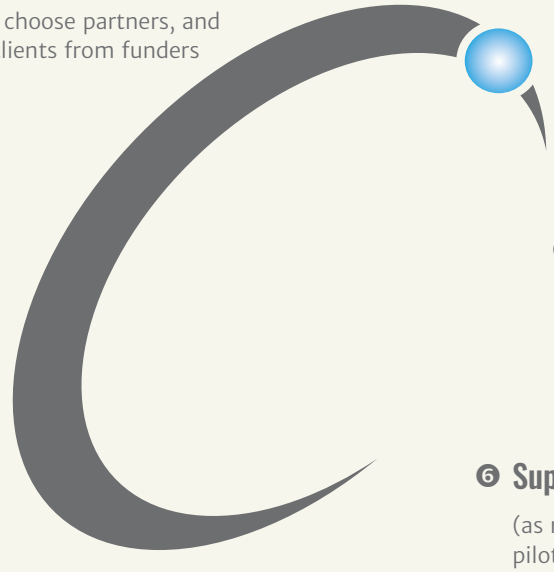
Handprints
across five years

CEEW
Council on Energy, Environment & Water

Year-in-Review 2014-15

#CEEWat5

Research to Action – CEEW's Arc of Learning



❶ Identify

Healthy skepticism to define the research question. Whose problem can we understand, whose problem can we solve, and who could help us do that?

❷ Conceptualise

Build an interdisciplinary team, design robust research methodology, choose partners, and differentiate clients from funders

❸ Understand

Research through data collection, objectivity in method, and evidence-based analysis

❹ Convene

Present findings to and exchange ideas with our network of scholars, industry experts and civil society representatives, within and outside India

❺ Communicate

core messages (based on facts) to inform policymakers, political leaders and wider public

❻ Support

(as necessary) policy processes and pilot interventions for innovative solutions to complex policy challenges

❼ Reflect

on our research and actions, measure key metrics, and learn from our failures

Contents

"This conference is perhaps the first occasion in India, where in a public forum, we are discussing India's Intended Nationally Determined Contributions (INDCs). I appreciate this initiative and invite CEEW to partner with us by contributing to our preparation of the INDCs and to the various studies that we will undertake."

SHRI PRAKASH JAVADEKAR
Hon'ble Minister of State (Independent Charge) for Environment, Forests and Climate Change

Excerpts from his keynote address at CEEW's conference 'Negotiating the Climate Cliff: India's Climate Policy and Intended Nationally Determined Contributions'

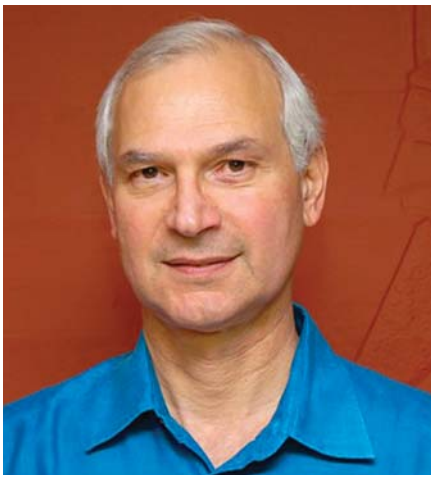
In January 2015, the '2014 Global Go To Think Tank Index' ranked CEEW as

1st in South Asia and 14th Globally among 'Top Think Tanks with Annual Operating Budgets of Less Than $ 5 Million USD'

1st in South Asia for 'Best Institutional Collaboration' involving two or more think tanks

Download our report: www.ceew.in/annualreport

Leadership Perspectives



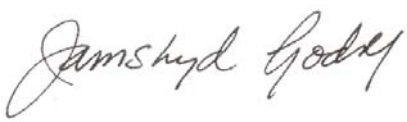
Five years is a key milestone in the lifetime of any organisation. CEEW's achievements within this short time span is worthy of praise and emulation for any young organisation operating in the challenging environment of public policy.

In August 2010, CEEW started operations in a single empty room with a single-minded vision of promoting a path of sustainable growth and development through the holistic management of energy, environment and water resources. Since then, through its cutting edge research CEEW has provided policy makers a new perspective of looking at and solving some of today's most pressing resource-related challenges: climate risk assessment, foreign policy implications for resource security, framework for national water resources management, energy subsidies reform, assessing and scaling up India's solar mission, energy and climate modelling, urban water management and sanitation, phasing down hydrofluorocarbons, geoengineering governance, and many others.

In the past five years, CEEW has also established itself as a convening body of repute with bringing together the brightest minds from industry, policymaking institutions, academia and other civil society organisations to deliberate on issues of sustainability. During this time, accolades have poured in for CEEW from all quarters and it was deservingly rated as India's top climate think-tank for two consecutive years by the ICCG. I congratulate the entire CEEW team and encourage them to keep raising the bar as always.

What lies ahead for CEEW? Today, it has established a strong foundation for continued growth and impact within energy, environment and water-related policy research within and outside India. With the adoption of the Sustainable Development Goals (SDGs) and crucial climate negotiations set to be held in Paris, CEEW is set to be a strong and credible voice that stakeholders look up to for unbiased and evidence based policy analysis and advice. I am confident that in the coming years we will see more in-depth, integrated, independent and timely research from CEEW.

Finally, I hope you find this Year-in-Review tracing CEEW's five year journey an engaging read. I hope it not only gives you a glimpse of the research and activities carried out last year but also helps you understand its evolution over the last five years and its impact on the framing of policy and on public discourse.



Jamshyd N Godrej
Chairperson, CEEW;
Chairman, Godrej and Boyce
Manufacturing Company Pvt. Ltd.

Institutions are like trees...

On 11 August 2015, CEEW celebrated five years of operations. From the first financial year when we had one active researcher, we have grown into a small, young, diverse and interdisciplinary team. This team has now completed or worked on 102 research projects, published 51 peer-reviewed papers or reports, advised governments across the world more than 140 times and organised more than 110 seminars and conferences. Our handprints over five years have been extensive. Four characteristics have helped us to make our mark.

We have remained independent! This was a core value when conceiving CEEW. We do not take institutional positions and we aim to separate clients from funding institutions. We have engaged with the highest levels of government (on water and sanitation, energy and environmental governance, or renewable energy) without letting our editorial independence be compromised. And we have an international outlook, which helps us understand global challenges (such as climate risks or energy-related trade disputes) and their implications for India's development.

Secondly, **we have an extraordinary team** thanks to the culture we promote. At CEEW, leadership is by initiative, not seniority. This means that we try to create a work environment where anyone can conceive an idea, do the initial research, build a team across domain areas and execute on the vision. CEEW has also partnered with more than 70 institutions from across the world. We are not always successful, either in raising funds for our ideas or in having the desired impact. But we do not hold back anyone from trying.

We emphasise rigour. The credibility of any research institution rests on the the quality of its work. We have demonstrated thought leadership, such as on HFCs, critical minerals or global governance. We have tried to be genuinely integrated in our work, such as on the energy-water nexus, or on climate, health and economic linkages. Data and evidence are at CEEW's core, whether conducting the largest survey in India on energy access, mapping hundreds of traditional water bodies or counting thousands of jobs in renewable energy.

Our outreach is evidence-based. At CEEW we believe that our outputs ought to result in outcomes in terms of improving governance. Our work on state-level irrigation reforms, national reforms of energy subsidies, bilateral energy technology partnerships or international climate negotiations demonstrate this. We reach out to stakeholders through various platforms but we do not comment on any issue without underlying research. Facts are sacred.

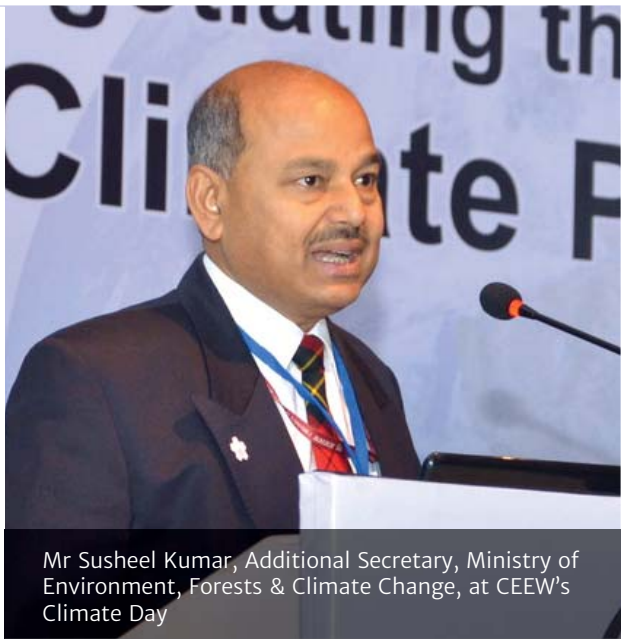
None of this would have been possible without the guidance and leadership of our illustrious Board. Mr Suresh Prabhu, our founding Chairperson, consistently emphasised the need to develop an integrated understanding of complex development challenges. Our current Chair, Mr Jamshyd Godrej, has remained at the forefront of the quest for finding a balanced strategy for economic prosperity and social and environmental sustainability. The visionaries and institution builders on our Board have always given us the freedom to chart our own paths, for which we are deeply grateful.

In Beijing, a plaque commemorating 100 years of Tsinghua University (China's top-ranked institution) reads: *It takes decades for trees to grow but a century to nurture talents.* I agree. **Institutions are like trees. They need vision and nurturing, but the best ones stand on their own, resilient, independent and always reaching higher than the day before. CEEW is an institution.**

Arunabha Ghosh
Chief Executive Officer, CEEW

Events & Outreach

CEEW hosted Hon'ble Kevin Rudd, President of the Asia Society Policy Institute and Former Prime Minister of Australia, for a roundtable discussion on 'India's Energy, Environment and Climate Concerns'



Mr Susheel Kumar, Additional Secretary, Ministry of Environment, Forests & Climate Change, at CEEW's Climate Day

Mr Suresh Prabhu at CEEW – InSIS Oxford Conference on 'Climate Geoengineering Governance'

V. K. Saraswat, Member, NITI Aayog and Former Secretary Defence, R&D, at CEEW's conference on 'India-Russia Cooperation in Innovation and Technology'

Mr Shatrughna Singh, Additional Secretary, Department of Industrial Policy & Promotion, at CEEW's Climate Day

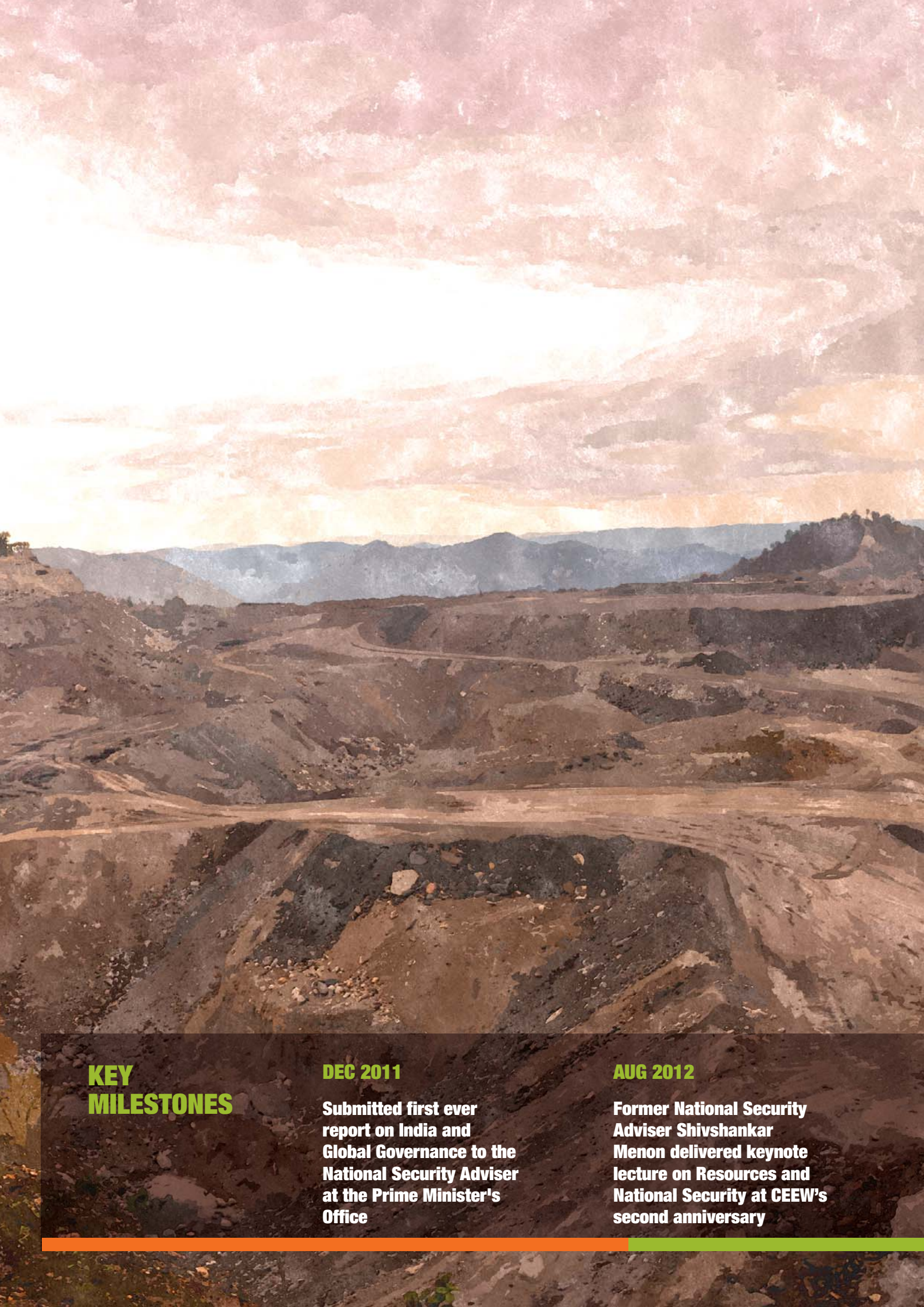
CEEW hosted Prof Ngaire Woods, Dean, Blavatnik School of Government, University of Oxford, and Dr Andrew Steer, President, World Resources Institute for a dialogue on 'India in a Shifting Global Governance Order'

Dr Anil Kakodkar, CEEW Trustee, at CEEW's Climate Day

Sir David King, UK Special Envoy for Climate Change and Former UK Chief Scientific Adviser, at CEEW's workshop on 'Climate Risk'

H.E. Maciej H. Grabowski, Environment Minister, Republic of Poland at CEEW's office

CEEW hosted Ms Christine Lins, Executive Secretary, REN 21, for a roundtable discussion on 'Transitioning to a Renewable Energy Future and the Global Status of Renewables'



KEY MILESTONES

DEC 2011

Submitted first ever report on India and Global Governance to the National Security Adviser at the Prime Minister's Office

AUG 2012

Former National Security Adviser Shivshankar Menon delivered keynote lecture on Resources and National Security at CEEW's second anniversary

RESOURCE EFFICIENCY AND SECURITY

JUN 2013

Work on India Energy Scenarios – Access, Vulnerability and Long-Term Modelling – begins

NOV 2013

Submitted report on Strategic Industries and Enabling Technologies to the National Security Advisory Board

JUL 2015

Published major multi-country report on Climate Change: A Risk Assessment

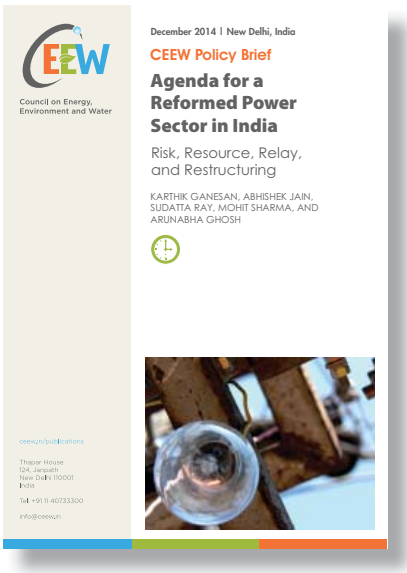
Seminar by Mr Raymond Vickery Jr on his book 'India Energy: The Struggle for Power' at CEEW's office

Power Sector Reforms for India

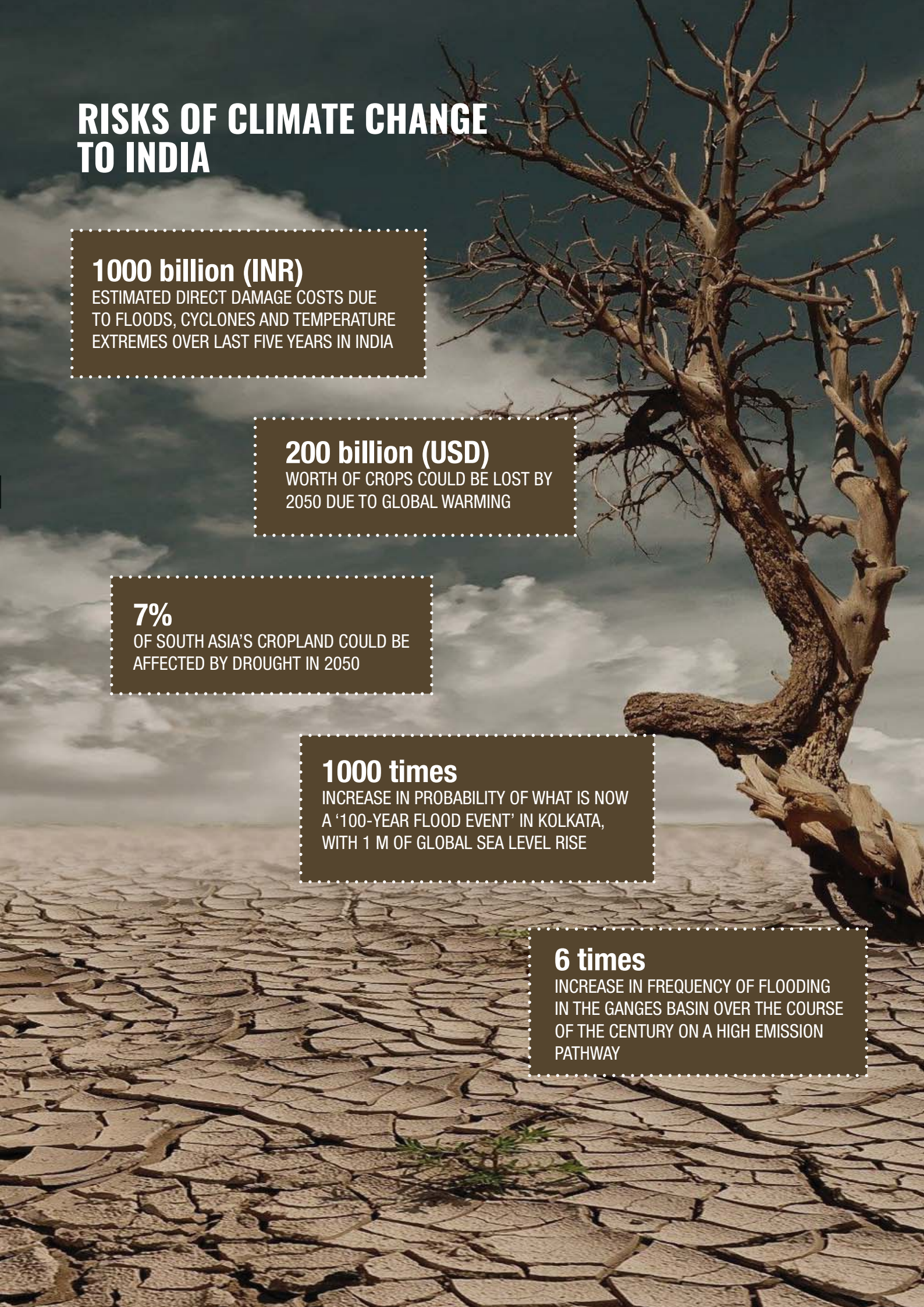
The Indian power sector is remarkably characterised as one where electricity availability has always lagged behind demand. India still has close to 75 million households (almost 45% of all rural households) with no access to electricity, but the existing system is stumbling in its efforts to even cater to the demand of the population currently connected to the grid.

