goals, it was very much evident that increasing access to energy will play a significant role in halving extreme poverty by 2015. Mr. Prabhu, emphasised the need to strengthen international cooperation on technology transfer and training. He also called for changing the UNFCCC Clean Development Mechanism to include decentralised off-grid energy projects.

Mr. Eric Usher summed up the discussion on finance for renewables and mentioned that across the globe, banks, industry and governments are collaborating in unprecedented ways to massively increase investment in renewables. However, much still needs to be done as the policy frameworks should also incorporate



*Mr. Eric Usher, Manager,  
Seed Capital Programmes, UNEP*

various approaches of providing investment for the industry. The drivers of these policies, he stated, must be understood pragmatically as necessarily being more related to industrial and export policy than to environmental policy.

The session, Mr. Usher said underscored the challenges for increasing investment in areas related to technology transfer and addressing the needs of the first-movers, who may not necessarily get decent returns in the beginning. So, what is needed is to address the mismatch between the urgency of the renewable revolution and the slow policy scenario related to renewables. He lamented that while solar technology has radically advanced of late, the poor have not yet benefited from this due to lack of investment in technologies they can use.

Explaining the new financing initiatives he pointed out the example of the German Government and KfW Development Bank's Global Climate Partnership Fund which provides financial and technical assistance to financial institutions in developing countries and is essentially focused towards addressing the multiple challenges of bringing financing to all the levels.

## The Concluding Session

DIREC 2010 saw a grand closing with an eclectic participation of ministers, energy experts and government representatives of 71 countries, with an aim of up-scaling and mainstreaming renewable for energy security, climate change and economic development. The conference outlined the need for global leadership to ensure that the potential of renewable technologies are realised, dependence on fossil fuels is reduced and energy needs of the countries across the globe are met at affordable rates. Consequently DIREC 2010 was successful in promoting the campaign of renewable energy to the next level – 'demystifying renewable energy for common man's usage'.

Dr. Farooq Abdullah, Union Minister for New and Renewable Energy, Government of India, in his concluding remarks expressed gratitude to all the participants and stressed on the urgent

need to work together. He also stated that Copenhagen didn't come up to his expectations, but he did have great expectations from DIREC 2010 and now with Cancun. He cautioned that if we don't save this world, we won't be able to have another world.

In his initial remarks, Mr. Thomas Friedman, New York Times columnist and Pulitzer Prize winning author said, that world has become hot, flat and crowded owing to climate change and over population. He added that "the world is witnessing five major trends namely, supply-demand imbalance, energy poverty, biodiversity loss, climate change and petro dictatorship. All these problems of the 21<sup>st</sup> century have the same solution-reliable, abundant, cheap and clean electrons."

His Excellency Mr. Trond Giske, Minister of Trade and Industry, Norway, explained that his country is committed to renewable energy and cited Norway's target to be carbon neutral by 2050. He stated the need for innovation and multilateral agreements to set a price on carbon and open investments in clean energy. This move, he said is essential if we need to focus on the health of people living on planet earth. He stated that we have to combine solutions and work towards sustainable economic growth with focus on renewable energy and outlined three areas of action: innovation where binding global agreement is required, moving capital from rich to poor countries and action in the private sector regarding financial support. These three areas will lead to growth in green technologies and will require commitments from a broad range of stakeholders. Mr. Giske in his remarks also stressed the need for increased public-private partnerships and mentioned Norway's partnership with the Tata Group to develop hydropower in India. Attracting the attention of delegates to the severity of the global challenges, he urged the participants to commit themselves to positively changing the world for the next generation.

Dr. Mohamed El-Ashry, Chairman, REN21 added that DIREC 2010 has been a great success and there is a clear consensus on the outcomes. One of the key outcomes was the Political Declaration.

