Climate Change Community

Community Update
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In this Issue

FROM THE RESOURCE PERSON

Dear Members,

We are presenting the 67th Edition of the Monthly Community Update of the Climate Change Community of Practice (CoP), today.

We thank you for your continued cooperation and support to this unique knowledge sharing platform facilitated by UNDP which has completed six glorious years since its inception on 1st July, 2009.

We seek your inputs on the following query by the Centre for for Environment Education:

UNDP in collaboration with CEE is in the process of revising and adding supplementary information to the training toolkit on Low Carbon Lifestyles, which was first published in 2010.

A link to the original toolkit is given below: ftp://ftp.solutionexchange.net.in/public/clmt/resource/res02111001.pdf

The new project involves the revision of the training toolkit on 'Low Carbon Lifestyles' that was prepared in 2010. The past five years have seen changes in technologies, costs and data as well as specific and significant lifestyle changes that require additional focus on certain other sources of GHG emissions. This calls for a revision of the current data and information highlighted in the training toolkit and addition of several new messages.

The toolkit has been disseminated far and wide throughout the length and breadth of the country over the past 5 years and inputs gathered from all stakeholders during the dissemination process will be integrated into this revision.

The revised toolkit will give a short background on individual contributions to GHG emissions, quantitative information on how our actions contribute to these emissions and key monitoring and action points that can be adopted by the public at large. It will be disseminated through NGOs and CBOs to a wide variety of audiences including other channels of communication, in particular the electronic and print media.

The project duration to complete this revision is about 2 months only, commencing September 7th 2015 to October 30th 2015.

The SCOPE OF WORK envisaged at this stage is given below:

- Collection of revised data on emission factors, efficiencies and costs, from various agencies.

Re-tabulation of the emission and cost reductions for each action point, based on the latest new data collected.

- Identification of at least 20 new action points, pertaining to better waste and water management, apart from adding to the action points on LED, electricity and fuel conservation.
- Collection of data for each of the identified new action points and tabulation of the emission and cost reductions for each action point, as in the earlier toolkit, incorporating the latest information.
- Collection of background information on the physical science basis for climate change and the identification of key contributors to the problem, as an introduction to the different chapters of the training toolkit.
- Creating the revised and updated toolkit, splitting action points into chapters and providing an introduction for each chapter. Key monitoring processes will also be highlighted in each chapter.

We request members to let us know:

- **Do you think now is the opportune time to revise the earlier toolkit?**
- **What additional sectors and messages according to you should be included in the toolkit?**

Your comments and suggestions on improving / enhancing the scope of work will also be greatly appreciated.

We would like to involve you all in helping us to prepare this revised toolkit, which we believe is really the need of the hour. Please let us know how you can help us in this endeavour of national importance as climate change is affecting each of us adversely.

We look forward to receiving your inputs and insights in large numbers on this subject of immense importance for the survival of humankind on the planet earth. At lease we all will be doing our bit to save mother earth by contributing to this query and helping us to revise the low carbon lifestyles toolkit.

Thanks & best regards,
Ramesh Kumar Jalan
Resource Person & Moderator
Climate Change Community,
Solution Exchange-India
United Nations Development Programme, New Delhi

DEVELOPMENT IN THE SECTOR

Biomass Energy Powered the Edo Period of Japan

This article is available at the website of Kanto Regional Agricultural Administration Office:
http://www.maff.go.jp/kanto/kihon/kikaku/biomass/ktrenraku/foram/ishikawa.html

The interval of Japan's history between 1603 and 1867 is called the Edo Period. During this era, Japanese society established a unique and sustainable society that operated within the capacity of its domestic resources by properly using plant-based materials without depending on overseas imports including fossil fuels.

The novelist Eisuke Ishikawa, one of Japan's leading researchers on the Edo Period, delivered a keynote speech at the "Kanto Biomass Forum" in 2004 hosted by government-affiliated

associations in the Kanto region. The theme of this forum was to consider biomass energy with a perspective spanning three generations -- encompassing Japanese traditional culture and future biomass use.

In Japan, it seems that on one pretext or another, Japanese people stopped following the daily habits that we now call "recycling" and "volunteering," using words borrowed from English. This gave rise to an array of problems, and so we imported the same ideas from overseas and started doing the same things again, using foreign words, as such things were formerly taken for granted and not conceptualized in the Japanese language.

On the other hand, the case of the imported word or idea of "biomass" is slightly different. It seems that the idea of biomass is perceived in Japan as directly analogous to our traditional recycle-oriented lifestyle.

We tend to say, "Let's go back to a recycle-based society," however, this will never be achieved in our current society.

This is because an enormous amount of energy - as much as about 120,000 kilocalories (kcal) - is now consumed per capita every day in Japan. About 100,000 kcal of this is generated from fossil fuels, which cannot be replenished once they are used. Since fossil fuels are necessary even for material recycling nowadays, it is completely impossible to do "true" recycling.

Our current world is in fact a one-way civilization. Resources such as fossil fuels are consumed at a rapid rate while resource replenishment hardly ever occurs. What we call a "recycling-based society" is simply like spinning a top on a one-way conveyor belt.

In this context the Japanese society in the Edo Period as a society on a turntable. All the material resources flowed through the society in a cycle we can compare to a turntable spinning a record; it was a truly recycle-oriented society. The turntable revolved 360-degrees over the course of a year, because almost all materials in those days were biomass resources derived from plants.

Biomass is defined as "biological resources, mostly plant-based materials." Almost all commodities consumed in the Edo-Period lifestyle were made from fast-growing plants. Anything that wore out was disposed of or burned and the residue would decompose into water and carbon dioxide, which helped grow plants during the following year. This kind of cycle would not increase the volume of carbon dioxide in the atmosphere, while maintaining a stable annual material balance.

Of course, metal products, ceramics and other products not derived from plants were used in daily life. People used biomass resources such as charcoal to refine metal products and to fire ceramics. As long as plant materials are used properly and within certain parameters, they do not become depleted. Photosynthesis made it possible to operate such a system. Carbon dioxide and water are taken up into plant tissues again and again using energy from sunlight.

The simplest example of biomass use in the Edo Period is rice cultivation. The population in the 1720s was about 30 to 31 million, of which 14 million people - nearly half - were engaged in growing rice. Wet-paddy rice cultivation is the most suitable agricultural practice given growing conditions in Japan. Compared to wheat production during the same period in Europe, wet-paddy rice cultivation in the late Edo Period (1751-1868) could produce enough food for about 10 times more people using the same sized area.