Given this background, the overarching objective of any forthcoming electricity policy must be to provide 24x7 power to all the sectors of the country at adequate price levels, in a cost effective, resource efficient and financially sustainable manner.

CEEW's research on power reforms identified four areas of attention, in order of priority in terms of urgency of action. These are: the risks entailed in banks' exposure to the power sector; the resource crunch i.e. limited availability and poor quality of coal supplies (as against what is promised in fuel supply agreements); the challenges in operationalising open access in transmission (relay) of electricity; and the eventual imperative of restructuring DISCOMs and improving the state of their finances and the efficiency of their operations.



Download Brief
http://bit.ly/1Oy4Wah



RISKS OF CLIMATE CHANGE TO INDIA

1000 billion (INR)
ESTIMATED DIRECT DAMAGE COSTS DUE TO FLOODS, CYCLONES AND TEMPERATURE EXTREMES OVER LAST FIVE YEARS IN INDIA

200 billion (USD)
WORTH OF CROPS COULD BE LOST BY 2050 DUE TO GLOBAL WARMING

7%
OF SOUTH ASIA'S CROPLAND COULD BE AFFECTED BY DROUGHT IN 2050

1000 times
INCREASE IN PROBABILITY OF WHAT IS NOW A '100-YEAR FLOOD EVENT' IN KOLKATA, WITH 1 M OF GLOBAL SEA LEVEL RISE

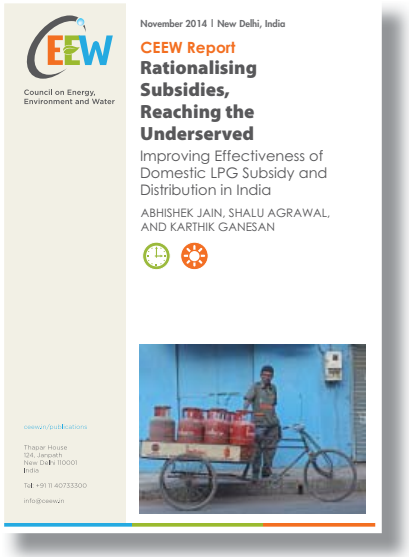
6 times
INCREASE IN FREQUENCY OF FLOODING IN THE GANGES BASIN OVER THE COURSE OF THE CENTURY ON A HIGH EMISSION PATHWAY

In March 2015, CEEW organised a two-day simulation exercise on climate risk in New Delhi involving a number of former generals, admirals, national security policymakers, diplomats and academics from ten countries, including India, China, the European Union, and the United States.

Rationalising LPG Subsidies

India has witnessed considerable increase in domestic consumption of Liquefied Petroleum Gas (LPG) over the years and the phenomenal rise in the number of LPG connections in the country is testimony to it. However, only 28.5% of households reported LPG as their primary fuel for cooking (Census 2010-11). Excessive dependence on traditional fuel continues and much needs to be done to provide clean cooking energy at affordable prices. LPG consumption and the subsidies linked to it are heavily skewed in the favour of higher income groups and the urban areas of country.

CEEW research highlighted that more than 50% of the LPG subsidy is cornered by the richest 30% of Indians, whereas the poorest 30% receive a meagre 15% of the total subsidy disbursed. Urban areas have more than 70% of distributors, as well as LPG connections, against 32% of the Indian population living in these areas. As a result of poor penetration of distributors in rural areas, even the richest rural households derive only (~) 50% of their total cooking energy from LPG. The study emphasised that affordability, availability and awareness should be the guiding principles for rationalising LPG subsidies.

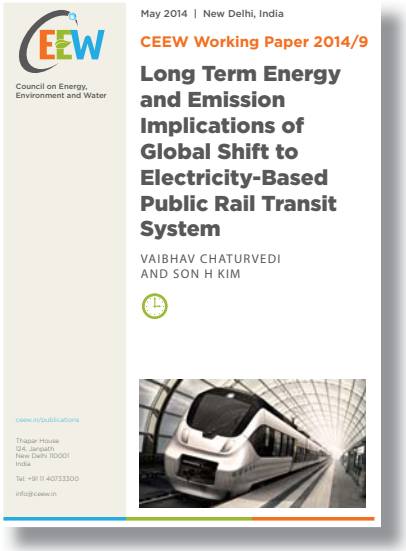


Download Report
http://bit.ly/1CXz7mo

Electric Rail Transport

The transport sector was highlighted in the Kyoto Protocol under the UN Framework Convention on Climate Change as one of the key sectors for ambitious global greenhouse gas emission reduction targets. However, in the last two decades, the emissions intensity of transportation energy has not shown any perceptible decline. Different strategies like land use and urban planning, fuel switching towards low-carbon vehicles, improving vehicular fuel efficiency, etc. have been proposed for reducing transportation energy demand and emissions. But some of the largest benefits could come from electricity-based mass rapid public transportation. Is there a role for electricity-based rail system in India's climate policy?

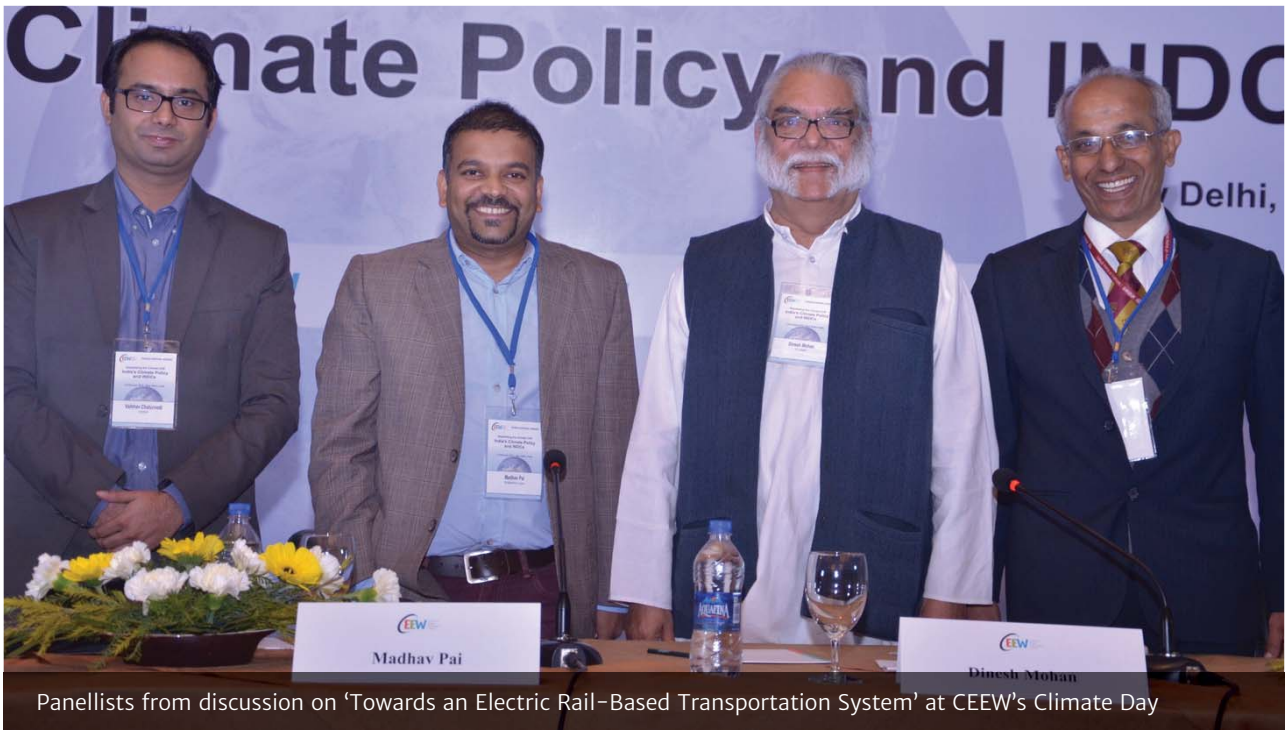
CEEW's research assessed the energy and climate policy implications of a global and regional shift towards a higher share of electricity-based rail system for meeting passenger travel demand for India.



Download Paper
http://bit.ly/1jbJ4Ck

Key Results:

- In a business as usual scenario, passenger cars would take an increasingly higher share of passenger service demand in the future, from 5% in 2010 to 24% in 2050. The share of passenger rail and buses keeps on declining, although in absolute terms they will increase.
- A climate policy, implemented through a carbon price, leads to a 100% decarbonisation of electricity supply by 2100. However, there are significant direct emissions from the transportation sector, even with a comparatively higher penetration of low carbon vehicles.
- Increasing the share of electric rail in India's transportation sector to 30% by 2050 from 13% in 2010, can reduce direct transport sector carbon dioxide emissions by 25% in 2050.



Panellists from discussion on 'Towards an Electric Rail-Based Transportation System' at CEEW's Climate Day

Panel discussion on 'Powering Ahead: Nuclear or Unclear?' at CEEW's Climate Day

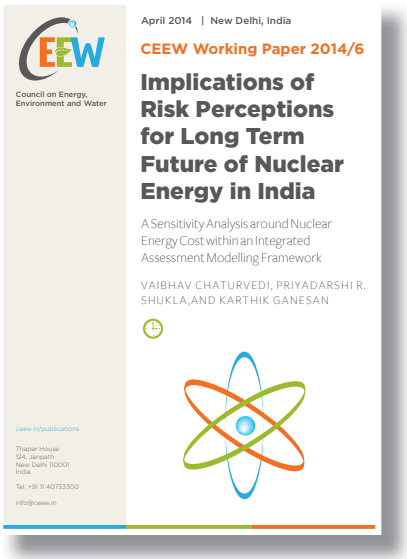
Nuclear or Unclear: Powering Ahead with Nuclear Energy

India has ambitious plans of increasing the share of nuclear energy by several-fold in India's electricity generation portfolio. In this plan, imported nuclear reactors have an important role, along with indigenously developed reactors. However, nuclear energy has seen an increase in capital cost across the world. Ambiguities around the 'recourse to supplier' clause in India's nuclear liability framework have added to delays. Adding to the challenges are public protests against nuclear power plants. Deeper understanding is needed about the implications of all these developments for India's energy and climate policy.

CEEW research assessed the implications of varying nuclear energy cost pathways for the long term future of nuclear energy in India, as well as its interaction with climate policy.

Key results from CEEW's research

- Nuclear energy penetration in India's electricity mix is highly sensitive to its cost. A further 50% increase in cost will effectively push the share of nuclear energy in 2050 to 3% down from 8% (with reference costs).
- A climate policy, through pricing carbon, spurs the penetration of nuclear energy even with increased nuclear energy costs. With reference costs, the share increases from 8% (in 2050) to 20% (in 2050).
- Nuclear liability offsets climate liability, but there clearly is a trade-off between the two. Society has to decide which liability it wants to bear, and to what extent.



Download Paper
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We take no institutional positions

Creating more from less

After a period of low to moderate growth over the last three years, there are signs that a revival of the Indian economy is on the cards. The sentiment is positive and investors are eyeing the untapped potential of India's dormant manufacturing sector. While 'Make in India' is yet to create a dent, the aspirations are certainly in the right direction and policies to promote the right mix of manufacturing in India are needed.

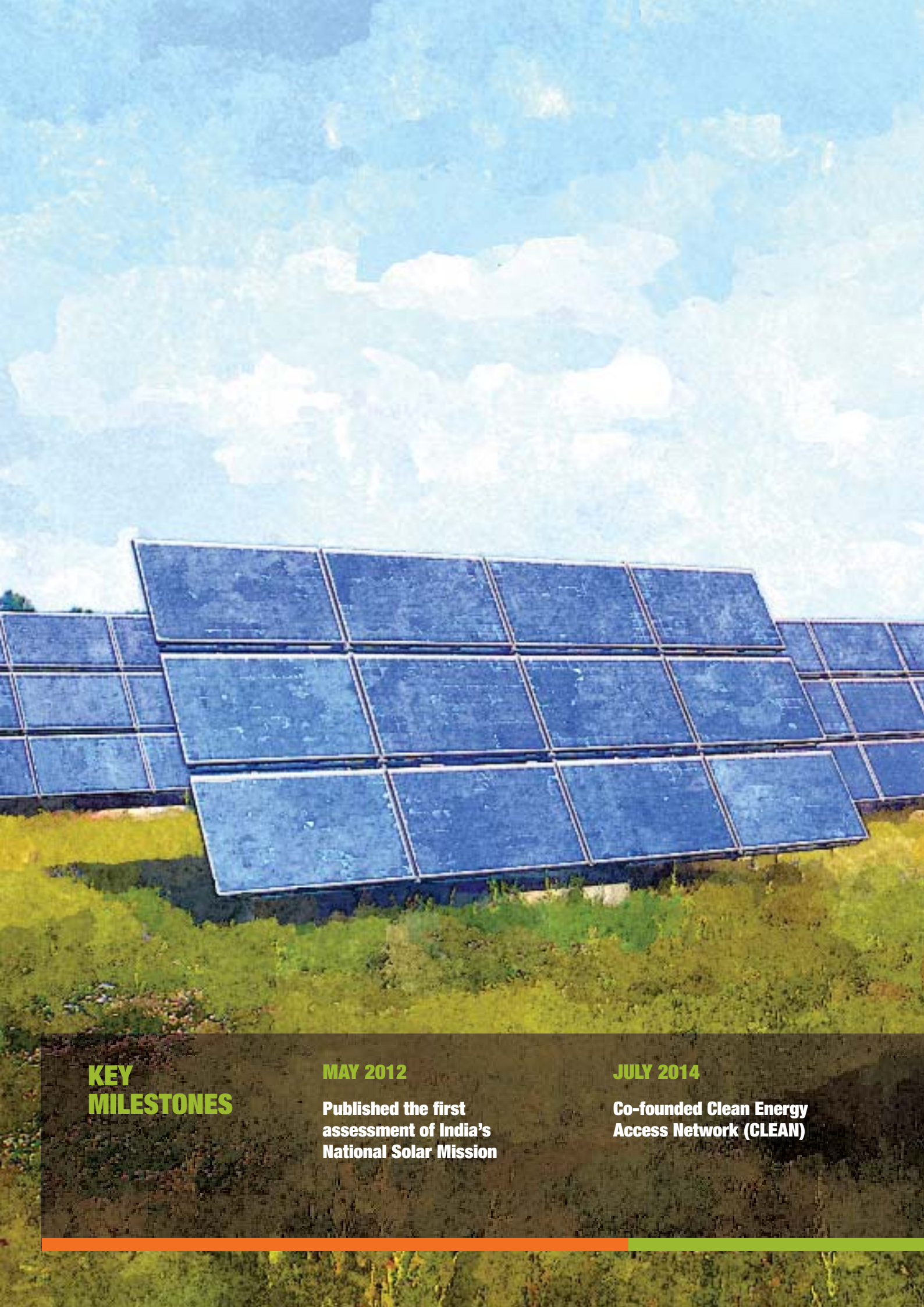
The issue of foremost importance is that the average share of raw materials in overall production cost is very high for India at 76%, as compared to an advanced economy like Germany where this stands at 40%. This can be attributed to the low share of high-technology (R&D driven) products, high share of semi-finished intermediate goods (many imported) as an inputs, indicating lower value add from the sector. This manifests in India's overall resource productivity (GDP per tonne of material consumption), being one-tenth of Germany and significantly lower than other developing economies.

The other issue that policymakers must contend with is growing per capita consumption of finished goods. As developed country growth stories have illustrated, high productivity in the use of resources is also accompanied by high per capita consumption. India will have to buck the trend and ensure that, as it improves productivity, the concomitant rise in per capita consumption is kept in check.