# THE POLITICAL DECLARATION

## **Dr. Farooq Abdullah presented the DIREC Declaration:**

1. We acknowledge the multiple benefits provided by renewable energy. Together with energy efficiency, it provides energy access especially for the poor; creates economic and job opportunities; improves air quality and moderates climate change; and enhances energy security and sustainable development. In the last five years, the renewable energy sector has grown strongly and steadily. Even in 2009, up against strong headwinds caused by the global recession, lower oil and gas prices, and the lack of an international climate agreement, total investment has increased.
2. Besides finance, the growth in renewable energy has largely been policy driven. By early 2010, more than 100 countries had some type of target and/or promotion policy related to renewable energy. In addition, adoption of renewable energy is no longer confined to the industrialised world—more than half of the existing renewable power capacity is now in developing countries.
3. Despite the impressive growth in renewable energy adoption in the last five years, the challenge is that its share in the world's primary energy supply remains small and its adoption uneven. The world has tapped only a small amount of the vast supply of renewable energy resources. For the upward trend of renewable energy growth to accelerate, technology development and policy efforts need to be taken to the next level, and large-scale private investment needs to be encouraged.
4. A large proportion of the world's population has remained without access to modern energy services for too long. Depending upon the energy source in question (electricity for lighting, modern cooking fuel, etc.) anywhere between 1.4 billion and 2.7 billion people lack modern energy services. The use of renewable energy sources will not only provide access, but also help in the eradication of poverty and in the achievement of the other Millennium Development Goals (MDGs).
5. The goal enunciated by the UN Secretary General's Advisory Group on Energy and Climate change (AGECC) of universal access to modern energy services by 2030 is commendable and should be pursued by the international community and accorded a high development assistance priority.
6. We support the designation of a Year of Access and call upon the United Nations to designate 2012 as the International Year of Energy Access. We agree to work with governments, development banks, the private sector and NGOs to achieve this objective.
7. In many of our countries, investments in targeted research and development

in the energy sector are much lower than in other comparable sectors of the economy and incommensurate with the scale of the task at hand. We reaffirm the importance of investments in research, development and deployment (RD & D) and of international cooperation in RD & D for more cost-effective and advanced energy technologies.

8. It is only by significant scaling-up of renewable energy that we will enter the virtuous cycle of cost-reductions followed by more significant scaling-up. We recognise that increasing the use of renewable energy faces several challenges but consistent and sustained government policies can and do have a favorable impact on technology deployment. Supportive frameworks, procurement policies, a level playing field, providing access to affordable long-term finance, all will help increase the uptake of renewable energy. The integration and mainstreaming of renewable energy into national sustainable development strategies for poverty reduction, agriculture, education, health and family welfare, will further provide more opportunities for scaling-up.
9. We welcome and urge cooperative global action to strengthen human and institutional capacities in developing countries. Long-term strategies for capacity building are required for policy analysis and technology assessment, supporting development of technologies

and related skills in sourcing, marketing, installing, operating, maintaining, and servicing renewable energy equipment and in the sharing of best practices.

10. While there is no shortage of capital in the world, the challenge has always been how to scale up private investment in clean energy in developing countries. Public funds are instrumental in leveraging and incentivising large-scale private investment in developing countries through, for example, guarantees, risk sharing, buying down interest, etc. The provision of fast-start funding in the Copenhagen Accord, as well as existing multi-lateral and national funds, could catalyse much larger private flows for clean energy in developing countries. Some of these resources should also be provided for improving access to modern energy services in rural areas of the developing world.
11. We welcome the Delhi International Action Programme that encourages governments, international organisations, private companies, industry associations, and civil society organisations to take voluntary action for up-scaling renewable energy within their jurisdictions or spheres of responsibility. We request the Government of India to present an update of these voluntary actions at the next International Renewable Energy Conference to be hosted by the Government of Abu Dhabi, UAE.





*Delegates on dais during the Closing Plenary*

Mr. Sultan Ahmed Al Jaber, Assistant Minister, Ministry of Foreign Affairs, United Arab Emirates (UAE), invited participants to the next IREC conference to take place in Abu Dhabi, UAE in 2013. He noted that the meeting will provide an opportunity to continue collaboration on renewable energy and stressed that the world does not have the luxury of choosing between environmental protection and economic growth. "We have to be champions for both," he said.

Ms. Virginia Sonntag-O'Brien, REN21, reported on the results of REN21's Delhi International

Action Programme, a call for pledges which ran throughout the conference. She announced that 30 pledges had come in with seven coming from National Governments and stated that most pledges came in the areas of target-based measures, followed by rural energy, communication/awareness raising and deployment. As an incentive to make progress on the pledges, REN21 will be offering awards to those who reach their milestones by the next IREC.

Closing the conference, Mr. Deepak Gupta, Secretary, Ministry of New and Renewable

#### **As they said it:**

- ❖ "Addressing gender inequality and access to energy are critical to reducing poverty".

**Mr. Suresh Prabhu**, Chairman, Council for Energy, Environment and Water, India

- ❖ "Countries must learn from one another's policy successes in order to design the energy grids of the future, which will require policy as well as technological innovation.