In these former times, people chose to grow rice varieties that would produce as much straw as possible, since rice straw has many uses. After we eat rice, we produce excreta and people in the

Edo Period sold human waste as fertilizer. Such fertilizer went back into the soil and never flowed into drainage systems. Therefore, the river water in Edo (present-day Tokyo & vicinity) and Osaka was clean enough to drink. Well water was used for daily housework such as washing clothes and house cleaning. People drank water from the rivers. This was exceptional because no other [urban] river in the world at that time could provide drinking water. Thus, farm crops consumed in cities ended up as a source of fertilizer. For farmers, it can be said that cities functioned as a device for converting food into fertilizer.

As for rice straw, according to researchers, half of the straw produced was returned to farmlands as fertilizer in the form of compost or barnyard manure. About 30 percent of straw was used for fuel, and even ash left after burning straw was a useful resource. Ash is an important source of potassium in fertilizer, and so there were ash buyers who collected ash in cities in the Edo Period. Though many cultures throughout the world are said to use ash, Japan is the only country where ash was sold to specialized merchants, as far as my own research shows. Ash was a marketable biomass product. The remaining 20 percent biomass was used for producing daily commodities.

Both rice and rice straw were totally recycled back into the earth within a year. Solar energy alone supported this recycling system. In the Edo Period, more than 99 percent of kinetic power came from human labour, and humans were fed by grain mainly harvested in the previous year. The grain harvest was also the product of human labour and solar energy during the previous year. Therefore, when we consider human resource use, at present we depend on fossil fuel, but our ancestors depended on biomass.

Japan was a 'plant-based country' in the Edo Period. In the sense that Japanese people grew the plants on which their daily lives depended and therefore, the expression "plant-based country" is appropriate. We can also say "biomass-based country" to express the same thing in a trendier way. Therefore, Japan was a 'biomass-based country' in the Edo Period".

Biomass was also used as an energy source for light and heat. In the Edo Period, most people in cities used lanterns as lighting equipment.

Lanterns were very dim - only about one-hundredth to one-fiftieth of the brightness of a 60-Watt bulb. Lanterns also produced black soot, blackening the walls and ceiling of the house. That's why a thorough house cleaning used to be called "susuhaki," which means sweeping the soot out of the house. Thus, as lighting equipment, lanterns had some down sides.

However, the oil used for lighting was mainly from rapeseed and cotton seed sources. Thus, lighting oil was also a product ultimately extracted from the solar energy of the previous year. When oil was burned, it was converted to carbon dioxide and water, which were absorbed by plants in the following year, with oil being produced again from the harvested plants. That is, when burning oil in lanterns, people also promoted circulation in the recycling system. People took good care of plants and led their lives in a society based on biomass.

For people who spent their childhood during World War II, the biomass-based life of former days seemed frighteningly hard. However, from the era of our prehistoric ancestors down to the present, the human genome or DNA (deoxyribonucleic acid) sequence has basically not changed much. Therefore, our bodies are designed to be adaptable to difficult circumstances, such as food shortages and cold weather.

Meanwhile, our lifestyles have dramatically changed in only 50 years or so. The easy modern lifestyle does not put so much of a burden on our bodies, but in fact it might be forcing us to put a heavy burden on society as a whole.

Why do problems emerge in our present society one after another without surcease, in spite of our affluence? Lots of suggestions no doubt come to mind. It is impossible for us to go back to a lifestyle that is 100 percent dependent on biomass. But, we might be more comfortable in a real sense, if we could return to a biomass-based life.

In our present Japanese society, it will be difficult to replace even 10% of fossil fuels with biomass. However, we just need to do whatever we can do, however small. The important thing is that we try many different approaches and gain as much experience as possible.

It is doubtful that we can continue to consume as much fossil fuel as we desire. One reason for this uncertainty is that we do not know whether Japan will continue to be an economically powerful nation. Another reason is that we might be entering an era in which we hesitate to use fossil fuels due to environmental deterioration.

One good approach that can lessen our fear of failure is to try using biomass as widely as possible. This works even better if you enjoy doing it.

As one example, Japan's food self-sufficiency is rated at 40% based on calories. At the same time, 40% of kitchen garbage collected in the city of Kyoto is comprised of leftovers, according to one researcher. The percent of leftovers is the same as Japan's food self-sufficiency ratio, meaning that this city is throwing away an amount of food equivalent to its supply of home-grown agricultural products.

According to data published by the Science and Technology Agency in 1999, Japan's gross agricultural production amounted to 12.4 trillion yen (about US$101.64 billion), while the monetary equivalent of discarded leftovers amounted to 11.1 trillion yen (about US$90.98 billion) based on market prices. In monetary terms, this means that we are dumping the equivalent of 90% of domestically-produced food.

This data implies that we are actually living on 60% of the food that is already accessible. At the same time, Japanese people are increasingly suffering from weight gain because of over-supply. So if we ever become unable to import food, 40% of the 60% we are actually living on now could be replaced with home-grown products, on the condition that we don't waste food. Calculating 40% out of 60% gives us 66.666%; this would raise Japan's food self-sufficiency to nearly 70%. And if we try to eat less and import about 10% of the food we consume, it might be possible to live without relying too much on imports.

The same goes for energy. Per capita energy consumption in the Edo period was equivalent to 0 kcal in terms of present standards; however, present, daily per capita consumption of energy from fossil fuels alone is as much as 100,000 kcal. Back in 1970, this figure was only 50,000 kcal. If the fossil fuel energy supply decreases, the use of biomass will automatically increase whether we like it or not.

The use of biomass is already part of our lives. There are still many people adept at making charcoal, which is a good example of biomass-derived energy, as well as those who are creating new energy sources. You don't need to try too hard to increase the use of biomass because society will soon be demanding it. For the time being, we just need to patiently try every available technology.

In the Edo period, there weren't many kinds of energy sources available except biomass, most of which was derived from fast-growing plants. You may think that tree growth would have been too slow to keep up with firewood demand, resulting in insufficient firewood supply. However, Japan's population at that time was only 30 million and only 1,000 kcal of energy from firewood was

required per day. This was actually considerably less than percent of tree growth at the time. It was an era when forestry was managed properly.

There are many things that we should learn from the people of the Edo period, particularly regarding biomass.

MNRE should not go back to capital subsidies for rooftop solar: Here is a better idea by BRIDGE TO INDIA.

The article is available at : http://www.bridgetoindia.com/blog/dear-mnre-please-dont-go-back-to-capital-subsidies-for-rooftop-solar-here-is-a-better-idea/

To meet India's ambitious 40 GW target for rooftop solar, the Ministry of New and Renewable Energy (MNRE) is again leaning on capital subsidies. In line with one of the earlier notifications, it wants to provide 15% subsidy to residential consumers, government buildings, hospitals, educational institutions and other establishments of common use.

Plans to use interest rate subvention as a primary incentive to drive the market in the initial few years, which sounded like good news to us, have not found favour with the Ministry of Finance. Presumably, their concern was assumption of greater risk and indebtedness by the Government of India.