There are three strategies that India could adopt in overcoming this dual challenge. The first is to rationalise the subsidies on offer for the consumption of electricity, fossil fuels and products derived from fossil fuels. While Indians pay one of the highest energy prices, subsidies are not targeted and result in wasteful consumption. The second is to shift focus more towards technology-driven, high value addition manufacturing (electronics, machinery, transport, chemicals), while promoting emerging technologies to find active substitutes to the exhaustible materials. For instance, CEEW research estimates that nanotechnology finds application in products that contribute upto 85% of the manufacturing sector value add. Finally, recycling (and reuse) holds immense potential. It is largely in the informal sector and, due to the lack of scale, only a limited set of minerals are recovered. Active promotion of 'waste to wealth' is necessary for driving a circular economy in the use of minerals and materials. In addition, it is estimated that upto 8 Million Tonnes of Oil Equivalent (MTOE) of recoverable energy is sent to the landfills each year. This could provide lifeline consumption to more than 80 million households.

While these are effectively demand side solutions, supply cannot be ignored. Strategic acquisition of reserves overseas and the conscious shift to the use of renewable energy will serve India well in the decades ahead.

CEEW's former Chairperson, Mr Suresh Prabhu, and founding trustee, Mr Tarun Das, released a special report on 'Shaping a Prosperous and Sustainable India' at CEEW's fourth anniversary dinner



KEY MILESTONES

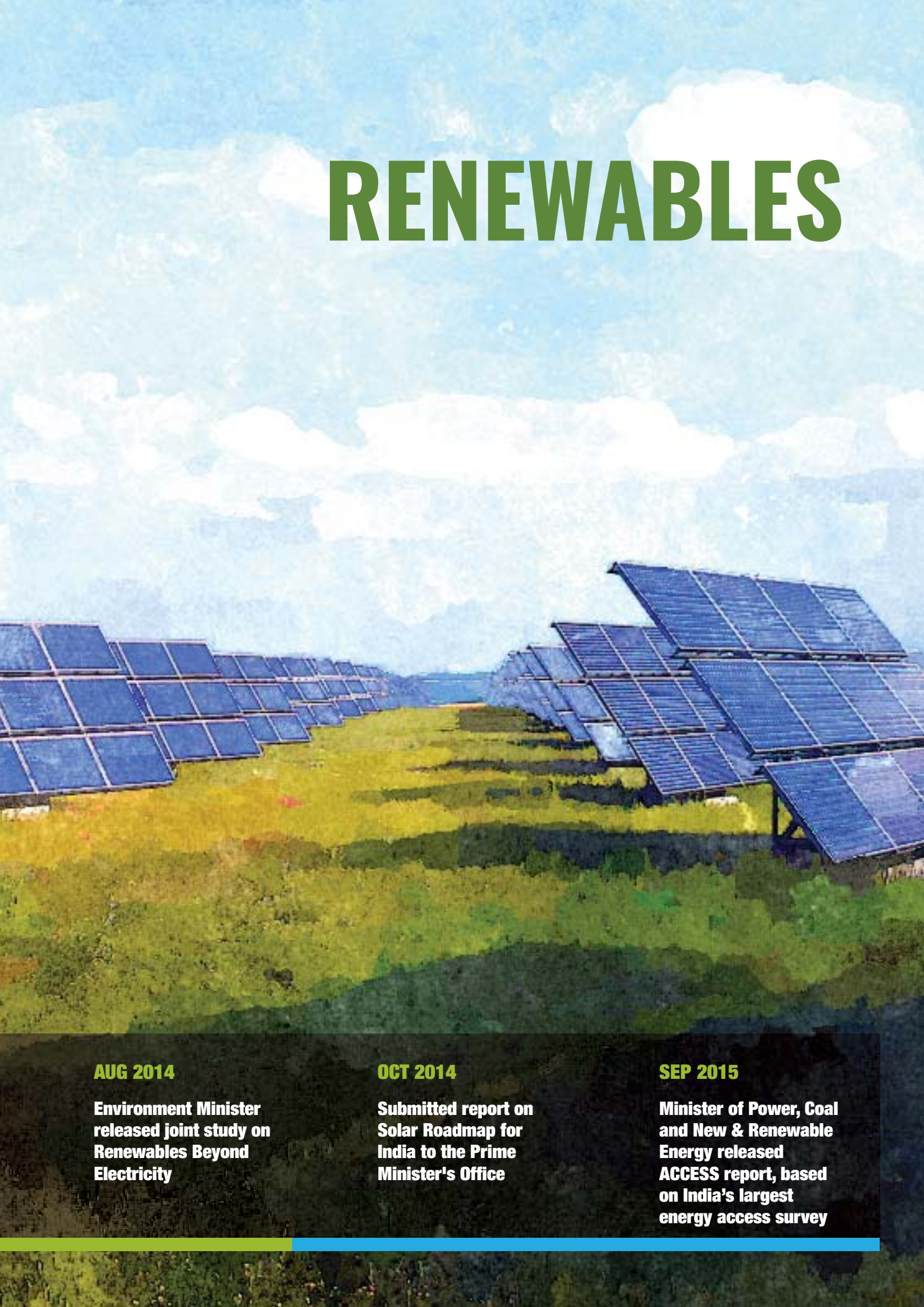
MAY 2012

Published the first assessment of India's National Solar Mission

JULY 2014

Co-founded Clean Energy Access Network (CLEAN)

RENEWABLES



AUG 2014

Environment Minister released joint study on Renewables Beyond Electricity

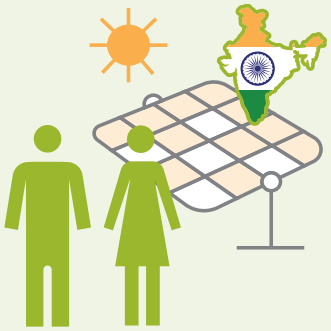
OCT 2014

Submitted report on Solar Roadmap for India to the Prime Minister's Office

SEP 2015

Minister of Power, Coal and New & Renewable Energy released ACCESS report, based on India's largest energy access survey

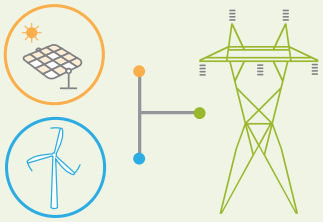
Clean energy = full-time employment. Tens of thousands of indian citizens are employed by clean energy industries, directly and indirectly. This is great news for india's growing population and workforce.



Between 2011 and 2014

24,000

full-time jobs were generated through solar photovoltaic (PV) projects alone.



Grid-connected solar and wind energy is estimated to have created **70,000** nearly full-time jobs in India so far.

If India achieved its target of 100 gigawatts (GW) of installed solar energy by 2022 as many as

1,000,000

full-time jobs would be created.

Renewable Energy Powers Local Job Growth in India

Over the past year, India has significantly scaled up its ambitions in renewable energy. The target for the National Solar Mission was raised from 22 GW in 2022 to 100 GW. The target for wind energy was raised to 60 GW along with 10 GW for biomass and 5 GW for small hydro.

During the RE-Invest conference in February 2015 in New Delhi, CEEW in collaboration with the Natural Resources Defense Council (NRDC) released a report on renewable energy jobs. The analysis highlighted that achieving 100 GW by 2022 could create as many as one million jobs, while greatly improving energy access for Indian citizens and fighting climate change. This projection does not include jobs created in the manufacturing sector, another significant jobs opportunity. Achieving India's proposed target of 60 GW of wind energy by 2022 would also generate an additional 180,000 jobs. The analysis also documented a growing need for more accurate tracking of job creation data. CEEW and NRDC had earlier released reports, which counted that nearly 70,000 jobs in solar and wind had been created in recent years. **Download Report:** http://bit.ly/1J9WopJ

CEEW's Aditya Ramji presenting at the 14th World Congress on Public Health

#CEEWat5

We value leadership by initiative, not seniority

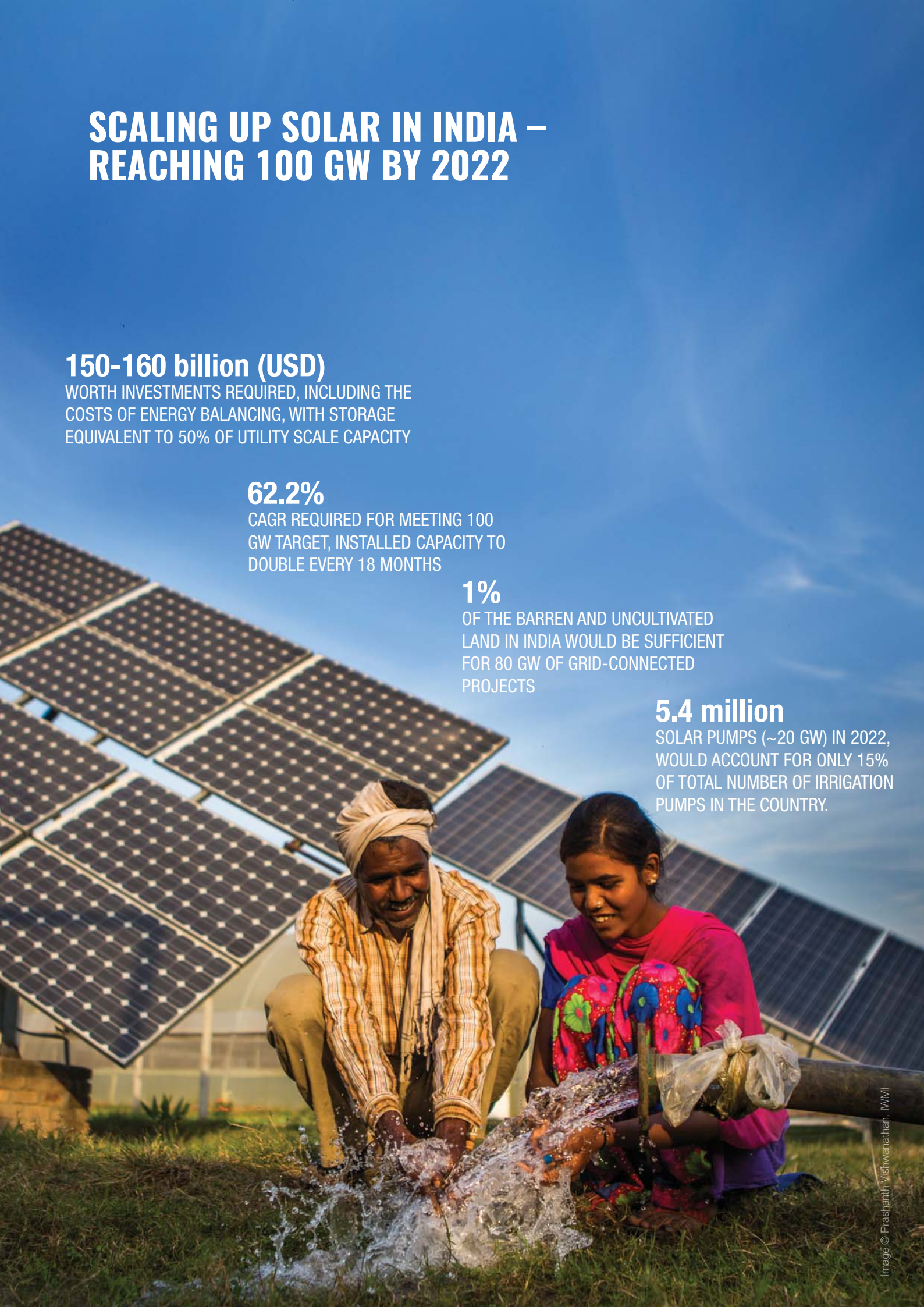
SCALING UP SOLAR IN INDIA – REACHING 100 GW BY 2022

150-160 billion (USD)
WORTH INVESTMENTS REQUIRED, INCLUDING THE COSTS OF ENERGY BALANCING, WITH STORAGE EQUIVALENT TO 50% OF UTILITY SCALE CAPACITY

62.2%
CAGR REQUIRED FOR MEETING 100 GW TARGET, INSTALLED CAPACITY TO DOUBLE EVERY 18 MONTHS

1%
OF THE BARREN AND UNCULTIVATED LAND IN INDIA WOULD BE SUFFICIENT FOR 80 GW OF GRID-CONNECTED PROJECTS

5.4 million
SOLAR PUMPS (~20 GW) IN 2022, WOULD ACCOUNT FOR ONLY 15% OF TOTAL NUMBER OF IRRIGATION PUMPS IN THE COUNTRY.



Glimpses from India's largest energy Access Survey carried out by CEEW

Renewables beyond Electricity: Solar Air Conditioning and Desalination

The potential of renewable energy is not only limited to electricity generation, but also for a variety of applications (heating, cooling, mechanical power and cooking) spanning across several sectors (residential, commercial and industrial). WWF-India and CEEW had published a report, RE+: Renewables beyond Electricity, which focused on the status and potential of 14 renewable energy applications (WWF-India and CEEW, 2013). As a follow up to this study, WWF-India and CEEW undertook a comprehensive analytical study of two renewable energy technologies, namely, solar air conditioning and solar desalination.

With growing urbanization and demand for cooling, solar air conditioning can play a significant role in reducing peak-load demand on the electrical grid, especially during the day time.

Apart from GHG mitigation and economic benefits, solar technologies also have far reaching and significant benefits, such as provision of basic resources in remote areas and creating regional and local level jobs. For example, low-cost solar desalination is being employed by local communities in arid regions of India to get clean and safe drinking water at affordable prices. **Download Report:** http://bit.ly/1WsFVio

Environment Minister, Shri Prakash Javadekar released CEEW-WWF's report 'Renewables Beyond Electricity: Solar Air Conditioning and Desalination in India'

India needs a comprehensive clean cooking energy policy

Every year, India witnesses 1.3 million premature deaths due to indoor air pollution (IAP). Burning of biomass on traditional chulhas is the primary cause of IAP. Over the decades, multiple programmes have focused on cleaner cooking energy solutions, such as improved cookstoves, biogas, and LPG. However, except for LPG no other solution has been able to achieve significant impact. So, is LPG the only solution to India's cooking energy needs or should we continue to focus on other alternatives as well?

India has a mammoth 150 million LPG connections, against a total of 250 million households. But connections do not ensure complete transition to LPG. Almost 80% Indian households (majority being rural) continue to use biomass for cooking and are exposed to hazardous IAP. Meanwhile, LPG scale up is affected by concerns over energy security, ballooning subsidies, consumer affordability and distribution reach. To provide clean cooking energy to its vast population, India must consider a more comprehensive cooking energy policy, instead of solely relying on LPG.

What solutions could be considered? A mix of centralised solutions, such as PNG and LPG, supplemented by decentralised solutions like biogas and improved cookstoves, could counter the severe IAP problem. PNG can be a cost-effective solution in densely populated areas. There is a case for India to transition its growing urban population to PNG, beginning with Tier-1 and Tier-2 cities. This would allow more LPG to be supplied in rural areas. In areas where LPG is difficult to supply or faces completion from cheaper alternatives, decentralised cooking energy options could be promoted. It is critical that the technology (emission reduction and resilience) for cookstoves improves and technology management strategies for biogas-based cooking get attention.

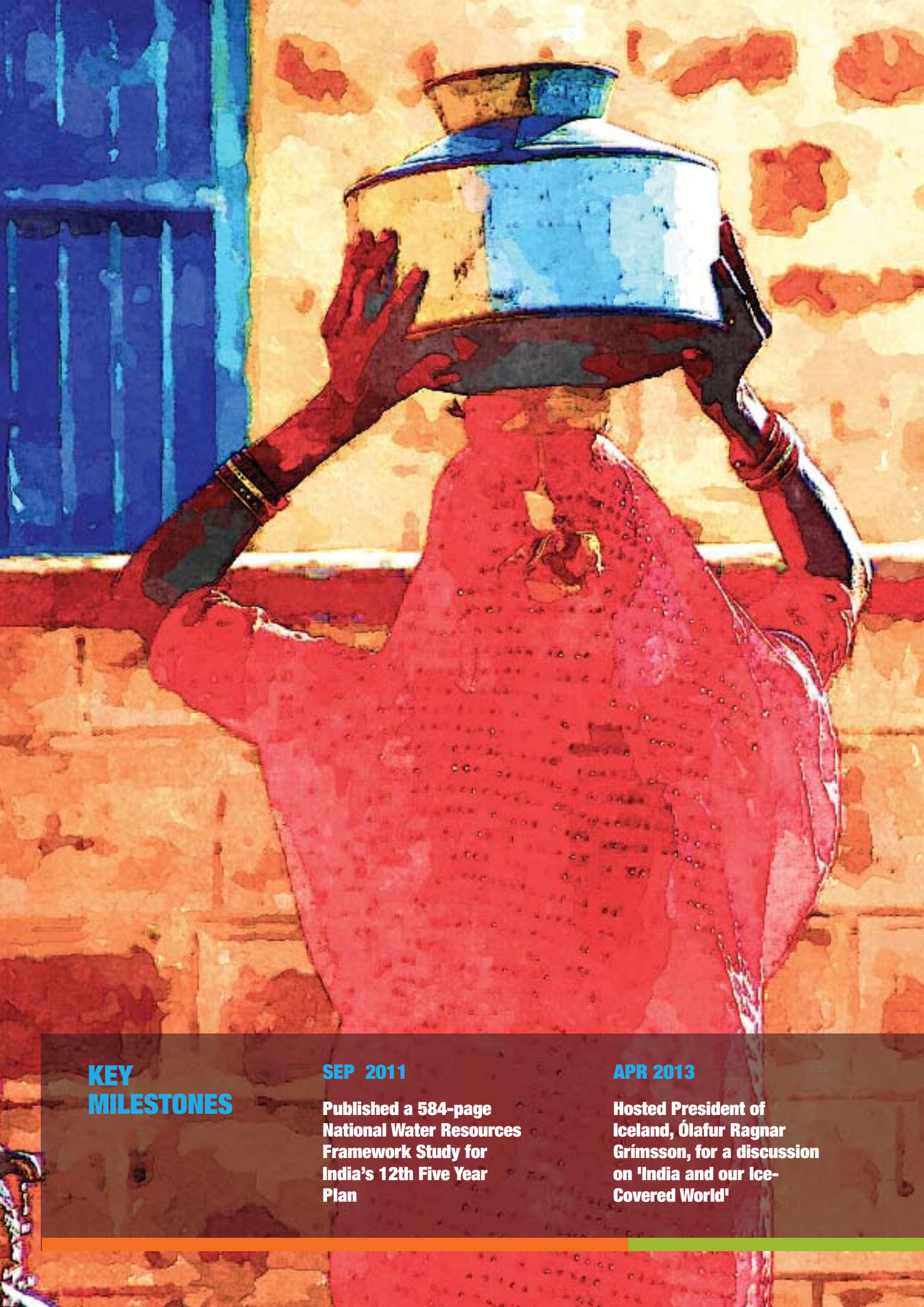
Sustained campaigns to generate awareness about negative health impacts of traditional cooking fuels would be central to creating bottom-up demand for clean cooking energy solutions. While LPG continues to be the mainstay of India's cooking energy policy, other alternatives could complement it in ensuring clean cooking energy for every Indian.