**Dr. Eric Martinot**, Senior Research Director, Institute for Sustainable Energy Policies

- ❖ "Long, loud and legal policies are needed to encourage financiers to invest more heavily in renewables. Policy frameworks cannot only be supportive but must be investment grade."

**Mr. Eric Usher**, Manager, Seed Capital Programmes, UNEP

- ❖ "We need to work together to have a better world....if we don't save this world, we won't be able to have another world."

**Dr. Farooq Abdullah**, Union Minister for New and Renewable Energy, Government of India.

Energy, India, expressed his appreciation of the interest shown by the delegates and pointed out the interest shown by large number of students, which he saw as promise for the future.

A number of official side events and parallel events were also held during DIREC 2010. Some of these were on CDM projects in renewable energy: Issues and Presentation, BEE: National Mission on Enhanced Energy Efficiency, UNDP ACE project on cook stoves, Wind energy, Solar Water Heating systems, National funding institutions promoting renewable energy: best practices and future, commercially viable

biomass based technology. DIREC 2010 Expo with 525 exhibitors and 15 country pavilions facilitated interaction between the experts and practitioners in the field of renewable energy technology.

Globally, some 1.5 billion people lack access to electricity. In India, itself 40% of the population lacks access. Renewable energy can provide the means to provide this access. DIREC 2010 provided an opportunity to the participating countries and organisations to showcase policy initiatives and best practices in facilitating the rapid scale up of renewable energy.



सत्यमेव जयते

Government of India  
Ministry of New and  
Renewable Energy



# DIAP

## The Pledge

DIAP is a joint effort of Government of India and REN21 that encourages governments, international organizations, private companies, industry associations, and civil society organizations to take action for scaling up renewable energy within their own jurisdictions / spheres of responsibility. It is a powerful and flexible mechanism to stimulate voluntary action on renewables. Pledges with the Most Visible Achievements will be awarded at the next IREC.



## DIAP Pledge Summary

### Ren21 Secretariat

The Renewable Energy Policy Network for the 21st Century (REN21), provides a policy forum for international leadership seeking to accelerate deployment of renewable energies worldwide and proved to be an ideal international partner for the Ministry of New and Renewable Energy, Government of India.

32 pledges have been submitted in total and new pledges continue to be made. In fact, more pledges are expected until the end of the year (December 2010)! Governments, industry and non-profit stakeholders can still showcase their leadership and join the front-runners who have already pledged their commitments.

During DIREC 2010, strong pledges were announced by the Government of India (6), Germany (4), Norway (2), and Switzerland (1). Local Governments in Japan lead the way with pledges from the government of Tokyo (1) and Yokohama (1). Ten pledges were made by the private sector representing India (9), Bangladesh (1) and Nigeria (1). Seven pledges were submitted by NGO's representing India, Canada, Europe and West Africa.

India submitted 6 pledges to promote renewable energy technology financing, development and deployment for grid and off grid power generation in rural areas. This included the creation of a global competition to develop and deploy affordable, efficient and clean cookstove technologies as part of India's National Biomass

Cookstoves Initiative; the installation of 1180 water pumping windmills and 608kW cumulative capacity of wind-solar hybrid systems by 2013; on-grid and off-grid biomass and biogas applications; target of 200 MW of off-grid solar installations by 2013 for hot water and lighting in rural areas; and decentralised bioenergy applications for rural areas.

Germany submitted 4 pledges based on the new German Energy Concept, the International Climate Initiative (ICI), the national Development Plan on Electro mobility and the bilateral program for development cooperation on renewable energy (RE) and energy efficiency (EE). In detail, Germany pledged to increase the share of gross final energy consumption in Germany to 18% in 2020, incrementally increasing each decade to 60% by 2050. In conjunction with the national plan on electro mobility, pledges were also made on the integration of Germany's electricity grid into the European grid network as well as electric vehicle and transportation deployment. Germany also committed to a 300 billion euro contribution annually (from 2010 to 2012) for capacity building and development cooperation on RE and EE in developing countries.