Even if sufficient funds are provided for capital subsidy, it will still be an inefficient incentive tool because it encourages wrong behaviour. Lack of financing and high cost of financing have been key barriers to the growth of rooftop solar and the government needs to address these urgently. **One of the most cost effective ways to promote rooftop solar is to make utilities a partner by incentivizing net-metering implementation**

In the past, a key challenge of the capital subsidy mechanism has been the limited availability of funds, which restricted the market and did more harm than good. But now MNRE plans to get a sanction for INR 40 billion (USD 630 million) for subsidies until 2019.

Based on analysis by Bridge to India, capital subsidies are one of the most inefficient ways of using government funds. It projects that India will install 3,739 MW of rooftop solar by 2019 based on the commercial viability of solar vis-à-vis the cost of solar. With the government's proposed scheme, it is estimated that the net increase in installations will only be around 400 MW and the government will end up using INR 20 b (USD 313 million).

The low impact of the subsidy mechanism is primarily because the subsidy is targeted towards customers for whom financial viability of solar is not the primary driver for adoption. This is especially true for residential consumers. Several projects that would benefit from the subsidy would have been constructed without it as well as they are primarily driven by need for power and other non-economic drivers. On the other hand, if this subsidy was to be targeted towards industrial and commercial consumers, it would have had a larger impact but then the funds wouldn't be sufficient and the subsidy mechanism would again become a bottleneck.

The main point, however, is that the inefficiency of running subsidy programs is counterproductive. Projects that might have been built without subsidy are stalled because stakeholders prefer to wait and get caught up in process delays. Subsidies encourage "rent seeking" behaviour – it was observed in the past that subsidized prices were usually 10-20% above non-subsidized prices prevailing in the market. **This means that a large share of the subsidy is pocketed by the middlemen rather than by the consumers.**

The new plan is to channel subsidies through state nodal agencies rather than the MNRE It is expected that this would only increase inefficiencies.

As a part of the Solar Rooftop Policy Coalition (SRPC), BRIDGE TO INDIA is working with the Climate Group, Department for International Development (UK Government) and the Khemka Foundation among many others to develop suggestions on how the government can increase solar adoption in the country in the most cost effective manner – i.e. getting the most solar for a taxpayer's Rupee.

Interim findings by Bridge to India show that one of the most cost effective ways to promote rooftop solar is to encourage utilities to effectively implement net-metering, which can increase adoption rates by as much as 50%.

If instead of providing subsidies, the government pays the DISCOMs an amount of say INR 1/kWh for banking of power for the first four years and the regulatory framework allows the power output to be counted for RPO fulfilment, rooftop solar can actually become the one of the cheapest means for RPO fulfilment for the DISCOMs.

Interim analysis by Bridge to India shows that by spending just INR 4.5 billion (USD 70 million) until 2019 on incentivizing DISCOMs to implement net-metering, an additional 1,450 MW can be added over and above the status quo installations. This can take total rooftop solar installations to over 5 GW by 2019. It will also encourage the utilities to evolve business models around rooftop solar integration and help form a solid foundation for the future growth of the sector.

Short story titled: Pani barsa, dil bahar (Rain falls, heart bloom) written by Darpan Chhabra.

He is providing educational services to some of the schools in Western and Northern India and this is one of the stories written for kids of these schools to understand desertification and productive solutions to combat it.

You are out…out…out...this is final! Yeh!" A yell emerging and bouncing on the rocky hillock located in front of mud coated thatched house of Hira Dhan signifying the traditional Indian game Sikdi was under momentum.

A palm sized mineral pebble in the right hand of Gurua, son of Hira Dhan, was waiting to meet another block bordered with chalked outline on the ground. "I got it…got it…", a yell he heard from the long distance and lonely path. "Papa?!", he murmured.

With two steel made water pots, one placed over the head and another lifted under the left arm, Misha Dhan, wife of Hira, was out of the house along with three women neighbours. To see the glance of water in the well, located five kilometres away from the house, she travelled daily though the barren soils and crossed thorny stunted bushes. She also had to go to the village market to purchase vegetables.

With one son studying in fifth standard, another in tenth and one daughter in eleventh standard Hira and Misha had lot of concerns of their career. Being the only farmer in the house Hira brought a mere sum of four thousand rupees to his house in a month.

His dependency on the money lender was increasing day by day. To fulfil the wishes and daily needs of his children and wife he used to take loans from big farmers and money lenders. A small

chemist shop and higher education of children were the stepping stones he dreamt to build up the future of his children.

"I got it…got it", chanted Hira running towards his house with power. It seemed to Gurua that his father has got a treasure.

"Hey what you got Papa?", asked Gaura from Hira. He got a loan amount from his Samadhan Village Committee to kick off land treatment on the hillock and surrounding plains.

He showed the cheque of one lakh rupees to Guara and Misha. The family jumped out with joy.

"What you will do the money?", asked hopeless Misha. "Planning and land treatment", replied Hira holding his breath. "What this means?", asked curious Gurua.

"I am very hungry", said Hira looking at his wife. This was quite rare that his face was glowing with joy and exited tongue sticking to the dry mouth. During his late lunch he started imagining of one more dish in the plate.

After eating food he came out from his room with his son and wife and told them "to listen very carefully." He picked up the measuring tape and started measuring the land area occupied by hillock and plain land.

"Small trenches, and stone bunds will be constructed across the slope on the chuck of land area", he told his son.

"What are trenches and stone bunds", asked Gurua. "We exactly call them contour trenches. Trenches are one and a half foot deep, five foot long and point eight foot broad structures dig across the land slopes."

"Stone bunds are four to five foot raised stone walls constructed across the slopes to restrict soil erosion."

Explaining Gurua and Oli further he said, "Trenches will absorb the rain water, along with trenches stone bunds will help stop the soil erosion".

"In this way the water will be absorbed and important nutrient from the soil will not be swept along with water and wind."

"What more can be done to absorb the water down the ground?", asked Gurua. "We will plant fodder grasses on the land and in the trenches whose roots will bind the loose particles of the soil."

"The fodder will be harvested after three months which we can feed to our two cows and one buffalo. The leftover we will sale in the village market and fodder bank."

"What we can do more?", asked Hira this time from Gurua. "Uuuuu!", "can we plant trees on the plain?" "Yes!", replied Hira.

Explaining Misha, Gurua, Ari, his another son and daughter Oli, he said, "the construction will rise the water level underground and water in the wells around and help restore the soil quality by preventing the water and soil to flow down the ground."

"Good quality of soil and rich amount of water will increase the vegetation on the hillock which

will feed the livestock. Thus, livestock will produce more milk. The milk will be sold to the nearby dairy. The water absorbed in the land will nurture the crops in the fields. Crop harvested will be sold in the market."