Download Report
http://bit.ly/1DgLjJs

1.3 million
Premature deaths in India every year due to indoor air pollution

150 million
LPG connections in India, against a total of 250 million households

80%
Indian households dependent on biomass for cooking



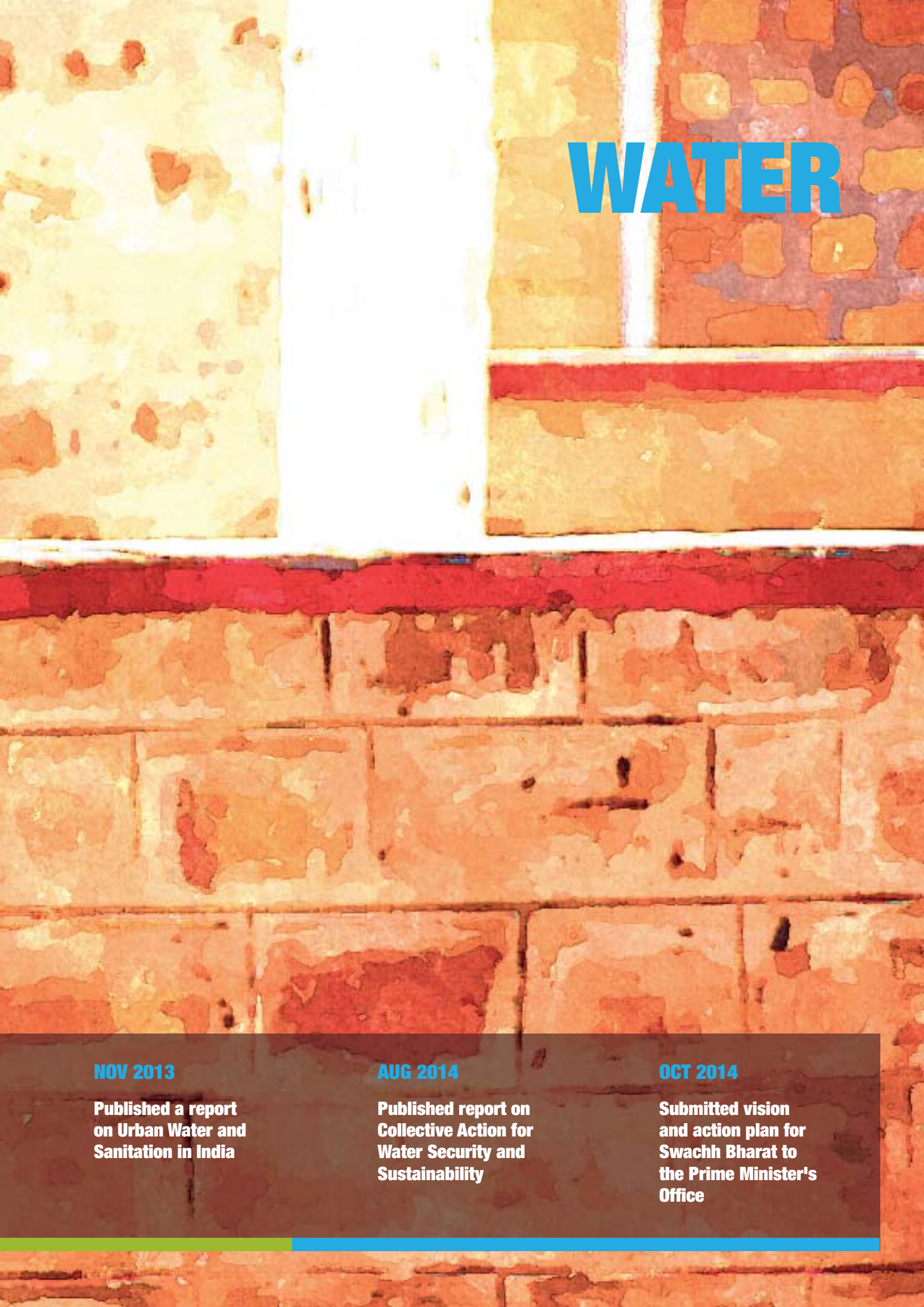
KEY MILESTONES

SEP 2011

Published a 584-page National Water Resources Framework Study for India's 12th Five Year Plan

APR 2013

Hosted President of Iceland, Ólafur Ragnar Grímsson, for a discussion on 'India and our Ice-Covered World'



WATER

NOV 2013

Published a report on Urban Water and Sanitation in India

AUG 2014

Published report on Collective Action for Water Security and Sustainability

OCT 2014

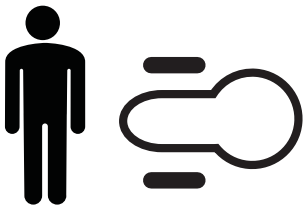
Submitted vision and action plan for Swachh Bharat to the Prime Minister's Office

Swachh Bharat

Prime Minister Narendra Modi launched a new mission, Swachh Bharat (Clean India), on 2 October 2014, Mahatma Gandhi's birth anniversary. Intended to last until 2 October 2019, when India will celebrate Gandhiji's 150th birth anniversary, Swachh Bharat is a targeted mission to build a clean, hygienic and healthy India with adequate sanitation facilities and, more importantly, dignity for all Indians.

Envisioning Swachh Bharat as "***Kachhra Mukta, Shouchalya Yukt Bharat***, CEEW developed an action plan for this ambitious mission outlining specific interventions, estimating the associated costs, and offering a detailed phase-wise roadmap to fulfil the Mission. The action plan focused on two key tracks: **Rural Sanitation** and **Urban Solid Waste Management**. The specific interventions required for these were outlined under four broad categories in the study: Behaviour, Capacity, Infrastructure, and Management.

Download Brief
http://bit.ly/1Lw2yKL



80 lakh INR
estimated cost per gram panchayat for improving rural sanitation

134 million INR
estimated cost per urban agglomeration for improving solid waste management

OECD – FICCI – ADB – 2030 WRG seminar on 'Water Risk and Water Stewardship'; release of CEEW's 'Collective Action for Water Security' report

SUCCESSFUL COLLECTIVE ACTION – THE GUNDAR BASIN EXAMPLE

PERCEPTION OF COMMON THREAT/OPPORTUNITY

- A agriculture dominant area dependant on tank irrigation was struggling due to poor status of tanks
- HUF, DHAN Foundation, NABARD and farming community realised renovation of tanks was an opportunity for improving livelihood of marginal farmers

LEADS

- Conducting a background study of the area, conceptualising a cascade level tank rehabilitation programme, procuring funding – and most importantly, convincing farmers, Panchayat Union and the government department, DHAN easily lead the project

STRONG TIES AND NETWORKS

- With farmers and government agencies doubting a private sector initiative, the process of building trust was not easy
- Initial tank-level successes demonstrated the project's efficacy and gradually led all stakeholders to develop strong ties and networks

STRONG COMMUNICATION AND COORDINATION MECHANISMS

- Conducting regular farmer's meetings, establishing field offices to share farmers' concerns and organising capacity building programmes for field staff to strengthen the coordination process
- A strong communication and coordination strategy was key to the success of this intervention

EFFECTIVE ACCOUNTABILITY AND MONITORING PROJECT

- Monitoring of work and setting of objectives occurred at three levels – tank, cascade and block level
- Both internal and external project monitoring made the system transparent, and the intervention sustainable

Rainfall measurement gauge – demonstration by Mr Verachari, farmer and secretary, GMC, R.K Puram village

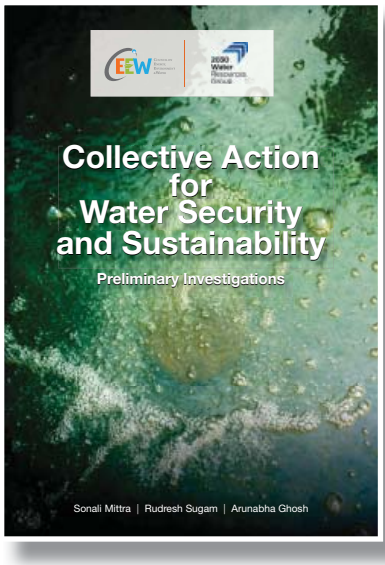
Crop water budgeting – visual representation displayed on the wall of the main village road

Groundwater data displayed on the wall of the main village road, R.K Puram village

Collective Action for Water Security and Sustainability

India's water security challenge is characterised by a contradiction between soaring demand, competing uses and finite availability of water. Top-down and isolated planning, reductionist and exclusive participatory approaches have all contributed much to the current state of water resources in the country. An emerging discourse on integrated water resource management and inclusive participatory models has highlighted the roles and responsibilities of different actors, including public, private, civil society and communities. While there are numerous cases of successful community-based collective action on water, a key challenge is identifying the conditions which produce and hinder collective action. Under what conditions do seemingly disparate groups, with conflicting interests, come together to resolve water problems? How could one-off motivations be sustained over time and across geographies?

CEEW collaborated with the 2030 Water Resources Group (WRG) to study collective action in India at different hydrological scales.



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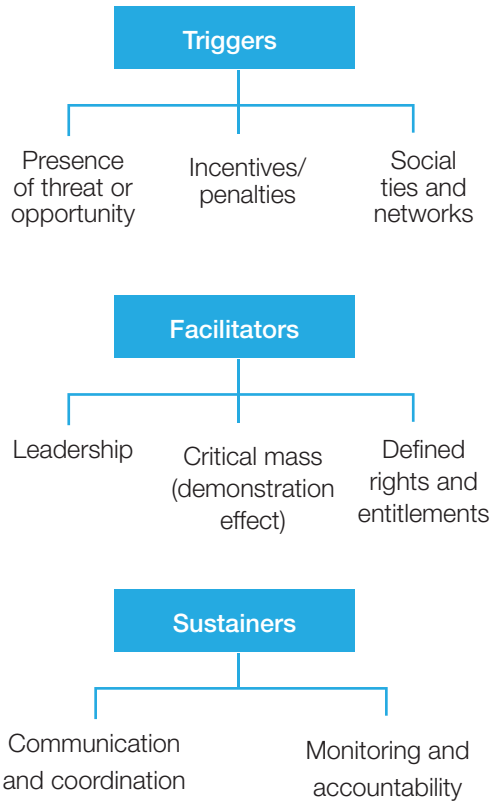
Factors for Collective Action



#CEEWat5

We cherish our independence: Our clients are not our funders

Dying Traditional Water Bodies in India

India has thousands of traditional water bodies (ponds, tanks, lakes, *vayalgam, ahars, bawdis, talabs*), broadly categorised as wetlands, which are rich repositories of biodiversity. Globally, lakes make up less than 3% of the landscape, but bury more carbon than all the world's oceans combined. However, these water bodies are under continuous and unrelenting stress, caused primarily by demographic pressure and economic growth.

As a start, CEEW has been mapping and measuring the quality of 120 water bodies in Meerut district. Even a single district in India can demonstrate how unplanned and unsustainable development can threaten not only hundreds of water bodies but also undermine future economic growth. Whereas, historically, communities across India were known to give immense importance to these water bodies, serious steps are now needed to preserve them. A well planned strategy would include the following.

Precise information: *GIS mapping and water quality analysis* of these water bodies is essential. Biannual/seasonal change detection of both area and quality could be then easily performed by the local institutions. This information should be made public. A good *water quality monitoring system* would reduce the chances of polluters and illegal developers escaping prosecution.

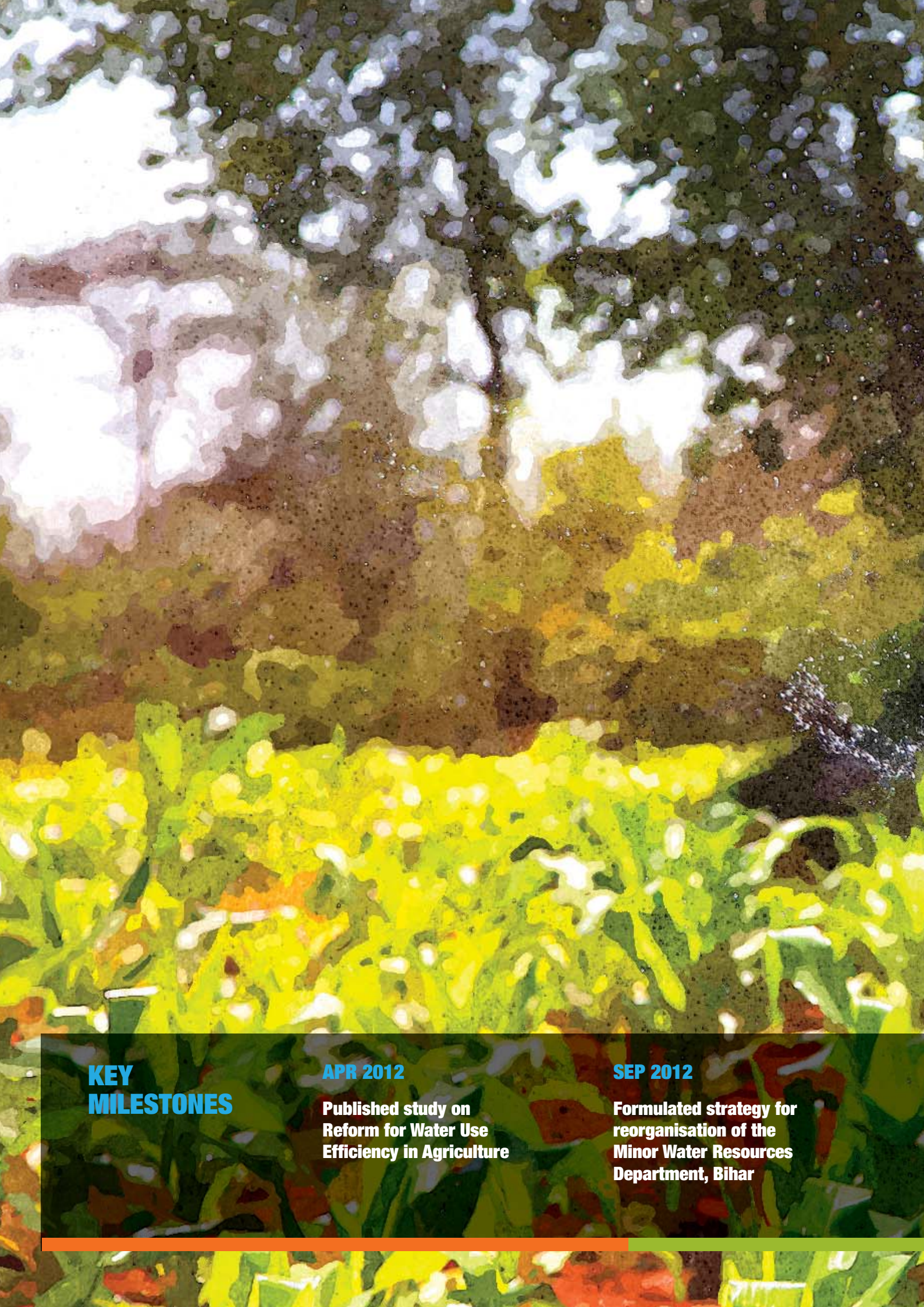
Understanding public perception: Surveys are needed to gauge the reasons behind public negligence towards these water bodies. Awareness generation and behaviour change should be the core of any conservation plan.

Pricing services: These water bodies often provide more valuable services than land. Evaluating and putting a price on them could be the key to protecting them. City development/industrial area development plans should estimate the price and equivalent compensation should be made mandatory.

Externalities and litigation: It would be necessary to also estimate and make people aware of the negative impacts, especially on health, due to polluted water bodies. Most of the cases where ponds/lakes have been restored have been due to filing PILs against the negative health impacts caused by the pollution.

Financial support: GIS mapping, water quality analysis, public surveys or development of information systems would need financial support. However, compared to the funds allocated for irrigation development projects, the funds required for restoration of traditional water bodies would be insignificant.

Collective action: Whether they act as information provider, as whistle blowers or as contributors of labour, without community participation such efforts are unlikely to sustain over time.