Norway submitted 2 pledges targeting policy development and financing. Norway committed to double for the promotion of clean energy in developing countries from NOK 800million to 1.6billion by 2011. Domestically, Norway also pledged to reach its new national combined target for renewable energy and energy efficiency of 30 twh increased annual production from 2001-2016

## Delhi International Action Program (DIAP) Follow-Up



### **REN21 coordinates DIAP follow-up**

- **OBJECTIVE** – achieve 100% pledge implementation !
- REN21 will **FACILITATE** pledge implementation through
  - **Assessment of NEEDs** for implementation
  - Creation of **EXCHANGE** platform between pledge makers
  - Access to **EXPERTISE/ technical ASSISTANCE**
  - Capacity Development (webinars, monitoring tools etc.)

### **DIAP AWARD at IREC 2012**

- Pledges until end 2010 eligible
- Granted based on implementation progress of pledges

**Continue to PLEDGE !**



and to allocate NOK 1.85 billion (USD 310billion) to RE and EE in 2011.

Switzerland pledged to continue the strengthening of their FIT law. The new FIT law, effective in 2009, increases the overall money for FITs 12 fold against the previous FIT. Qualified projects will receive approximately CHF 260 Mio as they come on line.

Japan local governments took the lead submitting two pledges. Tokyo pledged to increase the use of renewable energy through the Tokyo Metropolitan Government Cap and Trade program and cooperation among regions. Yokohama pledged to increase the use of renewable energy 10-fold by 2025 in comparison to a 2004 baseline through public private partnership.

**Non Profit:** Pledges made by non-profit organisations represented India (such as the Indian Institute of Technology, World Vision India, Himalayan Water Service), Canada

(Canadian Renewable Energy Alliance), West Africa (ECOWAS Center for Renewable Energy and Energy Efficiency) and Europe (European Renewable Energy Council).

As REN21 continues to follow up and document the pledges in an ongoing dialog with the program partners, successful results will be highlighted, and active cooperation will be encouraged. REN21 will keep track and report on progress made on the pledges at the next International Renewable Energy Conference which is scheduled to take place in Abu Dhabi in 2013. REN21 will also track the progress made on the four themes that were addressed at DIREC: technology and infrastructure, policy, finance, energy access and MDGs. It will further help MNRE to design the DIREC International Action Programme award programme.

MNRE sincerely thanks all those who contributed to, and will continue to contribute to, the successful implementation of the Delhi International Action Program.

# Programme Structure

DAY 1 - 27 October 2010

Timing	Parallel Workshops	MAIN EVENT MORNING SESSION (Room: Ganga)	Parallel Workshops
08h00-09h00		<b>Registration</b>	
09h00-09h10		Welcome and introduction by the Chair (Room: Ganga)	
09h10-09h50		Journey from Johannesburg to Delhi (Room: Ganga)	
09h50-10h00		Upscaling & Mainstreaming Renewables for Energy Security, Climate Change and Economic Development (Room: Ganga)	
10h00-10h30		Road to Cancun (Room: Ganga)	
10h30-11h00		<b>Tea Break</b>	
11h00-11h30		Green Economy and Role of Renewables (Room: Ganga)	
11h30-12h30		Vision 2020: Role of Renewables for energy security, climate change, and economic development (Room: Ganga)	
12h30-14h00 Lunch/Side Event			
14h00-16h00			
16h00-16h30			
16h30-17h00			
17h00-18h30 Side Event			
18h30-20h00			