"The income got in first year will also serve the Village Committee to settle the loan amount. Amount taken as debt from the money lenders will also be repaid to them."

"We will be rich and happy family", said Oli taking a big sigh.

Plan started to work. Hira hired local farmers to construct trenches. Measurements of the trenches were decided. 2 months deadline was given to complete the work. Trenches, stone bunds, and pits for plantation were prepared at the planned site.

Came the monsoon trees were planted and fodder seeds were sprinkled by Hira, Misha and Gurua. Water was accumulated in the trenches with the continuous and mild showers falling on the hillock and plains.

"Pani barsa, dil bahar, Angan mein aayo kushian hazaar, Tan bheega, haath mein boonden liye hazaar", which enchanted the women living around. (Translates to : Rain falls, heart bloom; Thousands of happiness brought to the house; Body becomes wet with thousands of water drops hold in the hand.)

Announcements

Visit to project sites and bankers meet for the Project: Market Development and Promotion of Solar Concentrator based Process Heat Applications in India.

The participants received the information well, and more than 50% of them later participated in the field visit to CSH installations. The Banks were keen to extend lending.

Though the subject of extending low interest loans came up for discussions by the Bankers, PMU indicated that the technology is market ready and the project is filling in the gaps in awareness, capacity, supply network, providing technical assistance, financial assistance in selected cases etc.

Bankers suggested that a stronger annual maintenance should be extended so that the systems do not becoming non-functional and the customer do not default on this account.

For PMUs proposal to the Bankers that the CSH be provided lending without additional collateral but system itself as collateral appeared reasonable since Renewable Energy is included in prime lending by banks .

The installations visited in **Bangalore and Hyderabad** include:

1. **Bangalore :** Bosch has installed a scheffler system for generating steam, about 3 years back near Bangalore. This has helped them reduce the consumption of LPG in the kitchen. The system is installed on the roof of the canteen. Though rest of the maintenance is good, mirror deterioration is a cause of concern. PMU will raise this subject at the CSH platform which consists of most stakeholders involved in promotion of CSH systems including the manufacturers.

2. The four installations visited in **Hyderabad** include:
   - PTCs based system with 821 sq. m. area (128 PTCs each of 6.4 sq. m.) at Honeywell Technology Solutions Lab by Thermax for comfort cooling using 100TR VAM;
   - Paraboloid dish based systems of 450 sq. m. area (5 dishes each of 90 sq. m.) at Synthokem Labs by Megawatt Solution for heating thermic fluid required for heating the reactors being used for chemical treatment of medical compounds;
   - Paraboloid dish based system with 540 sq. m. area (6 dishes each of 90 sq. m.) at Unique biotech by Megawatt Solution for heating thermic fluid required for manufacturing of medical compounds

   - PTCs based system with 255 sq. m. area (170 PTCs each of 1.5 sq. m.) at Almond House Sweet Makers by Oorja Energy Engg. Services for heating thermic fluid required for preparation of sweets.

Cleaning of mirrors has been a problem in most cases. More periodical cleaning of mirrors was required in almost all the cases we visited. The

users need to be made aware on the importance of cleaning and its impact on performance. A clear understanding on impact of cleaning on performance is not available. PMU can commission a short study to assess this as the results can be used for creating awareness to the users.

Parabolic dish collectors for heating are appearing useful, one dish of 90 sq. m. saving 25 liters diesel per day [as per user feedback] and users are expecting reasonable payback of 3 to 4 years.

VAM system does not appear to provide attractive payback under the current operating conditions.

Delhi's clean air challenge: It is time to understand what we have done and the actions we need to take urgently and decisively by Sunita Narain, CSE, New Delhi

The article is available at: http://live.downtoearth.org.in/blog/delhi-s-clean-air-challenge-50153

It is good that deadly air pollution in Delhi has become national headline. But it is bad that we are failing to deal with it and find answers that are commensurate with the scale of the problem. It is time to understand what we have done and the actions we need to take urgently and decisively. Otherwise, next winter—barely five months away—will be even more severe and hazardous. While foreigners can choose not to live in polluted Delhi, most of us do not have that option. Let's also be clear that home air purifiers and filters are not the solution even if the rich in the city believe that they can shut their houses and clean their own private air.

Some 16 years ago, the Centre for Science and Environment (CSE) issued an advertisement: "Roll down the window of your bullet-proof car, Mr Prime Minister. The security threat is not the gun, it is the air of Delhi." This was the time when the air of Delhi was full of black smoke, fuel and emission standards were virtually non-existent and motorisation was just beginning to take off. The agenda for action—also listed by CSE in the public notice—was to advance the roadmap for fuel-emission standards; restrict diesel vehicles and make the transition to a much cleaner fuel, compressed natural gas (CNG).

Not anymore. Since 2007 pollution has risen to dangerously toxic levels. This winter, the level of PM 2.5—tiny particles emitted from vehicles that can go deep into the lungs and enter the blood stream—remained three-four times higher than the safety standard. In fact, in November, December and January, air was classified as "severely polluted" for over 65 per cent of the days. According to the government's own air quality index, this meant pollution was so bad that it could cause "respiratory effects even on healthy people". It is unsafe to breathe. This is what we must realise.

So, what has happened to make Delhi residents, once again, wheeze, choke and die because of dirty air? In the past decade, since the introduction of CNG, some things have changed. First, there has been an explosion of personal vehicles—near 100 per cent increase in registration in Delhi alone. So, even as each car has become cleaner because of tighter emission standards and better quality of fuel, the number has increased exponentially. The net result on pollution is the same.

Second, while in 2000 diesel cars were only 4 per cent of the total sales, this increased to 50 per cent by mid-2000. Each diesel car is legally allowed to emit four to seven times more than the petrol variant. Pollution is inevitable. Third, the bypass road, ordered by the Supreme Court in 2004, was not built. So, some 50,000 trucks using dirty fuel and even dirtier technology transit

the city.

One new source of pollution has made an entry. Post mid-2000, Punjab and Haryana directed farmers to delay paddy transplantation to reduce groundwater usage in peak summer. Now farmers have no time to prepare the field between harvesting paddy and growing wheat, so they burn the straw. In October and November, just as winter inversion is settling in, smoke from this fire makes its way to the already polluted airshed of Delhi.

The country immediately needs an aggressive roadmap for clean fuel and vehicle technology. This is not acceptable to powerful vehicle manufacturers. Even as oil companies have started the supply of cleaner fuel across north India since April 1, 2015, car companies have succeeded in getting an extension for supply of clean vehicles from the surface transport ministry. Now, the same car companies are busy arguing that they should continue to have the licence to pollute. They want 8-10 years to move to the cleaner vehicle technology Europe uses today. These companies need to understand that we have all run out of time and air to breathe.