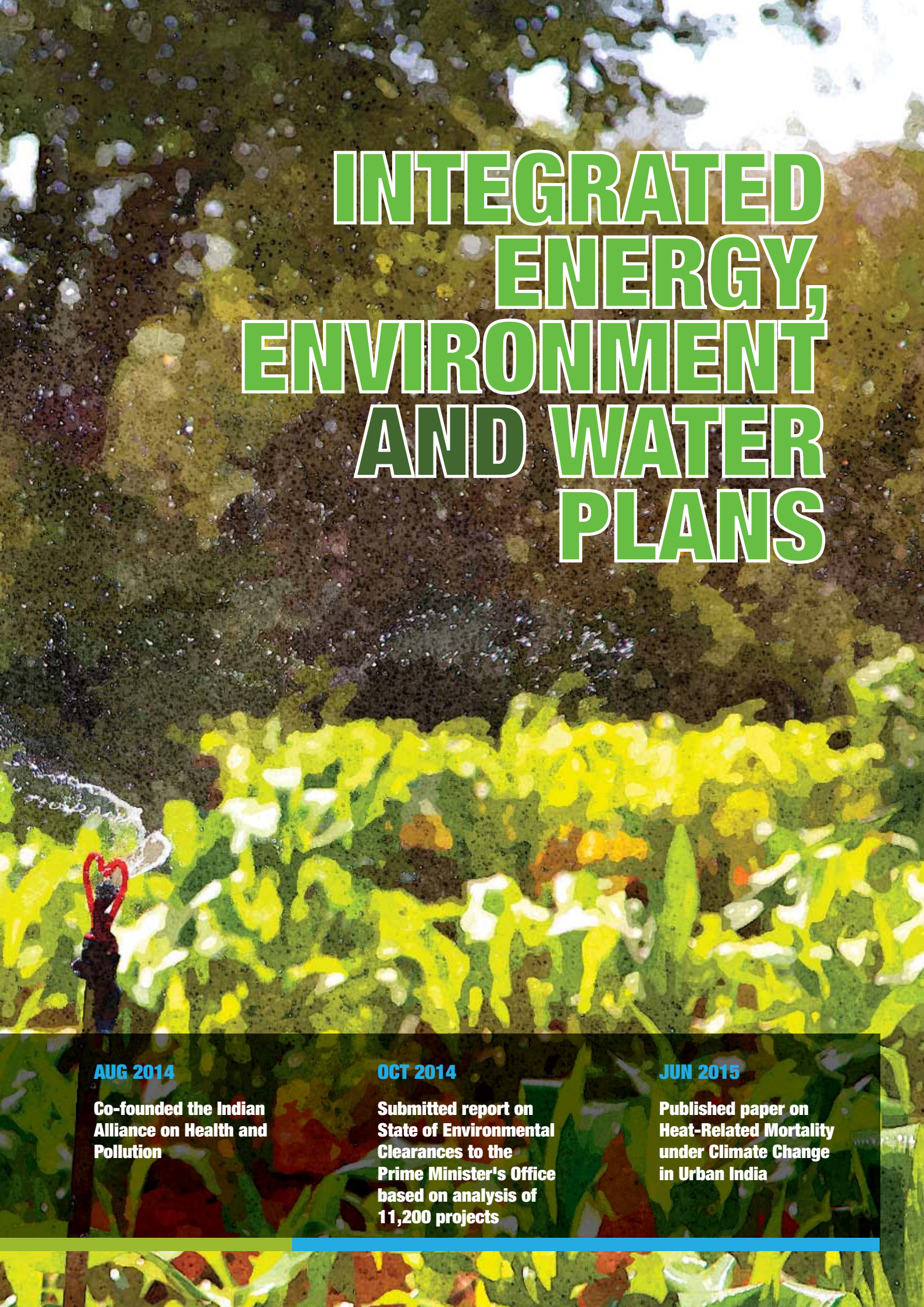
KEY MILESTONES

APR 2012

Published study on Reform for Water Use Efficiency in Agriculture

SEP 2012

Formulated strategy for reorganisation of the Minor Water Resources Department, Bihar



INTEGRATED ENERGY, ENVIRONMENT AND WATER PLANS

AUG 2014

Co-founded the Indian Alliance on Health and Pollution

OCT 2014

Submitted report on State of Environmental Clearances to the Prime Minister's Office based on analysis of 11,200 projects

JUN 2015

Published paper on Heat-Related Mortality under Climate Change in Urban India

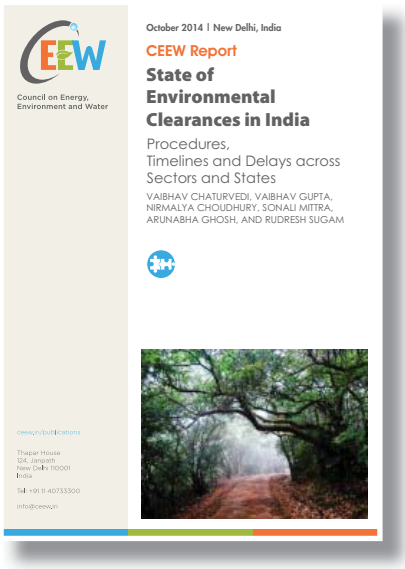
Environmental Clearances in India

The trade-off between economic development and environmental protection becomes critical for any country aspiring for high growth to achieve broader development objectives. Within India, "Green clearances", an instrument to balance this trade-off, has been subjected to severe criticism for deterring the industrial development process and impacting economic growth. CEEW analysed key aspects of the process of securing environmental and forest clearances which need.

The analysis covered several industrial sectors (industry, mining, coal mining, thermal power, infrastructure, construction, hydropower and nuclear power) and states (Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Maharashtra, Madhya Pradesh, Tamil Nadu, Uttar Pradesh, West Bengal, and the north-eastern states taken together). In all 11,174 projects were analysed. **Download Report:** http://bit.ly/1QCFspF

940 days
threshold defined as per CEEW analysis for categorising whether project clearances are delayed or not

90%
projects across sectors, especially under the industrial category, pending due to forest clearances

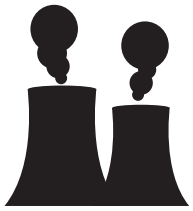


Download Report
http://bit.ly/1QCFspF

50%
projects rejected, returned or withdrawn in north-eastern states of India, under the forest clearance process


Mary Nichols, Chair of the California Air Resources Board, at CEEW's roundtable discussion on 'Air Quality Standards and Enforcement in US and India'

We are driven by data



40%-60%

projects in thermal power, hydropower, coal mining and nuclear power sectors have faced delays during EIA, public hearing and submission of required data and information to the committee

60%-70%

projects in the clearance pipeline in Bihar, Chhattisgarh, West Bengal and north-eastern states for at least two years since their date of application

Mohit Sharma | Hem H. Dholakia

No Smart Cities sans Smart Policies and Smart Citizens


Today, unchecked and growing resource consumption and waste generation in Indian cities are commensurate with the populations they sustain. As economic growth triggers greater urbanization, the cities of tomorrow need to break away from this traditional paradigm. New urban development models under the Smart City Mission are one such step. However, smart cities will have to be shaped through clear policy choices. We present three such choices.

First, develop system-wide thinking. This means adopting a holistic approach to understanding urban issues. The smart city narrative has been lop sided with a focus on technology and infrastructure. One example is waste management where waste treatment or waste-to-energy plants are still perceived by policymakers as the sole solution. The deep-rooted problems of unsustainable behavioural patterns, mixed waste, land degradation and urban poverty are missing from the debate. There is a need to emphasise employment, skill development, environment protection, social justice, personal safety, equity and other social dimensions, which have weaker voice. The systems approach can be a tool assimilate these perspectives.

Second, integrate top-down and bottom-up approaches for urban planning. Traditional planning approaches have been top-down and often fail to include citizens' perspectives. Competing goals of social, economic and environmental benefits need to be evaluated in local context. Citizen participation, combined with planning helps induce transparency, create ownership and promote sustainable behaviours.

Third, create digitally and socially networked cities. Cities, like people, can coordinate to learn from one another to address common problems. Cooperation would be a prerequisite for strengthening citywide networks for different services. Cities can understand the way technology and society adapt and how they constantly shape the evolving dynamics of human interaction with their immediate environment. The efficiencies of such a network will create new opportunities for coordinated action across departments and between levels of government.

India's smart cities cannot be those we see in Europe or North America today. They have the potential to be truly transformational. For this, we need to imagine them differently. Cities are not inherently smart, but our choices can make them so.

KEY MILESTONES

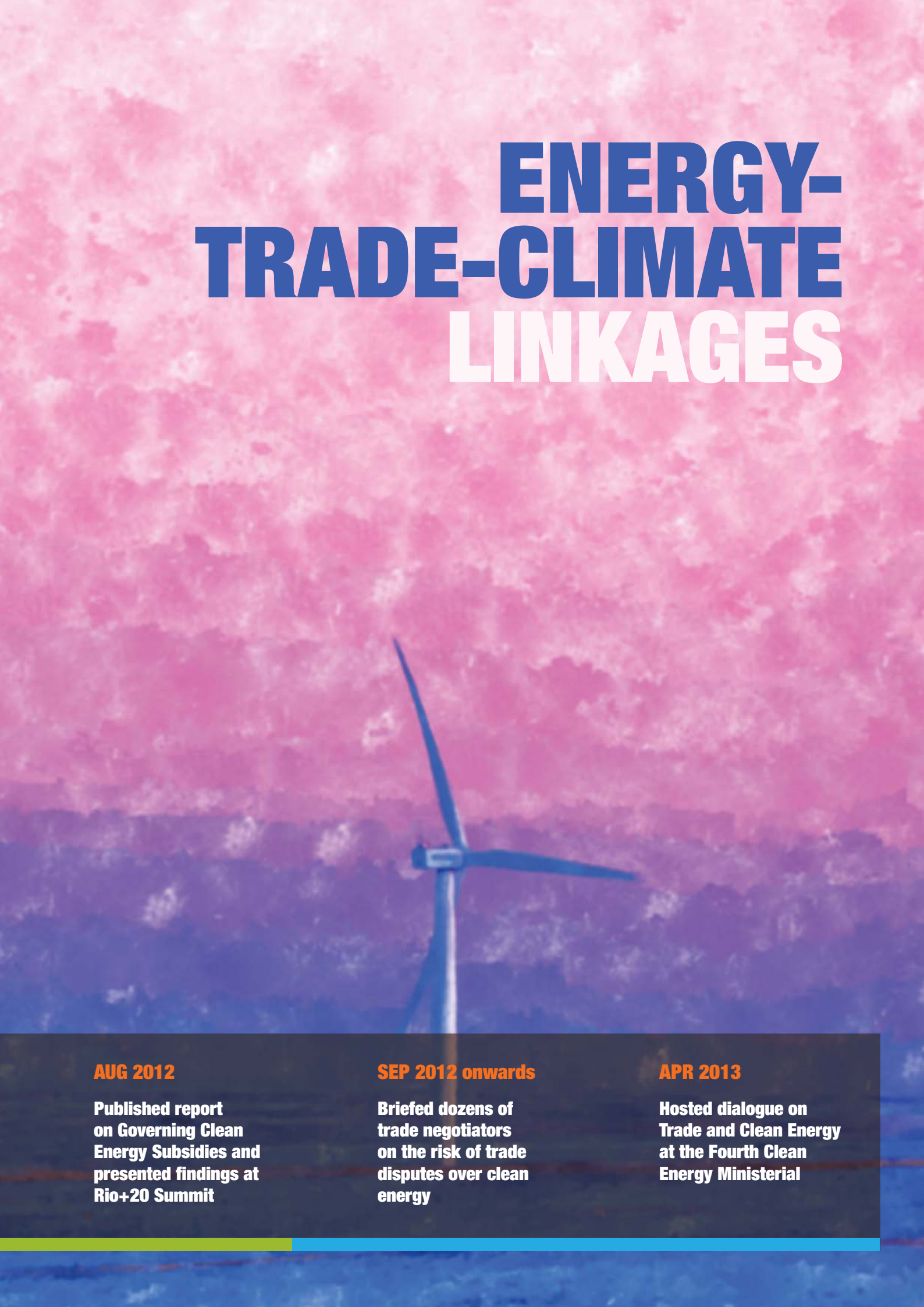
AUG 2011

Published brief on Climate, Trade and Consistency of India's Domestic Policies

SEP 2011

Published paper on Governance of Energy by Trade and Investment Institutions

ENERGY-TRADE-CLIMATE LINKAGES



AUG 2012

Published report on Governing Clean Energy Subsidies and presented findings at Rio+20 Summit

SEP 2012 onwards

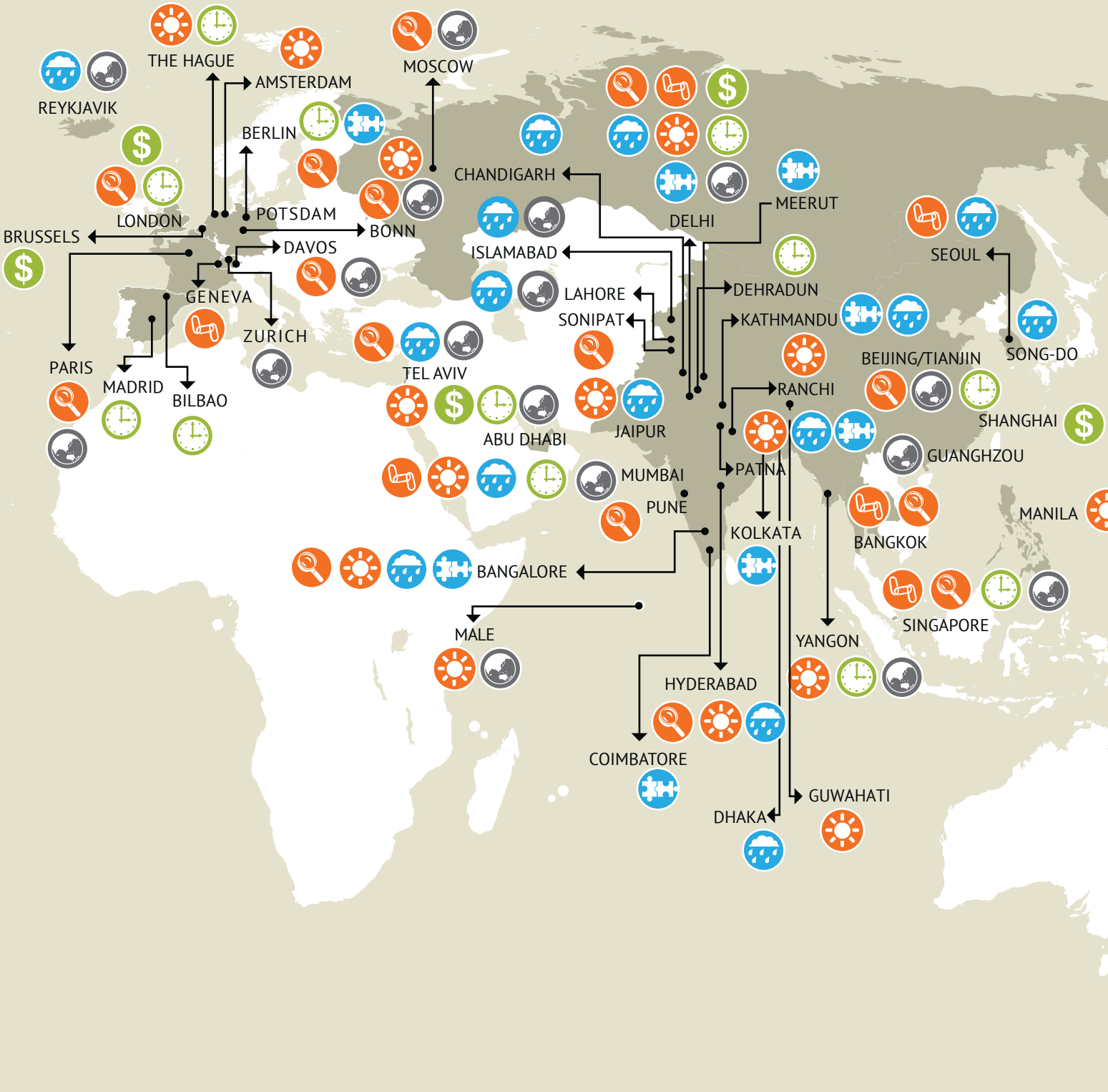
Briefed dozens of trade negotiators on the risk of trade disputes over clean energy

APR 2013

Hosted dialogue on Trade and Clean Energy at the Fourth Clean Energy Ministerial

INTEGRATED | INTERNATIONAL | INDEPENDENT

The world map showcases places where CEEW has engaged in projects or presented its work. The icons represent thematic areas of CEEW's work, each of which is studied in depth while also focusing on its linkages with other development concerns.