## DAY 2 - 28 October 2010

Timing	Stage Setting for Each Track by Track Chair				Parallel Workshops	
	TRACK 1 - TECHNOLOGY AND INFRASTRUCTURE	TRACK 2- POLICY	TRACK 3 -FINANCE	TRACK 4 - RENEWABLES ACCESS AND MDGs		
08h45-09h00						
09h00-10h30	Power Technology and Infrastructure (Room: Yamuna)	RE Scenarios (Room: Narmada)	Financing innovation - projects, businesses and technologies (Room: Krishna)	Renewable, Access & MDG (Room: Sutlej)	CII, MNRE, Indo-Brazil Chamber of Commerce: 3rd International Biofuels India 2010 (Room: Kosi)	TERI, REEP, ADB: Promoting Rural Entrepreneurship for Enhancing Access to Clean Lighting Options (Room: Jhelum)
10h30-11h00	Tea Break					
11h00-12h30	Heating and Cooling Technologies (Room: Yamuna)	Supporting Policies I (on-grid) (Room: Narmada)	Financing deployment at scale (Room: Krishna)	Capacity Building (Room: Sutlej)		
12h30-14h00 Lunch Break/Side Event	WWEA: Wind Power Worldwide – Status, Prospects, Drivers (Room: Yamuna)	EREC: Renewable Energy scenarios as guidance for policy maker (Room: Narmada)	Afghanistan Govt.: Afghanistan Rural Renewable Energy Development (Room: Krishna)	Norwegian Embassy & IREDA: Mini-grids for remote village electrification and income generation activities (Room: Sutlej)	UNEP: Considerations, policies and measures to promote sustainable bio-energy development (Room: Kosi)	WBA: Possibilities to increase the supply of sustainable Biomass for Energy (Room: Jhelum)
14h00-15h30	Buildings (Room: Yamuna)	Supporting Policies II (off-grid) (Room: Narmada)	Financing for small businesses and end-users (Room: Krishna)	Empowering Women (Room: Sutlej)	CII, MNRE, Indo-Brazil Chamber of Commerce: 3rd International Biofuels India 2010 (Room: Kosi)	
15h30-16h00	Tea Break					
16h00-17h30	Transport (Room: Yamuna)	State and Local Governments (Room: Narmada)	Initiatives to catalyse and scale up investment in renewable energy (Room: Krishna)	Renewables in India (Room: Sutlej)		
17h30-19h00 Side Events	Scottish Development International: Grid connectivity in Remote Locations (Room: Yamuna)	Enviro Legal Defence Firm & Heinrich Böll Foundation: Towards RE Law: locally adaptable globally competitive (Room: Narmada)	BMZ: South-South-Cooperation for Capacity Development (Room: Krishna)	MNRE: JNNISM (Room: Sutlej)	ACORE & USDOC: Innovation in Renewable Energy Finance (Room: Kosi)	IEA-RET D & IRENA: The Role of Renewable Energy in Tomorrow's Energy Systems (Room: Jhelum)
18h30-20h00 Networking Reception (Room: Ganga)						

## DAY 3 - 29 October 2010

Timing	Main Plenary Hall (Ganga)		Parallel Workshops	
	Plenary: Report key findings from all sessions (Room: Ganga)		MNRE, IIT Bombay, FAST, Spain, World Bank C-Step, GTZ and IFC: Concentrated Solar Power: A potent option for Grid Power (Room: Kosi)	MNRE and SESI: Solar Photo-voltaic (Room: Jhelum)
09h00-10h30	<b>Tea Break</b>  High level segment/Political Declaration or Plan of Action (Room: Ganga)  Closing remarks (Room: Ganga)			
10h30-11h00				
11h00-12h00				
12h00-12h30				
12h30-14h00 Lunch/Side Event	Vasudha Foundation, Heinrich Böll Foundation, and BMZ: Low carbon options ensuring energy security for India (Room: Yamuna)	BEE: National Mission on Enhanced Energy Efficiency (Room: Narmada)	MNRE: CDM projects in Renewable Energy: Issues and Perspective (Room: Sutlej)	
14h00-15h30		UNDP ACE: Cookstove (Room: Krishna)	CIE: Addressing barriers for equity investment and raising risk capital for grid-connected solar energy (Room: Kosi)	
15h30-16h00	<b>Tea Break</b>		MNRE, IIT Bombay, FAST, Spain, World Bank C-Step, GTZ and IFC: Concentrated Solar Power: A potent option for Grid Power (Room: Kosi)	MNRE and SESI: Solar Photo-voltaic (Room: Jhelum)
16h00-17h30				

## Parallel Workshops

Parallel Workshops were held alongside the ministerial conference at the same venue. These were half and full-day events, which aimed at enhancing participants' capacities and knowledge across DIREC's thematic areas. These events provided a unique opportunity to the world community to discuss the challenges of a rapid global scale-up of renewable energy, and to address the goals of energy security, climate change, and sustainable development.

### Parallel Workshops of DIREC 2010 during 27th to 29th October, 2010

No.	Central Theme of the Event	Organisation/Entity
1.	Solar Water Heating Systems: Global Perspectives	UNDP Project, MNRE and REEEP
2.	Wind Energy: Leap Frogging to a New Era	MNRE -C-WET, GWEC and IWTMA
3.	Strategy for Sustainable Habitats	ICLEI, MIRABILIS ADVISORY, TERI, BEE & MNRE
4.	Bio-methanation: Upscaling challenges and opportunities	MNRE and Swedish Embassy, SIDA, Swedish Energy Agency
5.	Renewable Energy for Rural Empowerment	WINROCK & UNDP ACE Project, SDC & MNRE
6.	Smart Grid Technology Semina	NEDO, MNRE, MoP, JSCA, METI
7.	National Funding Institutions Promoting Renewable Energy – Best Practices and Future Perspectives	KfW Development Bank
8.	3rd International Biofuels India 2010	CII, MNRE, Indo-Brazil Chamber of Commerce
9.	Promoting Rural Entrepreneurship for Enhancing Access to Clean Lighting Option	TERI, REEEP, ADB
10.	Concentrated Solar Power; A potent option for Grid Powe	MNRE, IIT Bombay, FAST, Spain, World Bank C-Step, GTZ and IFC
11.	Solar Photovoltaic Power, Technology and Manufacturing	MNRE and SESI