The other steps are equally urgent, from monitoring air quality to smog alerts, so that we know when it is advisable to take precautions because of bad air. But most critical is the need to massively augment our public transportation systems, from bus and metro to footpaths and cycle tracks, so that we can take a bus and then cross the road or just walk. We also need car restraints. Parking rates and fines for illegal parking need to be increased and then enforced. Today we have a handful of cranes and a sprinkling of traffic police to stop illegal parking. This cannot go on.

In mid-1990s, CSE published a report on air pollution and called it the Delhi Story. It is available at: http://cseindia.org/challenge_balance/readings/LeapfrogFactor_Delhistory.pdf .

Environment Journalism Competition 2015, Deadline 15th August 2015

GIZ India in association with IFAT India, ICLEI South Asia, The Third Pole, Asian College of Journalism and DW Akademie and under the patronage of the German Embassy organise **All India Environment Journalism Competition.** Our purpose is to encourage and inspire journalists to report on a wider range of environmental issues at various levels like local, state and national, which in turn would sensitize people on various environmental concerns and raise public awareness by providing accurate information and analysis. Thus contribute to a changing society and promoting sustainable lifestyle.

The award ceremony will be held in Mumbai on October 13, 2015 as part of the IFAT fair, India's leading trade fair for water, sewage, refuse and recycling, where GIZ India is the knowledge partner. This year will be the third year in series and we wish to reach out to many journalist, especially those who are writing on very local environmental issues in vernacular languages.

The details about the competition can be found at http://www.igep.in/e48093/e59184/

You can also refer to last year's winning entries and award winners at http://www.igep.in/e48093/e59184/e61264/

Disposal of waste plastic is no longer a problem in the steel city with Jamshedpur Utility and Services Company (JUSCO) using bitumen

technology on waste plastic, ranging from polybags to biscuit packets, for constructing roads

Disposal of waste plastic is no longer a problem in the steel city with Jamshedpur Utility and Services Company (JUSCO) using bitumen technology on waste plastic, ranging from polybags to biscuit packets, for constructing roads.

JUSCO, a 100 per cent subsidiary company of Tata Steel which maintains and provides municipal services in Tata command area of the city, has constructed 12-15 kms road in the steel city as well as Tata Steel Works besides widening 22 roads using the environment-friendly technology of utilising waste plastic.

"As far as we know, Jamshedpur is the only city in eastern India where bitumen technology (Dry Process) patented by Thiagarajar College of Engineering (TCE), Tirupparankuram, Madurai, has been implemented on accumulated waste plastic for the first time", Gaurav Anand, Senior Manager (Quality Assurance) of JUSCO, said today.

Claiming that there is no maintenance cost involved for the first five years, Anand, who is an environment engineer, said that for every stretch of such one km long and four metre wide road, one tonne of bitumen costing Rs 50,000 is saved.

The use of bitumen has been reduced by 7 per cent ever since JUSCO began using waste plastic in road construction work, he said, adding that the quality and longevity of roads made of waste plastic-aggregate-bitumen was two times better than bitumen road.

Describing plastic tar road as a "new pathway", Pratyush Dandpat, Deputy Manager (Quality Assurance) of JUSCO, said that the technology turned out to be successful.

Besides being water resistant, it has better binding property, higher softening point, can withstand high temperature and higher load, has lower penetration value, costs less as compared to bitumen road and has no toxic gas emission, Dandpat said.

Though there is great demand for the technology, including from Chattisgarh, Himachal Pradesh, Uttarakhand and Jharkhand governments, but "we do not have any plan to commercialise it but to serve society. We have even received a request from Nigeria, which wants to replicate it in their country", Anand said.

Due to the JUSCO initiative, the city will now have strong, durable, eco-friendly roads which will also relieve the residents from the sight of heaps of plastic waste.

6th World Renewable Energy Technology Congress & Expo-2015 to be held from 21th to 23rd August 2015 at Convention Centre-NDCC, Parliament Street, New Delhi.

Further details are available at: www.wretc.in .

The Energy And Environment Foundation with the support of Ministry of New and Renewable Energy, Government of India would be organizing the **6th World Renewable Energy Technology Congress & Expo-2015** to be held from **21th to 23rd August 2015** at **Convention Centre-NDCC, Parliament Street, New Delhi, India**. The theme of the conference is **"Promoting Renewable Energy, Energy Efficiency & Sustainability for a Brighter Future"**.

Further details are available at: www.wretc.in

The Conference & Expo is slated to be inaugurated by **Mr. Nitin Gadkari**, Hon'ble Cabinet Minister of Road Transport & Highways, Shipping and the Keynote Address will be given by **Mr. Piyush Goyal**, Hon'ble Minister of State (Independent Charge), Ministry of Power, Coal & New and Renewable Energy Government of India on Friday 21st August 2015 at 10.00 hrs at Delhi. Participants from Australia, Canada, Denmark, France, Gambia, Germany, Italy, Japan, Malaysia, Netherlands, Norway, Singapore, Spain, Sweden, Switzerland, Uganda, UK, USA apart from key executives of many national Renewable Energy companies have confirmed their participation in the conference.

India has tremendous potential for renewable energy. With **the visionary and dynamic leadership of Mr. Narendra Modi Hon'ble Prime Minister**, the Government of India and different State Governments are **actively promoting the development of Renewables through Green Energy Commitment**. Hence the upcoming 6th WRETC & Expo-2015 from 21st to 23rd August 2015 is of vital importance for sharing experiences, bringing together the policymakers, regulators, innovators, technologists, specialists, investors, exhibitors and other participants to give further stimulus for the utilization of renewable energy.

Looking forward your cooperation and support for the success of the 6th WRETC & Expo-2015.

Suryakumbh: Sun Shines through every child : A solar cooking initiative by 3,484 children has qualified for the Guinness Book of World Records

Further details are available at : http://www.suryakumbh.com/ .

Quotes from leading personalities from various walks of life on Suryakumbh:

- **Dr. Anil Kakodkar (Padma Vibhushan & Eminent Nuclear Scientist) :** I'm fascinated by the scale of Suryakumbh and the radical simplicity of the concept. Energy is the biggest currency of this century and every country is striving towards energy self-sufficiency. Suryakumbh, seen from this context is a landmark event that'd propel children to think out of box and invent a radical solution to otherwise complex problems of fuel poverty and environmental hazards.

- **Shri Amitabh Bachhan (Legendary film Actor) :** My congratulations to the entire team of Suryakumbh for coming up with such a novel idea of giving young children an experience with solar energy. In the times of climate change and global warming, harnessing Sun's energy is the best bet and who better to lead the change than the future of our country – the Children.