Resource efficiency & security

Renewables

Water

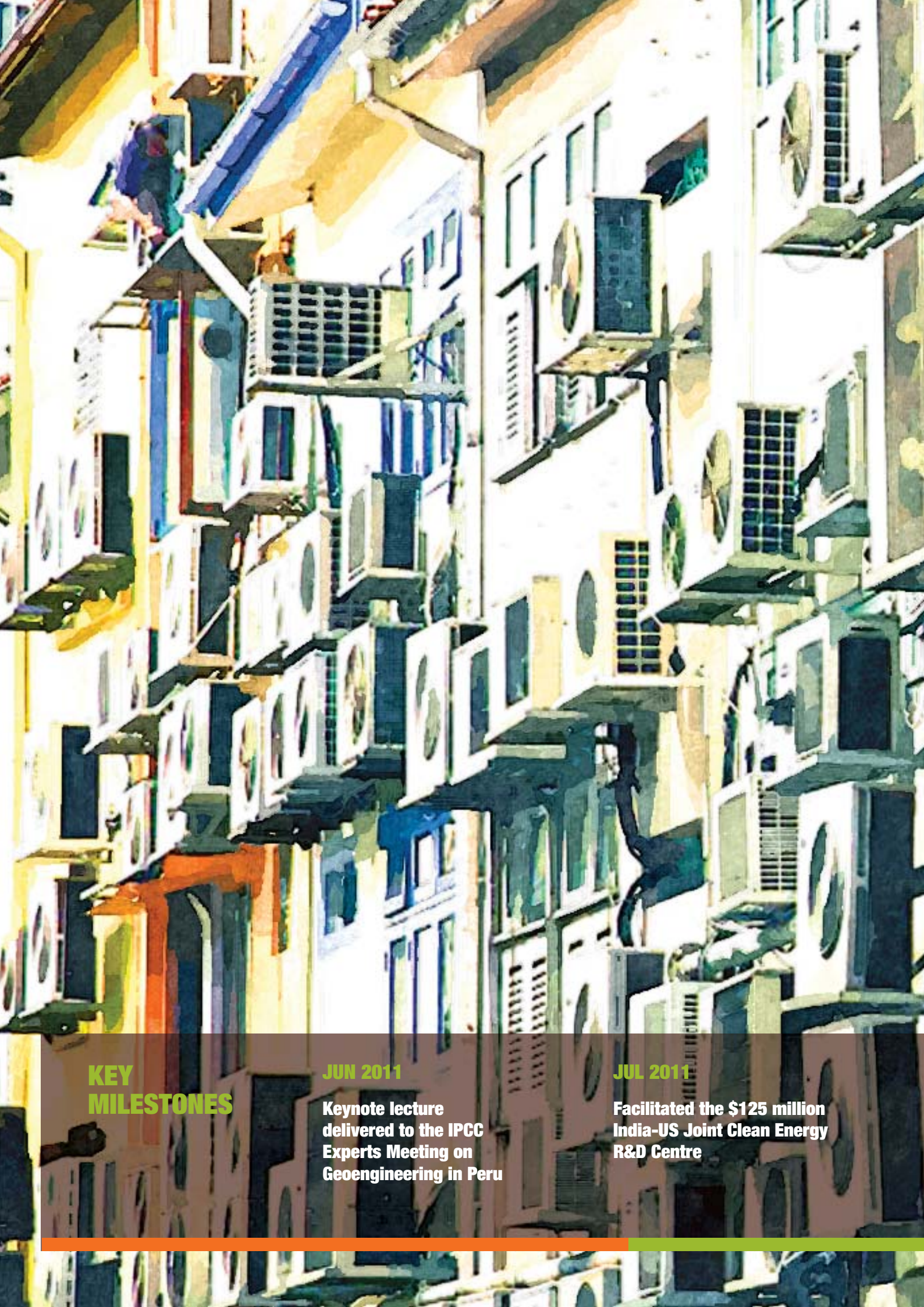
Integrated energy, environment and water plans

Energy-trade-climate linkages

Sustainability finance

Technology horizons

International co-operation



KEY MILESTONES

JUN 2011

Keynote lecture delivered to the IPCC Experts Meeting on Geoengineering in Peru

JUL 2011

Facilitated the $125 million India-US Joint Clean Energy R&D Centre

TECHNOLOGY HORIZONS

JUN 2014

Organised India's largest conference on Climate Geoengineering Governance with University of Oxford

JULY 2014

India's HFC emission scenarios released at Montreal Protocol meetings in Paris

MAY 2015

First-of-its-kind multi-sectoral analysis of India's long-term HFC emissions published

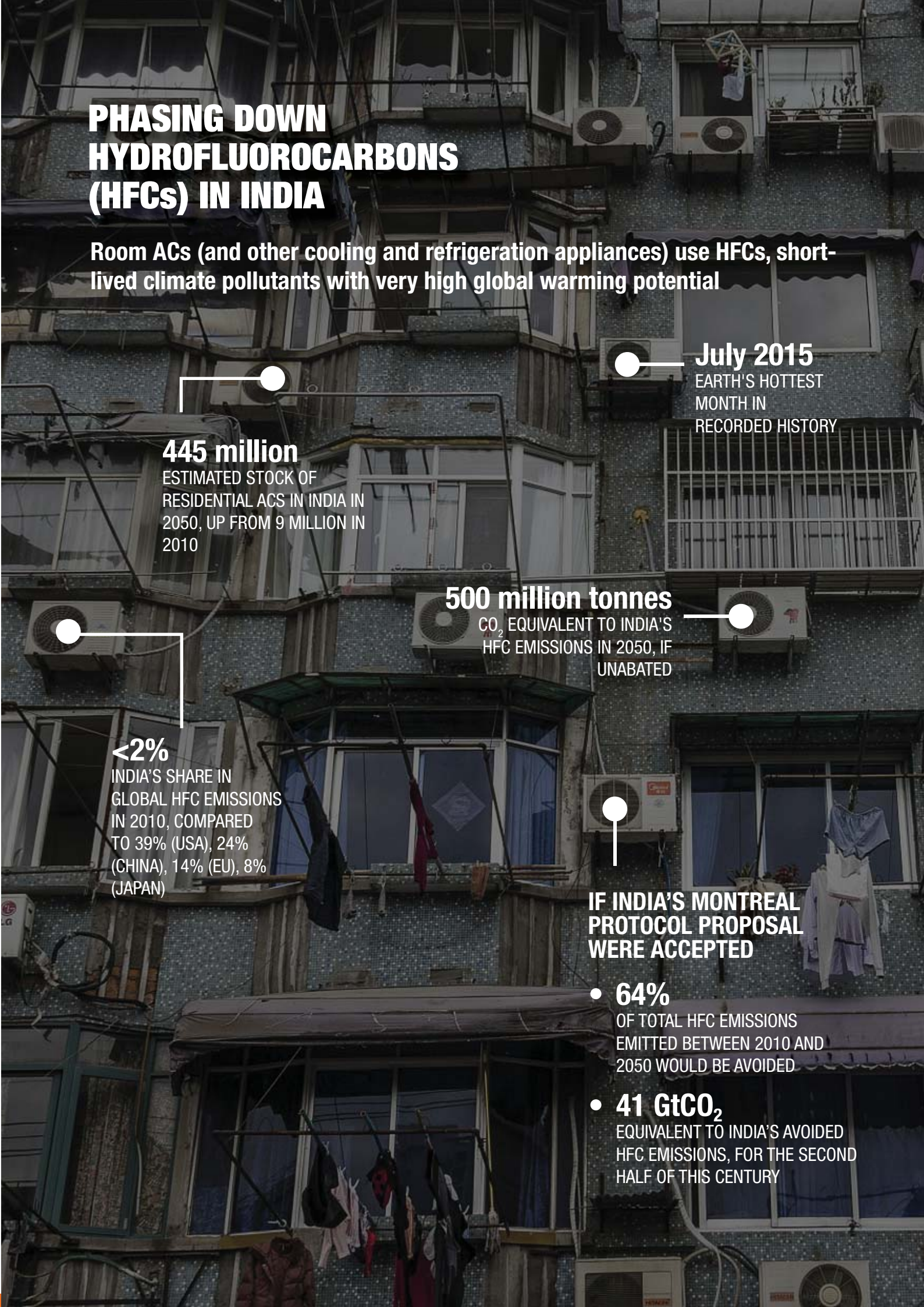
CEEW's Dr Vaibhav Chaturvedi at 'Climate Geoengineering Governance' conference

Climate Geoengineering Governance

Defined as the 'the deliberate large-scale manipulation of the planetary environment to counteract anthropogenic climate change', climate geoengineering covers a wide range of technologies, which work either by reducing the amount of sun's radiation reaching the earth (solar radiation management – SRM) or by removing carbon dioxide (CO_2) from the atmosphere (carbon dioxide removal – CDR) as CO_2 emissions are the largest source of greenhouse gas emissions.

Research has shown that any large scale implementation of climate geoengineering technologies is bound to have cross-boundary effects. However, there is a governance gap, particularly at the international level, for governing the choice and implementation of any geoengineering intervention by individual nations. No existing institution appears to have the mandate or capacity to govern the upstream process of laying down proactive research and governance mechanisms. And the existing landscape of multilateral environmental agreements varies in terms of its relevance to governing the deployment of geoengineering technologies.

In June 2014, CEEW in collaboration with the Institute for Science, Innovation and Society (InSIS), University of Oxford, organised a two-day conference on Climate Geoengineering Governance in New Delhi. The conference aimed at examining the governance arrangements, which may be needed to ensure that experimentation or deployment of any of the large range of geoengineering technologies being proposed are safe, fair, effective and economic. It saw participation of experts in multiple disciplines from across the world. The speakers included seasoned administrators and policy makers, social and political scientists, techno-economic experts and practitioners in international law. **Download Report:** http://bit.ly/1Vi9lwl



PHASING DOWN HYDROFLUOROCARBONS (HFCs) IN INDIA

Room ACs (and other cooling and refrigeration appliances) use HFCs, short-lived climate pollutants with very high global warming potential

July 2015
EARTH'S HOTTEST MONTH IN RECORDED HISTORY

445 million
ESTIMATED STOCK OF RESIDENTIAL ACS IN INDIA IN 2050, UP FROM 9 MILLION IN 2010

500 million tonnes
CO_2 EQUIVALENT TO INDIA'S HFC EMISSIONS IN 2050, IF UNABATED

<2%
INDIA'S SHARE IN GLOBAL HFC EMISSIONS IN 2010, COMPARED TO 39% (USA), 24% (CHINA), 14% (EU), 8% (JAPAN)

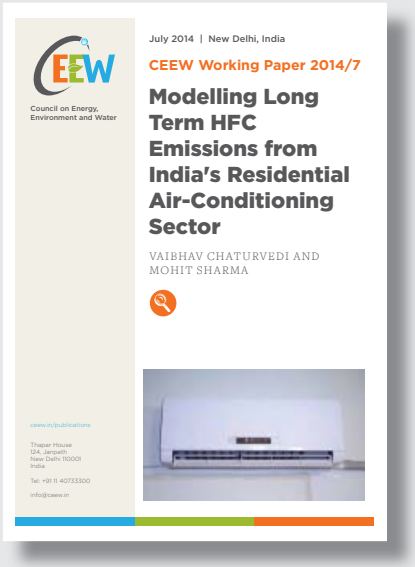
IF INDIA'S MONTREAL PROTOCOL PROPOSAL WERE ACCEPTED

- **64%**
  OF TOTAL HFC EMISSIONS EMITTED BETWEEN 2010 AND 2050 WOULD BE AVOIDED
- **41 $GtCO_2$**
  EQUIVALENT TO INDIA'S AVOIDED HFC EMISSIONS, FOR THE SECOND HALF OF THIS CENTURY

Modelling Long-Term HFC Emissions from India's Room AC Sector

CEEW's first-of-its kind study on long-term HFC emissions for the room air-conditioning sector highlighted:

- HFC 410A emissions will have a significant contribution in GHG emissions from the residential AC sector. The government should give a strong signal to the market for the development and deployment of alternative gases
- The energy efficiency potential of end-use AC technologies needs to be harnessed. The Bureau of Energy Efficiency (BEE) and other relevant government authorities should analyse the reason for low penetration of high efficiency equipment and take steps to increase their market share.
- Building efficiency improvements can reduce cooling energy demand significantly, and BEE should extend building energy conservation codes policy to the residential sector immediately.
- Information on AC coolant recharge frequency and recovery of scrapped AC units is required for better estimation and understanding of direct emissions. Authorities also need to regulate/ incentivize recovery and re-use of high GWP AC coolants.
- Independent technical assessments can provide unbiased and reliable information on flammability and safety concerns about alternative refrigerants.



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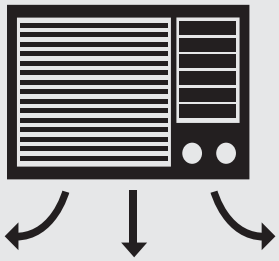


35%

Residential cooling sector's share in India's total HFC emissions in 2050 under business as usual scenario

#CEEWat5

We strive for outcomes, not just outputs

CEEW's industry consultation workshop on 'Long-term HFC Emissions and Alternative Policy Scenarios'

Moving Towards Climate Friendly Refrigerants: India's Challenges

CEEW's pioneering modelling research has shown that India's emissions of hydrofluorocarbons (HFCs) across sectors will grow at a significant pace. The Indian government's amendment proposal for the Montreal Protocol signals India's serious intent to move away from HFCs. However, there are many stakeholders in the industry that need to initiate and manage the transition process. Though the signalling is clear, there are still many challenges.

- The foremost of these is to understand the nuances of the Indian market and composition of industry stakeholders as ultimately it is they who have to make investments for any potential transition to alternate chemicals. What challenges do they face? Policymakers need to be informed through research based on intensive stakeholder engagement as well as analysis of policy and economic approaches for incentivising different stakeholders towards a transition. Incentives and regulations have to be devised to accelerate and support the transition for a wide variety of stakeholders and sustained over time.
- The second challenge is better understanding of safety issues and drop-in replacements for a near-term response. Safety has been an important concern. Though alternatives with low global warming potential are available, the applications where the refrigerant charge is small the challenge is to find solution for higher charge sizes. Until the technical alternative is clear, industry should focus on finding drop-in solutions so that there is no near-term investment required in design changes and the industry gets some more time to focus on safety and other technical issues such as high ambient performance.

"The Indian government's amendment proposal for the Montreal Protocol signals India's serious intent to move away from HFCs."

- The third critical challenge is clarifying legal and patent-related issues. Patent issues are related to design changes for equipment with alternative GHGs. How much will the different companies using these patents need to pay is an important issue that impedes moving away from HFCs?

Only addressing the above mentioned issues can help India and other countries move in the direction of alternative chemicals which can satisfy growing consumer demand but also lower the emission footprint.

"I would like to appreciate CEEW's efforts for the commendable analysis they have done on India's long-term HFC emissions. I hope that more civil society organisations in India bring out such independent research."

Susheel Kumar,
Additional Secretary,
MoEFCC

KEY MILESTONES

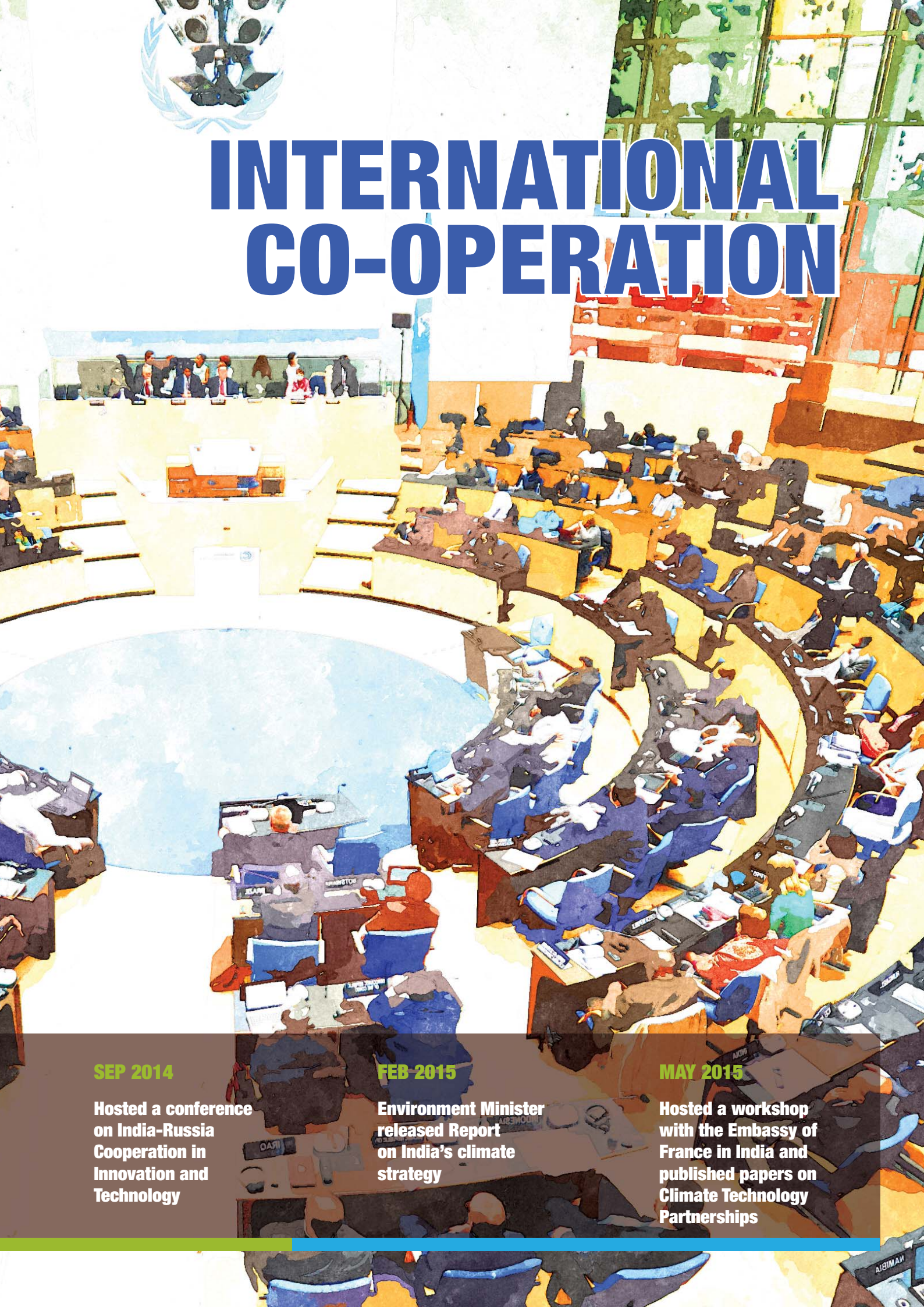
SEP 2010 onwards

Regularly participated in numerous track II dialogues with Bhutan, Israel, Pakistan, Singapore and United States

OCT 2010

Conceptualised and enabled the Maharashtra-Guangdong Partnership on Sustainability

INTERNATIONAL CO-OPERATION



SEP 2014

Hosted a conference on India-Russia Cooperation in Innovation and Technology

FEB 2015

Environment Minister released Report on India's climate strategy

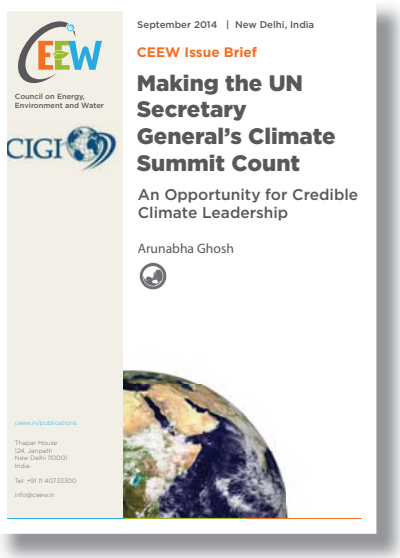
MAY 2015

Hosted a workshop with the Embassy of France in India and published papers on Climate Technology Partnerships

Stimulating Challenged Climate Regimes

The international governance of climate change is being altered by new pressures and institutions. For better or for worse, the climate regime is being challenged in five ways. First, there is little consensus on how to manage the balance between bottom up and top down approaches: whether we should aim for a new climate protocol, a new legal instrument or an 'agreed outcome with legal force'. Secondly, there remain fundamental disagreements over regime design, not simply the question of how much flexibility to accord to countries but persisting questions about lack of enforcement mechanisms, weak review of actions, and contestation over the Annex I/Non-Annex I distinction. Thirdly, the regime complex of climate negotiations has become more obvious, with debates about the decision-making at the G-20, the role of the Montreal Protocol, the Green Climate Fund's relationship with dozens of other climate-related funds, trade disputes at the WTO over promotion of clean energy, and so forth. Fourthly, there is growing reliance on informal networks to break logjams in multilateral negotiations and develop consensus on policy issues, with concerns about their exclusivity. Fifthly, many other issues remain semi-governed (the climate implications of continued fossil fuel exploration and production in the Arctic) or ungoverned (growing research and interest in climate geoengineering).