## Side Events

Side Events provided DIREC participants with an opportunity to delve deeper into the issues addressed at the conference from a policy, rather than purely a technical or business perspective. 29 side events were held by Governmental, Intergovernmental and Non-Governmental Organisations.

Side Events of DIREC 2010 during 27th to 29th October, 2010		
No.	Title of the Side Event	Name of Organisation
1.	Enabling Renewable Energy Generation in India	INTPOW & Norwegian Embassy
2.	Expanding Transmission: Efforts in U.S. and India	The American Council On Renewable Energy (ACORE)
3.	Renewable Energy Policy, R&D, Technologies, Applications and Projects, including in Emerging and Developing Countries	Swiss Federal Office of Energy, Swiss Government
4.	Contributing to scale up sustainable bio-energy	Global Bio-Energy Partnership (GBEP) and Food and Agriculture Organisation (FAO)
5.	International Support for Clean Energy Development Plans	US National Renewable Energy Laboratory
6.	New Approaches to Hydropower Development	International Hydropower Association
7.	Renewables Working Together Worldwide	International Renewable Energy Alliance (IREA)
8.	Green jobs, higher energy security, GHG mitigation	German Federal Ministry, Economic Cooperation and Development Division
9.	Access to Energy from Renewables in small Islands	IRENA and REEEP
10.	Widening access to low carbon energy	REEEP & ESMAP
11.	Solar Generation - A Global Photovoltaic Market Outlook until 2050	European Photovoltaic Industry Association (EPIA) & Greenpeace International
12.	Matching EU Policy and Practical Experience with India's Potential	Embassy of Belgium and The Delegation of the European Union
13.	Wind Power Worldwide – Status, Prospects, Drivers.	World Wind Energy Association (WWEA)
14.	Renewable Energy scenarios as guidance for policy makers	European Renewable Energy Council (EREC)
15.	Afghanistan Rural Renewable Energy Development	Ministry of Energy and Water, Afghanistan
16.	Mini-grids for remote village electrification and income generation activities	Royal Norwegian Embassy and Indian Renewable Energy Development Agency Ltd (IREDA)
17.	Possibilities to increase the supply of sustainable Biomass for Energy	World Bio-Energy Association (WBA)

## Side Events of DIREC 2010 during 27th to 29th October, 2010

No.	Title of the Side Event	Name of Organisation
18.	Considerations, policies and measures to promote sustainable bio-energy development	United Nations Environment Programme (UNEP)
19.	Grid connectivity in Remote Locations	Scottish Development International
20.	Renewable Energy Law	Environment Law and Development Foundation (ELDF) and Henri Boll Foundation
21.	BMZ: South-South-Cooperation for Capacity Development	German Federal Ministry BMZ
22.	Jawaharlal Nehru National Solar Mission	Ministry of New and Renewable Energy (MNRE)
23.	Innovation in Renewable Energy Finance	American Council on Renewable Energy (ACORE), US Department of Commerce (USDOC)
24.	The Role of Renewable Energy in Tomorrow's Energy Systems	IEA, RETD and IRENA
25.	National Mission on Enhanced Energy Efficiency	Bureau of energy efficiency (BEE)
26.	UNDP ACE: Cookstove	UNDP
27.	CDM projects in the RE, issues, perspective in Indian context	Ministry of New and Renewable Energy (MNRE)
28.	Addressing barriers for equity investment	Centre for Innovation Incubation and Entrepreneurship (CIIE), IIM Ahmadabad
29.	Low carbon options ensuring energy security for India	Vasudha Foundation, Heinrich Boll Foundation, and BM

# Notes

Handwriting practice lines consisting of 20 horizontal dotted lines.

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# DIREC 2010



**27 to 29 October, 2010**  
National Capital Region of Delhi



Government of India

**Ministry of New and Renewable Energy**

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