- **Shri Anand Mahindra (Chairman & MD, Mahindra & Mahindra) :** Suryakumbh is a novel programme to promote the use of renewable energy among youth. Just as students harness the Sun's energy to productive use, Suryakumbh harnesses the energy of these fertile minds to create a more sustainable and energy efficient future for all of us. I commend this great initiative and wish the team all the very best.

- **Dr. Vitthal Kamat (Chairman of Kamath Group of hotels) : I**t was a wonderful experience to celebrate the festival of Suryakumbh with 3484 children. The idea was unique, the food tasted great and the fact that it's World's Largest Solar Cooking event certainly

brings a sense of pride and self confidence amongst all.

- **Ms. Zarina Mehta (Co-founder UTV Group, CEO UTV Bindaas) :** Kudos! Suryakumbh: A solar cooking initiative by 3,484 children has qualified for the Guinness Book of World Records. What an inspiration!

- **Dr. Shireesh Kedare (Prof. IIT Bombay & Director Clique Technologies) :** Suryakumbh is a unique confluence of a scientific device and a toy. Its toy like simplicity invites children to play with it while its powerful performance propels their curiosity and inclination towards the fundamentals of Science. Even adults, including me, thoroughly enjoyed the event.

Three Tools to Help Government and their Partners to Redirect Land Use Finance

The article is available at : http://climatepolicyinitiative.org/publication/three-tools-to-unlock-finance-for-land-use-mitigation-and-adaptation/ .

Limited understanding of investments in land use mitigation and adaptation inhibits the design of efficient and effective public interventions.

In many cases, we do not know how much finance is being channelled to the land-use sector, how it is being delivered, what is being paid for and by whom.

Nor do we fully understand the proportion of finance going towards green versus BAU activities or the opportunities that may exist to address barriers, or create incentives to shift land use activities towards greener outcomes.

In this joint study supported by the EU REDD Facility of the European Forest Institute, Climate Focus and Climate Policy Initiative have developed three tools that address these issues. Governments and their partners can use them to:

- Inform the design of land use mitigation and adaptation strategies supported by multilateral and bilateral programs
- Identify domestic and international financial instruments to redirect public and private finance towards greener land-use practices
- Encourage coordination between public instruments across land-use sectors.

The tools cover national and international, public and private finance, across a full range of land-use activities.

1. Landscape of Land Use Finance
The Landscape of Land Use Finance tool provides a snapshot of public and private land use finance going to green and potentially BAU activities. It can help countries and development partners to understand how much and what type of finance is flowing, among which key actors, and to which activities. It helps by identifying channels, gaps, and blockages in the flow of finance. Governments could track public or private expenditures / investments as a first step to obtain an initial overview of core land-use financial flows, rather than comprehensively including all flows. As capacity and data availability increases, they could expand the scope to include all actors to enable a more detailed understanding of how different sources of finance interact.

2. Financial Viability-Gap Analysis
The Financial Viability-Gap Analysis tool explores whether climate change mitigation and adaptation activities are viable from a financial perspective. Some green land use activities are

more expensive than BAU ones, resulting in a viability gap. Here activities need to be publically funded or supported. Other green land use activities are not intrinsically more expensive but face risks or information gaps that can increase costs and discourage investors. Here public financial instruments can help overcome those barriers.

By highlighting potential barriers to the deployment of green activities (risk, information and capacity, or financial gaps), as well as the entry points for public and private finance, this tool can inform the design of tailored public incentives to unlock investment in mitigation and adaptation activities. Governments can increase the financial viability of green land use investments by:

- Reducing costs – through e.g. low cost loans and guarantees, tax breaks, and project preparation grants
- Increasing revenues – using e.g. price premiums, price floors, and pay-for-performance grants to improve investors' returns
- Improving the enabling environment – by e.g. legal / regulatory standards, land allocation and management systems, certification standards, and implementation of monitoring and enforcement systems.

The financial viability gap analysis tool can be carried out as part of a detailed sectoral assessment or at the activity level.

3. Public Finance Mapping

The public finance mapping tool provides a framework to track key public financial instruments for climate change mitigation and adaptation in any given country, jurisdiction or sector. It can identify whether instruments target BAU or green land-use activities. This tool enables governments to assess whether their overarching financial policies and instruments, including those supported by development partners, are coherent, and consistent and to what extent they provide support for green production. This tool can provide insights to enable greater coordination across sectors, technologies and geographies, among governments and donors, by identifying entry points for donors to deliver finance in ways that maximize domestic and private sources of investment. As a first step, governments could focus on mapping incentives for BAU and green activities. In time it could also be useful to map disincentives arising from, for example, taxes and fees imposed upon land use activities.

The frameworks, approaches and tools presented in the paper seek above all to help lower and middle-income countries and their development partners to identify opportunities to work together with businesses and to jointly finance green land-use transitions.

Salient features of The Clean Energy Solutions Center : Operating Agency : National Renewable Energy Laboratory (NREL).

Further details are available at : https://cleanenergysolutions.org/about .

Providing Policy Information and Assistance : The Clean Energy Solutions Center helps governments design and adopt policies and programs that support the deployment of clean energy technologies.

What It Offers : The Solutions Center offers no-cost expert policy assistance, webinars and training forums, clean energy policy reports, data, and tools provided in partnership with more than 35 leading international and regional clean energy organizations.

Ask an Expert Service : Its Ask an Expert service provides no-cost clean energy policy assistance through a global network of over 30 experts for government agency representatives

and the technical institutes assisting them. To date this service has supported more than 120 requests for assistance from over 60 countries. The Ask an Expert service makes it easy to request targeted, first-rate expert assistance and receive in-depth answers and support for your policy questions.

Web-Based Training and Peer Learning : Its high-attendance webinars are designed in collaboration with global partner institutions, and engage diverse global audiences in interactive discussions on important clean energy policy topics covering energy efficiency, renewable energy, energy access and transport issues. It also offers e-learning courses, podcasts and videos.

Resource Library : The Solutions Center features an extensive collection of more than 2,100 clean energy resources, including reports on best-practice policies, data and analysis tools for the benefit of policymakers. As part of this resource collection, the Solutions Center collaborates with Bloomberg New Energy Finance to provide bi-annual newsletters summarizing global clean energy investment trends.

Policy Briefs : Its Clean Energy Policy Briefs are intended to inform legislators, decision makers, analysts working for government agencies and utility executives on current good practices, lessons learned and success stories.

Clean Energy Analysis : The Clean Energy Solutions Center helps inform global energy dialogue with original research and analysis. Recently, it worked with Australia's Bureau of Resources and Energy Economics to release the Asia-Pacific Renewable Energy Assessment. The Solutions Center also issued a report on Integrating Renewable Energy in Electric Power Markets: Best Practices from International Experience.