The UN Secretary General's Climate Summit 2014 was an important milestone. As a precursor to the event, CEEW published a brief urging leaders attending the summit to speak less as negotiators and more as statesmen, outlining the areas in which they would promote action to demonstrate their commitment, build trust among partners and create conditions for an effective climate agreement.



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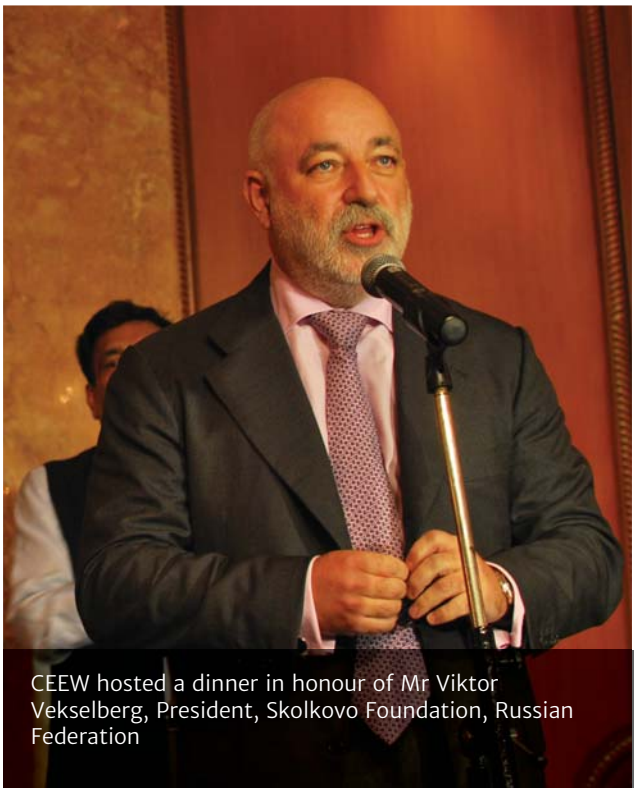
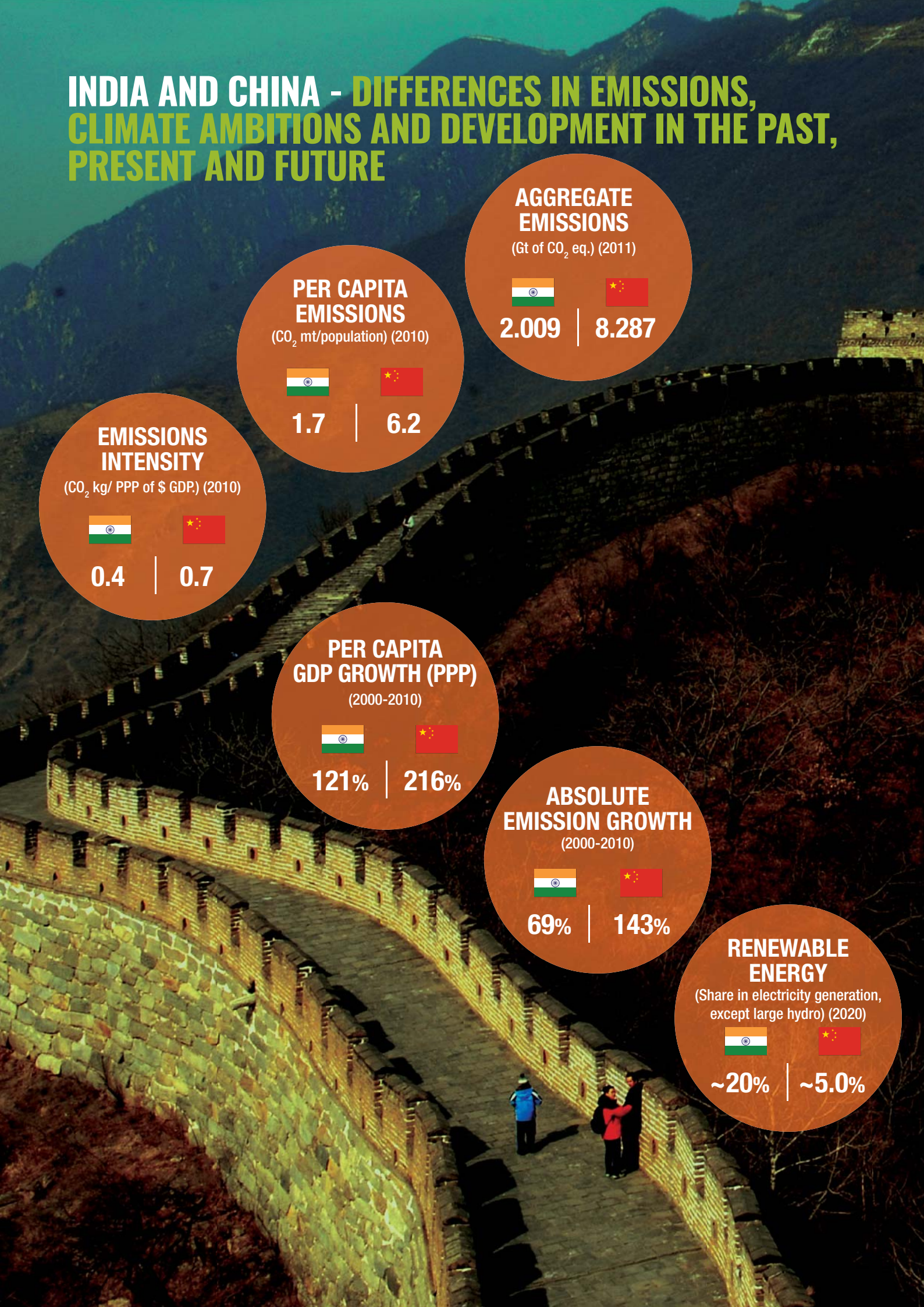
Oleg Fomichev, Deputy Minister of Economic Development of the Russian Federation, at CEEW's conference on 'India-Russia Cooperation in Innovation and Technology'



CEEW hosted a dinner in honour of Mr Viktor Vekselberg, President, Skolkovo Foundation, Russian Federation


INDIA AND CHINA - DIFFERENCES IN EMISSIONS, CLIMATE AMBITIONS AND DEVELOPMENT IN THE PAST, PRESENT AND FUTURE
AGGREGATE EMISSIONS
(Gt of CO_2 eq.) (2011)
2.009
8.287
PER CAPITA EMISSIONS
(CO_2 mt/population) (2010)
1.7
6.2
EMISSIONS INTENSITY
(CO_2 kg/ PPP of $ GDP.) (2010)
0.4
0.7
PER CAPITA GDP GROWTH (PPP)
(2000-2010)
121%
216%
ABSOLUTE EMISSION GROWTH
(2000-2010)
69%
143%
RENEWABLE ENERGY
(Share in electricity generation, except large hydro) (2020)
~20%
~5.0%

Environment Minister, Shri Prakash Javadekar, released CEEW's report on India's INDCs

India's INDCs: Renewable Energy and the Pathway to Paris

The climate negotiations scheduled in Paris in 2015 (COP21) present an important opportunity for India to showcase its climate leadership through the communication of its past and present actions and future ambitions in the climate arena. It is clear that leadership in climate change has not been forthcoming from some of the largest emitters. Therefore, countries such as India, likely to be acutely impacted by climate change would need to develop a strategy on two formats: pressing major emitters to increase their mitigation targets; and ramping up its own ambition to reduce the vulnerability of its own population to climate risks.

CEEW analysis suggests that India could push its ambition towards a target of 1,041 Billion Units (BU) of electricity from renewable energy sources by 2030. This would translate to cumulative emissions of 3.4 Gt of CO2 equivalents (CO2 eq.) and per capita emissions of 2.25 tonnes of CO2 eq. in 2030. However, this target would require an incremental cost of approximately INR 39,320 billion (2010, INR) (US$ 715 billion) over the next 15 years and could make the consumption of a threshold level of electricity unaffordable for the bottom two deciles of Indian households. Therefore, it is imperative that discussions around technology partnerships and financial mechanisms be an important pillar of any new climate agreement. This brief was extensively discussed at CEEW's Climate Day, at which Minister of State (IC) for Environment, Forests and Climate Change, Shri Prakash Javadekar, delivered the keynote address. **Download Brief:** http://bit.ly/1KZLVLf


Ambassador Chandrashekhar Dasgupta at CEEW's Climate Day


Ms Sudatta Ray at CEEW's Climate Day

India as a Climate Leader?

India has a broad range of policy initiatives, both ongoing and planned, which aim to mitigate and adapt to the impacts of climate change. These initiatives span several sectors, technologies and levels of intervention. India must not assume disproportionate burden in the response to climate change. In order to shape a more forward-looking narrative of its role in the global climate change discourse, India has to answer two important questions:

1. From where will the technology and finance for India's low-carbon strategies come?
2. How will India find a balance between mitigation demands and adaptation needs?

The answer to the first question lies in developing innovative partnerships, which could both showcase the range of clean energy work being undertaken in India and also attract additional investments. In answering the second question, India would need to count the resources it is already expending on adaptation and evaluate climate risks, which threaten its social and economic resilience.

Taking leadership via effective climate technology partnerships

Technology transfer (and associated financing) has been a key demand throughout the two decades of climate negotiations. However, prohibitive costs, restrictive intellectual property rights, lack of appetite for cross-border joint ventures, and insufficient capital to underwrite risks, have resulted in persistent failure in facilitating the development and transfer of climate-friendly technologies. India has an opportunity to forge an effective partnership that promotes greater decentralised energy production to satisfy the potential demand from the two billion poor people who still lack access to basic modern energy. Such an initiative would leverage the skills and experience of hundreds of Indian firms delivering energy services to the poor and connect with innovations in other regions such as in East Africa or even in developed countries.



A similar opportunity exists in the energy storage and grid balancing technology space, which is central for India as it targets the integration of large amounts of renewable energy in to its electricity mix. A new multi-country partnership to speed up deployment of these technologies, would give Indian research laboratories and public and private sector firms an opportunity to collaborate with the world's leading labs and companies working on energy storage. With this partnership India would have an opportunity to be at the frontiers of disruptive technological development.

Climate risk assessments to balance adaptation and mitigation

The decision on how much to spend on mitigation versus adaptation will need continuous risk assessments. India should co-chair a multi-country partnership on biennial climate risk assessments that includes decision-makers (to define objectives and interests), scientists (to assess direct impacts), and experts in national security, politics, technology, economics, finance and insurance (to assess systemic impacts).

All these ideas are consistent with India's stated interests in climate change but still allow India to position itself as a climate leader.

KEY MILESTONES

OCT 2010

Published report on Governance Options for International Climate Financing prior to Cancún climate negotiations

AUG 2012

Published paper on Quantity-Performance Funding Instruments for climate finance

SUSTAINABILITY FINANCE

NOV 2012

Published paper on Results-Based Financing for Off-Grid Energy Access in India

AUG 2014

Published reports on Clean Energy Finance

SEP 2015

Co-authored India's Adaptation Gap report with focus on financing needs

Mr Suresh Prabhu released CEEW–NRDC reports on 'Renewable Energy Jobs and Finance'

Finance for Solar and Wind Sectors

"Renewable Energy a Win-Win Solution for India's Energy Security Challenge. Today, it needs different types of funding and a long-term source of financing is essential. We need to rope in different financiers, including venture capitalists, to help develop renewable energy technologies, bring new innovation and improve efficiencies."

Shri Suresh Prabhu,
Minister of Railways,
Former Chairperson CEEW

India's solar and wind industries would not be able to continue on their trajectory of growth unless domestic lenders step in and play a larger role. A persistently high cost of financing calls for continued innovation in policy and the introduction of financial mechanisms that can help bring down costs and attract the level of investment needed to fulfil India's ambitious renewable energy targets.

CEEW, in collaboration with NRDC, published reports evaluating mechanisms used in India and internationally, discussing their impact on capacity addition, risk mitigation, and reduction in the cost of finance while leveraging existing policies. **Download Reports:** http://bit.ly/1VlbXKt and http://bit.ly/1JxWaRE

Key Findings

- Use generation-based incentives and penalties in combination with any form of viability gap or tax related capital subsidies
- Diverse financial mechanisms such as Infrastructure Debt Funds, priority sector lending, green bonds and tax incentives (such as Accelerated Depreciation/ tradable tax certificates) can improve access to low cost financing for renewable energy projects
- Strict enforcement of Renewable Purchase Obligations (RPOs) and nurturing the Renewable Energy Certificate (REC) market will enhance investors' confidence
- A green bank (capitalised through the National Clean Energy Fund) and green bonds (issued by the central/state governments) should be considered for leveraging more private investment in renewable energy

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Inflexion Points

Dr Arunabha Ghosh writes a monthly column 'Inflexion Points' for the Business Standard, one of India's leading business dailies. He has shared his thoughts and provided insights on a range of issues including air pollution, climate negotiations, climate risk assessment, energy security, environmental clearances, LPG subsidies, resource efficiency, solar energy and sustainable irrigation through his column.

Meet CEEW's Executive Team

Arunabha Ghosh | Chief Executive Officer

Public Policy, International Relations, Human Development, Energy & Resource Security, Renewable Energy Policy, Water Governance, Climate Governance, Energy-Trade-Climate Linkages; Worked @ Princeton, Oxford, UNDP, WTO; WEF Young Global Leader

Runs, Sings & Bakes; Connects dots

"If your dreams do not scare you, they are not big enough" - Ellen Johnson Sirleaf

Vaibhav Chaturvedi | Research Fellow

Climate Policy, Energy Policy, Integrated Assessment Modeling, Forest Management Grad, IIM Ahmedabad Doctorate in Economics, Pacific Northwest National Lab (USA) Post-Doc

Music Enthusiast, Avid Reader & Nature Lover

"There ain't no such thing as a free lunch."

Karthik Ganesan | Senior Research Associate

Energy Access, Energy Poverty, Nuclear Energy, Fiscal Policies for RE, Quantitative Techniques and Choice Modelling, Economic Valuation, Lee Kuan Yew School of Public Policy (NUS), IIT Madras

Football Enthusiast, Long Distance Running, Scrabble Fanatic, Quizzing

"If I have seen further, it is by standing on the shoulder of giants." – Isaac Newton

Hem H Dholakia | Research Associate

Public Health, Climate Change Adaptation, Urban Studies, Air Quality, Public Policy; Doctorate in Public Systems, IIMA; Exercise Scientist, Brighton University

Trekker, Scuba-Diver, Theatre & Music

"Natura valde simplex est et sibi consona." – Isaac Newton

Kanika Chawla | Junior Research Associate

Climate & Energy Policy, Green Jobs, Renewable Finance; UNEP, REN 21

Travel, Food, Partition Literature, Political Junkie, Militantly Liberal

"She's mad, but she's magic. There's no lie in her fire." – Charles Bukowski

Vaibhav Gupta | Junior Research Associate

Energy & Mineral Resource Security, Environmental Policy & Law, EMS (ISO 14001), Indian School of Mines (Dhanbad)

Sketching, Music & Sports; Be all you can be!

"Some goals are so worthy, it's glorious even to fail" – Capt M.K. Pandey

Abhishek Jain | Junior Research Associate

Energy Access, Industrial Sustainability, Project Management, Cambridge MPhil in Engineering for Sustainable Development, Chevening Scholar, IIT R Grad in Mechanical Engineering

Writing, Poetry, Trekking, Photography & Nature Walks

"Life is what happens to us while we are making other plans." – Anonymous

Aditya Ramji | Junior Research Associate

Energy Access, Energy Poverty, Choice Modeling, Decentralised Energy Solutions, Impact Assessment, Economics @TERI University

Music, Travel, Roller Skating Xtreme Sports

"Man is the measure of all things." – Protagoras

Mohit Sharma | Junior Research Associate

Energy & Climate Systems, Renewable Integration, Modeling and Systems Analysis, Sustainability in Urban Ecosystems, Technical University of Denmark Post-Grad in Sustainable Energy, NIT Grad in Chemical Engineering

Philosophising, Playing Music, Singing & Writing

"Solving problems is not so much about creating new information as it is about arranging that which is already existing and requires looking at them with a new perspective."