Unique Policy Resources : The Solutions Center provides current and relevant information on clean energy policies. These resources include emerging policy reports, enhanced policy data, and analysis tools such as the Indian Renewable Energy and Energy Efficiency Policy Database (IREEED)—an online database of India's renewable energy and energy efficiency policies, regulations, and incentive programs.

Solutions Center Governance : The Solutions Center is an initiative of the Clean Energy Ministerial (CEM), a global forum to share best practices and promote policies and programs that encourage and facilitate the transition to a global clean energy economy. The Solutions Center is co-led and co-funded by the U.S. Department of Energy (DOE) through support from the U.S. Department of State, and the Australian Department of Industry. The International Copper Association also provides support for Solutions Center activities such as the Clean Energy Regulators Initiative.

The Solutions Center operating agency is the National Renewable Energy Laboratory (NREL). It also coordinates activities with the many Solutions Center partners. It partners closely with various CEM countries on the design and implementation of its programs. CEM member countries that participate in the Solutions Center include **Australia, Denmark, India, Indonesia, Italy, Japan, Mexico, South Africa, Sweden, United Arab Emirates, and the United States of America**. Further details are available at: https://cleanenergysolutions.org/about/partners .

Oxford Policy Management (OPM) : Terms of Reference : Resident M&E Manager, New Delhi.

The Department for International Development (DFID) signed a contract with Oxford Policy

Management (OPM) on 2nd September 2014 to manage a five year programme – Climate Proofing Growth and Development (CPGD) in South Asia. The programme will work in partnership with the governments of Afghanistan, Bangladesh, India, Nepal and Pakistan. Over the next five years, the programme will help these countries to integrate climate change into policies, plans and budgets.

As the programme has concluded its inception phase and is moving into implementation, OPM wishes to recruit a resident Monitoring and Evaluation (M&E) Manager. The M&E Manager will be based at OPM's office in Delhi, India, and will manage M&E activities for the programme's 10 implementation sites, as well as liaise between programme management and the 10 team leaders (TLs) at the implementation sites, reporting to the M&E Lead. The programme is currently engaged in a long range planning exercise in the 10 locations to identify jointly with government counterparts appropriate workstreams for the coming 4 years. The workstreams cover a wide scope of activities, such as introducing climate change considerations into budgeting and planning, value chain analysis for climate resilient crops or introduction of a flood forecasting model.

It is envisioned that the M&E Manager gradually takes responsibility for the entire M&E process and does or oversees most of the M&E activities with guidance from the M&E Lead.

This position will be a full-time consultancy on a one-year renewable contract basis.

M&E Responsibilities

The key M&E responsibilities of the Manager will be to manage various M&E activities across 10 sites of implementation, serving as a liaison between programme management and the 10 team leaders (TLs) at the implementation sites. More specifically, the M&E Manager – working closely with the M&E Team (M&E Lead & Specialist) – will be responsible for the following:

- Coordination and provision of key reporting milestones – including monthly, quarterly and annually – amongst the 10 TLs and programme management, together with the M&E Team;
- Review and refine the M&E system. The logframe has a range of generic indicators that will need to be specified for each workstream.
- Gather evidence to substantiate progress on the logframe indicators (incl. qualitative monitoring).
- Design and facilitate monitoring and evaluation methods (quantitative and qualitative) towards outcome and assumption monitoring;
- Design and conduct of qualitative monitoring of the different workstreams, using participatory tools such as stakeholder mapping, process mapping, scenario mapping. This will help to understand the context in which the workstreams are operating, likely blockages and supporting factors, test assumptions and support the workstreasm to adapt more easily to a complex and changing situation.
- Generally manage communication amongst the TLs, particularly as a liaison between the TLs and the programme management on reporting requirements or updated planning processes; Provide report revisions and follow up as needed, based on programme management queries and TL feedback;
- Communicate closely with M&E Specialist, especially during first 6 months implementation, on reporting processes and design towards adaptation and refinement as needed;
- Prepare annual and ongoing developmental evaluation activities of the CPGD;

Required Expertise

The M&E Manager will have a solid understanding of monitoring and evaluation methods and techniques with demonstrable experience applying these techniques to development-related programming. Additionally, the Manager will possess the following:

- A graduate degree in a relevant field

- Qualitative and quantitative monitoring of climate change or governance-related projects;
- Excellent qualitative data gathering and facilitation skills, particularly in participatory methods;
- Substantial experience in the use of participatory tools (such as process mapping, stakeholder mapping, scenario mapping) and/or qualitative monitoring
- Familiarity with government policy and planning environment in South Asia is desirable;
- Demonstrable experience working with and managing diverse teams;
- Experience designing and conducting training and capacity building, particularly on M&E systems or frameworks;
- Demonstrable experience with various monitoring and evaluation methods and techniques;
- Preferred: Experience with DFID programmes; experience with DFID Annual Reviews
- Ability to work independently and take initiative;
- Advanced computer literacy, particularly Microsoft Office package;
- Strong written and oral communication;
- Ability to work under deadlines while delivering quality outputs.

For enquiries about the position, please contact:
Amit Sethi, Program Logistics Administrator, CPGD, Oxford Policy Management, 3/4, First Floor, Siri Fort Institutional Area, New Delhi-110049.

To submit an application, please provide a cover letter of no more than 2 pages and a current CV and expected salary to amit.sethi@actiononclimate.today

Submission deadline: 15th August 2015

First round of interviews expected: week of 1st September 2015

The presentation that Dr Yumkella delivered on 20th July, 2015

It is available at : http://solutionexchange-un.net.in/ftp/clmt/resource/res_info_20071501.pdf

Thank you for participating in the UN Public Lecture by **Dr Kandeh Yumkella, Special Representative of the UN Secretary General for Sustainable Energy for All on Monday, 20 July at the IIC Annex Lecture Hall from 11.00 – 12.30 hrs.**

The presentation was greatly appreciated by all those present. In case you missed it, the link above would throw some light on the excellent disposition on Sustainable Energy for All by Dr Yumkella.

Madhya Pradesh bid results: record low tariffs, tight margins" by BRIDGE TO INDIA.

The article is available at : http://www.bridgetoindia.com/blog/madhya-pradesh-bid-results-record-low-costs-tight-margins/

300 MW of solar capacity was auctioned in the Indian state of Madhya Pradesh (MP) recently. The record low tariffs surprised most observers. Canadian developer Sky Power offered to sell solar power at INR 5.05/kWh (50 MW capacity).

The bids closed at INR 5.64/kWh with the median tariff at INR 5.34/kWh. The auction received a lot of interest and over 2,200 MW of projects were offered at tariffs below INR 6/kWh.

- Solar tariffs in India are falling dramatically
- At these tariffs, effectively, there should be no need for incentives anymore
- Are return expectations sufficient for scaling up?