Rudresh Kumar Sugam | Junior Research Associate

Water Governance, IWRM, Resources Mapping & Nexus, Climate Change, GIS, TERI, Yale

Superbikes & Singing

"Absence of evidence is not evidence of absence." – Carl Sagan

Shalu Agrawal | Programme Officer

Energy Access, Renewable Energy – Technologies & Finance, Fuel Subsidies, IIT Roorkee

Political Economy, Philosophy, Contemporary Dancing, Badminton, Rains & Greenery

"The important thing is not to stop questioning." - Albert Einstein

Tirtha Biswas | Research Analyst

Mineral Resource Management, Security & Policy Reforms; Mineral Processing ; Coal; Data Analytics; Erasmus Mundus Scholar; Indian School of Mines

Epicure, Reading & Billiards

"You can never cross the ocean until you have the courage to lose sight of the shore – Christopher Columbus"

Neeraj Kuldeep | Research Analyst

Renewables, Data Analytics, Modeling, GHG Inventory, Sustainability, Smart Cities, Biogas; IIT Bombay Graduate

Trekking, Travelling, Running & Biking

"There is always an another perspective but the choice is always yours"

Kangkanika Neog | Research Analyst

Water Resources, Hydrological Modelling, Geographical Information Systems, Postgraduate in Environmental Studies and Resource Management, TERI University.

Music Aficionado, Cinema Enthusiast, Fiction Freak

"Only from the heart can you touch the sky." – Rumi

Ankita Sah | Research Analyst

Renewables, Energy Access, Climate Policy; Geography Hons. Post-Grad. Environmental Studies, University of Delhi

Travelling, Nature, Music, Astronomy & Philanthropy

"Amor omnia vincit" – Virgil

Prachi Gupta | Strategic Partnerships and Communications

Fundraising, Partnership Building, Lobbying, Advocacy, Public Relations, Advertising, Sciences Po Masters in Communications

Baking & Cycling

"It is only with the heart that one can see rightly; what is essential is invisible to the eye." - Saint Exupery in 'Le Petit Prince'

Mihir Shah | Communications Specialist

Development Communications, Brand Management, Digital & Social Media Marketing, Documentation, MICA Post-Grad in Management. Worked @ Government of Gujarat

Travel Photography, Running, Trekking & World Cinema

"Not all who wander are lost" - J R R Tolkien

Komal Verma | Events Coordinator

Event/Conference/Exhibition Planning, Logistics & Vendor Management, Strengthening Client Relationships, Negotiations ; MBA

Dancer, Interior Designer, Travelling, Ghazals

"Life is all about connecting the dots" – Steve Jobs

Aarti Katyal | Office Administrator

Administrator, Executive Assistant to CEO, Accounts & Finance; Post-Grad in HR & Supply Chain Management

Music, Dance, Art, Cooking & Cinema

"Don't waste a good mistake. Learn from it."

Marutendra Karyee | Finance and Accounts Executive

Professional Accounting, Reconciliations, Year-End Closings, Financial Reports; Commerce Grad

Cricket Lover

"Conservation is a state of harmony between men and land." – Aldo Leopold

Sandhya Singh | Administrative Assistant

Office Administration, HR Executive, MBA- HR & IT, 'A' Level from DOEACC Society, 'OCA' Certification from ORACLE

Travelling, Dancing, Cooking & Reading

"Confidence comes not from always being right but from not fearing to be wrong"

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Our Partners

Together with our partners in India and across the globe, we aim to achieve the highest standards of research in finding solutions to sustainability issues – and implement those solutions to make a difference to the world.

- 2030 Water Resources Group (WRG)
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- Asian Development Bank (ADB)
- Basque Centre for Climate Change (BC3), Spain
- Blacksmith Institute
- British High Commission
- Brookings Institution
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- Center for Study of Science, Technology and Policy (CSTEP)
- Centre for European Policy Studies, Belgium
- Centre for International Governance Innovation (CIGI), Canada
- Clean Energy Access Network (CLEAN)
- CNA Corporation, USA
- Columbia University
- Confederation of Indian Industry (CII)
- CSIRO, Australia
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- European Business and Technology Centre (EBTC)
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- Indian Institute of Technology Gandhinagar (IITGn)
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- Institute for Governance and Sustainable Development (IGSD)
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- International Institute for Sustainable Development (IISD), Switzerland
- International Institute of Applied Systems Analysis (IIASA)
- International Renewable Energy Agency (IRENA)
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- Lee Kuan Yew School of Public Policy, National University of Singapore
- Ministry of Environment, Forest and Climate Change (MoEFCC)
- Ministry of New and Renewable Energy (MNRE)
- Ministry of Petroleum and Natural Gas
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- The Energy and Resources Institute (TERI)
- The Nand and Jeet Khemka Foundation
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- United States Agency for International Development (USAID)
- Veolia Water India
- Vijnana Bharati

"It is enormously helpful to have a solid think-tank like CEEW helping sort out the complex issues involved in India's low carbon future."

Michael Bloomberg
Entrepreneur, Philanthropist, and Former Mayor of New York City

"Keywords I associate with CEEW: Highly professional; very capable; keen to learn and share knowledge; confident in their knowledge and capabilities; highly respected."

Dr Martin Burton
Independent Water Specialist

"CEEW has a very strong policy expertise and an excellent understanding of India's ground realities."

Johannes Urpelainen
Associate Professor, Columbia University

You could play an important role in supporting CEEW

You can support us by

- Offering financial support
- Giving a gift in kind to CEEW
- Creating partnerships with CEEW
- Helping CEEW gain visibility
- Contributing your valuable expertise and talent

#CEEWat5

We grow through our partnerships

Tracing CEEW's Five Year Journey

Key Milestones and Achievements

Jan 2010

Idea for a think-tank to integrate energy, water and environment conceived

Aug 2010

CEEW starts operations in a single empty room in Gurgaon

Oct 2010

Conceptualised and enabled the Maharashtra-Guangdong Partnership on Sustainability

Sep 2012

Published study on minor irrigation reform for the Indian State of Bihar

Mar 2013

CEO Dr Arunabha Ghosh nominated Young Global Leader by World Economic Forum

Jun 2013

Ranked number 1 climate think tank in India, 15th globally, by International Centre for Climate Governance (ICCG)

Nov 2013

Published report on Urban Water and Sanitation in India

Nov 2013

Submitted Report on Strategic Industries to the National Security Advisory Board

Jan 2014

Featured on University of Pennsylvania's '2013 Global Go To Think Tank Index' - Topped India in three categories

Mar 2014

Hosted Dr Ernest Moniz, US Energy Secretary, for a dialogue on Scaling Decentralised Clean Energy in India

May 2015

First-of-its-kind multi-sectoral analysis of India's long-term HFC emissions released

Jun 2015

Railways Minister released study on Solar Potential of Indian Railways

Jul 2015

Published major multi-country report on Climate Change: A Risk Assessment

Sep 2015

Minister of Power, Coal and New & Renewable Energy released ACCESS report, based on India's largest energy access survey

Dec 2010

Convened the working group on India and Global Governance

Jul 2011

Facilitated the $125 million India-US Joint Clean Energy R&D Center

Sep 2011

Published a 584-page National Water Resources Framework Study for India's 12th Five Year Plan

Aug 2012

National Security Adviser of India delivered keynote lecture at CEEW's Second Anniversary

May 2012

Published the first assessment of India's 22 gigawatt National Solar Mission

Dec 2011

Submitted first ever report on India and Global Governance to the National Security Adviser at the PM's Office

Apr 2014

Published first report on India's Green Industrial Policy

Jun 2014

Ranked number 1 climate think-tank in India for second year running by ICCG

Jun 2014

Organised Climate Geoengineering Governance conference with University of Oxford

Jul 2014

Co-Founded Clean Energy Access Network (CLEAN)

Feb 2015

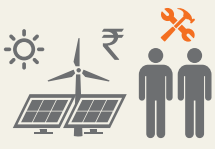
Environment Minister delivered keynote address at CEEW's Climate Day

Jan 2015

Featured once again on University of Pennsylvania's 'Global Go To Think Tank Index'

Oct 2014

Submitted reports on Environmental Clearances, Power Reforms, Solar, and Swachh Bharat to the PMO



Aug 2014

Published reports on Clean Energy Jobs and Finance

GERMAN KNOWHOW CAN HELP INDIA MEET GREEN TARGETS

KANIKA CHAWLA & ADITYA RAMJI
NEW DELHI

The term "energiewende", German for energy transition, was first coined in the 1970s by opponents of nuclear and fossil power who believed renewable energy

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theguardian

Environmentalists wary of India's plan to intervene in publishing of smog data

Concerned activists say government plan to analyse pollution figures for capital Delhi before they are released to the public is way to bury bad news

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mint

CONSUMER: India best placed for growth, says Polman
CORPORATE: RIL set to raise $750 million by selling 30-year bonds overseas
EARNINGS: Hero MotoCorp profit misses estimates
VIEWS: What Modi has Nehru to thank for

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SC JUNKS MALLYA'S PLEA IN FOREX VIOLATION CASE, IMPOSES ₹10L COST

UP COP BRINGS FIGHT AGAINST MULAYAM TO DELHI, SUSPENDED

IT'S D-DAY FOR CSK, RR
IPL BETTING VERDICT TODAY

India may be hotter by 8°C, lose $200bn per year

ENVIRONMENTAL AGENDA

Javadekar says budget will give direction to climate change efforts

By Mayank Aggarwal
mayank.a@livemint.com
NEW DELHI

Environment minister Prakash Javadekar on Tuesday said the upcoming budget will clearly signal the government's efforts to tackle climate change, adding that India has already begun work on its Intended Nationally Determined Contributions (INDCs), which will form the basis of climate change negotiations in Paris at the end of the year.

"I hope that the budget will energy, enhanced energy efficiency, sustainable habitats, water, sustaining the Himalayan ecosystem, green India, sustainable agriculture and strategic knowledge for climate change.

"So all put together, we are mapping what can be the best INDCs:.. There will be a complete synthesis between the country's declared intentions and its action," Javadekar added.

The environment ministry is already working with state governments, who have their own state action plans on climate change, for finalizing the INDCs.

Cohesive natural resource management needed for sustained growth

The Modi government can realise its vision of 'minimum government and maximum governance' by giving the public direct control over expenditure.

VAIBHAV CHATURVEDI, KARTHIK GANESAN, AND HEM DHOLAKIA
PATNA

Any government effort to invest in near term growth critically hinges on the availability of financial resources, but also equally importantly, the supply of natural resources.

To harness natural resources to drive growth, three critical questions need to be answered. First, what are the resource requirements to achieve an average GDP growth rate of 10% between 2015 and 2032? Second, what are the challenges in securing these resources? And finally, what are the strategies to mitigate the pressure on natural

demand can be expected to reach 2250 TWh. It is unlikely that this demand can be met without tapping all available sources — coal, gas, nuclear and renewable energy.

Experts have highlighted that coal is going to be the mainstay for power generation in India. Languishing domestic coal production and the increasing rate of coal imports have already thrown up questions of energy security. The government is moving fast on coal block auctioning and other measures to enhance domestic coal production, which currently has a capacity of 565 million tonnes for electricity

the power, transportation and residential sectors. Resolution of issues in domestic price determination and the incentive structure for increasing exploration and production are critical.

Even with coal expected to be crucial to the Indian economy, there is a big push on renewable energy, including the off-grid route to increase energy access, as a means to address the pressing concerns of climate change. India seeks to build GW of solar generation capacity and 65 GW of installed wind capacity by 2022. An analysis by the Council on Energy, Environment and Water has highlighted that as

is going to be the defining factor for the import of light water reactors to Ind tic reactors are cl there are limitation ing up capacity p domestic nuclear t

It is imperati to ensure tha water require irrigation do not increase production. can be done t technologies drip irrigatic

hectares of land (53% of the total geographical area) is

resources. While the eastern region has abundant rainfall

each drop of water counts. Even the water required for cleaning solar panels in re-

tious and expanded to cover the remaining two-thirds of the energy consuming

---

DELHI, MONDAY, JULY 20, 2015

THE HINDU

INDIA'S NATIONAL NEWSPAPER SINCE 1878

SOLAR POWER

AN IMPETUS TO 'MAKE IN INDIA'

The Indian EXPRESS
JOURNALISM OF COURAGE

WER SUPPLY AND FREQUENT POWER OUTAGES HAVE SERIOUS FINANCIAL IMPLICATIONS FOR INDIAN INDUSTRY

The Telegraph

India sees largest deal in solar in Q2

G. Balachandar

Global corporate funding in solar sector marginally down during April-June qua 2015 when compared with the preced quarter, Indian solar sector continued action by way of some VC (venture ca funding and M & A (merger & acquisitio deals. Total global corporate funding i week, she alleged that during her tenure as environment minister she had received specific

developing countries.

Javadekar also said the government plans to add to the

Kakodkar: Must target 63,000 mw n-power by 2032

AMITABH SINHA
NEW DELHI, FEBRUARY 3

FOLLOWING the recent understanding with the US on issues relating to nuclear liability, India must once again aim at achieving the target of producing 63,000 mw of electricity through nuclear energy by 2032, former secretary of the Department of Atomic Energy Anil Kakodkar said on Tuesday.

stalled capacity would still come only to 27,480 mw.

Many more reactors are to be built, but they might take some more time.

Several of these reactors are to be set up with collaborations with the United States, France and Russia. Work on the American and French reactors have been delayed due of some provisions in the civil nuclear liability law that India passed in

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Sun power for jobs, with ride

OUR SPECIAL CORRESPONDENT

New Delhi, Feb. 15: India's plans to expand solar energy 30-fold to 100,000MW in seven years could create more than a million new jobs but demand chunks of land cumulatively larger than the metro areas of Calcutta or Delhi, an environment think-tank has said.

An analysis by the Delhi-based Council on Energy Environment and Water has suggested that 40,000MW solar

an economist and policy analyst with the CEEW who is a co-author of the report.

Independent studies, including an assessment last year by the CEEW, have suggested that adding one MW of solar energy would require about five acres of land to support the standard commercial flat solar panels that receive light from the Sun and turn it into electricity. The addition of 80,000MW solar energy capacity Chawla said, would require

French company that is build-

Jasthan, Madhya Pra

THE HINDU
BusinessLine

'India will be one of the world's top 5 solar markets by 2020'

M Ramesh

मुंबईसह ५ शहरांमध्ये 'उष्मामृत्यू' वाढणार

म. टा. विशेष प्रतिनिधी, मुंबई

एनर्जी, एन्व्हायर्नमेंट अँण्ड वॉटर (सीईईडब्ल्यू) या संस्थेच्या माध्यमातून व इतर देशांच्याही तज्ज्ञ संस्थांकडून वातावरण बदलातील पर्यंत जोखमींचा अभ्यास करणारा हा अहवाल सोमवारी

स्थलांतरामुळे नक्षलवादाचा धोका

व्हाइसअँडमिरल (निवृत्त) प्रदीप चौहान यांनी वातावरणबदलाच्या अंतर्गत शांतता-सुरक्षेवरील परिणामांकडे लक्ष वेधले. अफगाणिस्तान-पाकिस्तानातील दुष्काळ किंवा बांगलादेशात वारंवार येणारा पूर व जमिनीचा ऱ्हास यामुळे या देशांवरील ताण वाढेल व त्यातून तेथील लोकसंख्या मोठ्या प्रमाणात

FRONTLINE

THE NATION KALBURGI
Murder of reason

SCIENCE & TECHNOLOGY
India's eye in the sky

ENVIRONMENT

CLIMATE CHANGE

Missed opportunity

of nuclear power, including the 1,000 MW of electricity being generated by recently-inducted Unit-I at Kudankulam. The 1,000 mw Unit-II at Kudankulam is also slated to begin power production soon. Five nuclear reactors with a total capacity of 3,300 mw are under various stages of construction. In addition, work on 19 new reactors, with a cumulative generation capacity of 17,400 mw, is scheduled to begin in the next few years. If all these start producing electricity by 2025 to 2027, the total in-

tors, and build them in "convoy" mode. "We shoul aim at building a reactor i five years, instead of th seven or eight years it take now. We have done it in cas of some reactors in th past," he said.

"What we need to do is t announce our intention rig away. We need to talk in tern of a programme and not ju projects. That is when the a sociated industry will als start investing and build its c pacity. The 63 gw target b 2032 is doable and we mu strive to achieve it," he said.

TIMES CITY

'If seas rise 1m, serious flood risk soars 1,000 times in coastal cities'

Global Study Reiterates Dangers Of Climate Change

Anahita.Mukherji

'4°C RISE IN TEMPERATURE WILL BE INTOLERABLE FOR HUMANS'

According to a multi-nation, multi-organization risk assessment report on climate change released on Monday, a 1-metre rise in global sea levels increases the probability of an once-in-a-hundred-year flood by

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HEAT IS ON IN NORTH INDIA

Deciphering Modi's Climate Change Gambit

"CEEW's achievements within this short time span is worthy of praise and emulation for any young organisation operating in the challenging environment of public policy."

Mr Jamshyd Godrej

"For anyone interested in energy, environment and water, CEEW is the think tank to follow. Their studies, research and reports are outstanding in the quality of data, analysis and recommendations. It just goes to show how much can be achieved within a short period of 5 years."

Mr Tarun Das

"Five years ago, CEEW tread a path where many didn't dare venture. Today, CEEW through its world-class research has increasingly proved indispensable to any conversation on sustainability in India and across the world."

Mr Gautam Thapar

"I congratulate the entire CEEW team to have built one of the finest climate think tanks to have emerged across the globe in recent years. Holistic understanding of issues, thorough analysis, and precise policy recommendations are a trademark feature of any CEEW research."

Dr Anil Kakodkar

"Five years ago, CEEW was an idea whose time had come. Since then, with every piece of its independent research, CEEW has challenged us to see the planet differently, listen more carefully to the increasing resource constraints, and innovate together for a more prosperous yet sustainable tomorrow."

Mr Deepak Parekh

"CEEW is one of those organisations that follow an integrated and interdisciplinary approach to their work. I am confident that CEEW is contributing in a positive way to the world, where various human systems including businesses, markets and international security are increasingly vulnerable to the risks of climate change."

Mr S. Ramadorai

Council on Energy, Environment and Water,
Thapar House, 124, Janpath, New Delhi 110001, India

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