At these tariffs, our estimate of equity IRRs is between 11-15% assuming market standard technical and financial parameters. These returns are too low in the Indian context but before we get into the implication of these bids on the project development landscape, let us first look at the bigger picture and the results for the solar and power sector in India.

Recently concluded bids for new coal-fired power capacity in Andhra Pradesh saw winning tariffs of INR 4.27-4.98/kWh. In 2013, in Rajasthan and Tamil Nadu, coal power was bid at INR 5.41-5.66/kWh (refer).

With the new MP tariffs, solar power seems to have graduated to become a mainstream option for power generation in the country. Effectively, there should be no need for incentives anymore – at least up until the point when grid limits are reached and balancing becomes necessary.

This begs the question about the future of the upcoming viability gap funding (VGF) scheme to be implemented by SECI where the proposed levelized tariff is at INR 5.79/kWh (set at INR 5.43/kWh for first year with an escalation of INR 0.05/kWh for next 20 years).

This, along with the results from the upcoming NTPC tender will require recalibration of benchmarks for these bids. In another proposed project of 750 MW in Madhya Pradesh with 50% funding from World Bank, the proposed tariffs should be reconsidered. All this suggests that solar is moving faster than expected.

Though the availability (supply) of projects is set to grow by a factor of 10 this year (from 1 to 10 GW), margin pressure does not seem to ease off. Existing and new players are aggressively building ever larger portfolios.

This Madhya Pradesh allocation of 300 MW was oversubscribed by over 1,200%. The ongoing allocation for India's largest tender till date for 2,000 MW in Telangana was also oversubscribed by 250%.

If these indications are anything to go by, India has already come to a stage where the country can shift focus from direct fiscal support to solar power to strengthening the transmission infrastructure, building balancing capacity for the grid and normalizing power prices. **Even the implementation of Renewable Purchase Obligations (RPOs) looks within reach.**

However, many industry stakeholders argue that return on their investment is not sustainable for scaling up. There is obviously merit in that argument but the government is not too concerned about it as it sees investments and commitments continuing to pile up.

The way things are going, it seems that competition amongst the solar developers will soon be replaced by solar competing with other sources of power in the country.

Salient features of Environmental Performance Index (EPI) 2014

Detailed profile for India is available at : http://epi.yale.edu/epi/country-profile/india .

The website is very interactive and allows for exploring various parameters for 178 countries. The same can be accessed at : http://epi.yale.edu/epi .

The 2014 Environmental Performance Index is a joint project between the Yale Center for Environmental Law & Policy (YCELP) and the Center for International Earth Science Information Network (CIESIN) at Columbia University, in collaboration with the World Economic Forum and support from the Samuel Family Foundation and the McCall MacBain Foundation.

The Environmental Performance Index (EPI) is constructed through the calculation and aggregation of 20 indicators reflecting national-level environmental data. These indicators are combined into nine issue categories, each of which fit under one of two overarching objectives.

The two objectives that provide the overarching structure of the 2014 EPI are Environmental Health and Ecosystem Vitality. Environmental Health measures the protection of human health from environmental harm. Ecosystem Vitality measures ecosystem protection and resource management. These two objectives are further divided into nine issue categories that span high-priority environmental policy issues, including air quality, forests, fisheries, and climate and energy, among others.

The issue categories are extensive but not comprehensive. After more than 15 years of work on environmental performance measurement and six iterations of the EPI, global data are still lacking on a number of key environmental issues.

These include, but are not limited to: Freshwater quality, Toxic chemical exposures, Municipal solid waste management, Nuclear safety, Wetlands loss, Agricultural soil quality and degradation, Recycling rates, Adaptation, vulnerability, and resiliency to climate change, Desertification.

Global Scorecard: The world lags on some environmental issues, while demonstrating progress in others. A "global scorecard' provides first-time insight as to collective policy impacts on the major environmental issues of our time.

Overall, improvements have been made in many of the categories of the Environmental Health objective, including Access to Drinking Water, Child Mortality, and Access to Sanitation, though Air Quality has declined.

Declines and overall low scores are found in Air Quality, Fisheries, and Wastewater Treatment. While in most areas, trends suggest improvement, some primary issues like air quality and fisheries show distressing decline over the last decade.

Country Scorecard:
The first place is taken by Switzerland with a score of 87.67.
In South Asia:

- Sri Lanka ranks 69;
- Bhutan is at 103;
- Nepal is at 139;
- Pakistan at 148;
- India at 155;

- Bangladesh at 169.

Detailed profile for India is available at : http://epi.yale.edu/epi/country-profile/india .

The website is very interactive and allows for exploring various parameters for 178 countries. The same can be accessed at : http://epi.yale.edu/epi

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Multi Faith Climate Convergence : An emerging dimension- Faith and Climate Change

I would like to share about the **Multi Faith Climate Convergence in Rome**, which was organized in Italy from the 27th June, 2015 to 1st July, 2015 by GreenFaith in the US in association with ourvoices, US and FOCSIV, Italty

An emerging dimension- Faith and Climate Change
A one of its kind, multi-faith climate change convergence was held from the 29th of June, 2015 to 1st of July, 2015 in Rome, Italy. The convergence was attended by 100 participants from all over the world, ages 21-40, representing different faith communities and covered dialogues, discussions, stories and initiatives about connecting communities through faith on climate change.

From India, there were six participants (including the contributor for this post) representing the Hindu, Sikh, Buddhist and Christian communities who were shortlisted for the convergence. The objective of the convergence was to relate faith and climate change in an open perspective and how best it can be leveraged in convincing world leaders in preparing their countries for tackling climate change and keep the rising temperature to 2 degree or less.

The event was organized by GreenFaith and ourvoices, US. The platform for the convergence was laid by Pope Francis encyclical (Laudato Si) which he delivered in May, 2015 urging humanity for protecting earth and her resources for future generations.

The convergence was preceded by a Peoples' March on the 28th of June, 2015 from Rome (la Piazza Farnese) to St. Peter's Square (Vatican City), bringing together people and green groups who are passionate for the climate and mother Earth. The March was full of colours, creativity and passion with the common message of: One Earth, One Family (Una Terra, Una Familiga).

The March was covered extensively in print and web media like in New York Times, The Guardian and others. Similar events are being planned in India as well in the coming months.

Resources and Further Reading:

The Pope's Encyclical:
http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

Message from UN Secretary-General-Ban Ki Moon for the convergence participants:
https://www.youtube.com/watch?v=fUeOZWLKGMY

The Peoples' March video
https://www.youtube.com/watch?v=a-vTPBvLbPY

Media Coverage
- http://www.theguardian.com/world/2015/jun/28/pope-francis-environment-rome-naomi-klein-climate-change

- http://www.nytimes.com/2015/06/29/world/europe/climate-marchers-gather-to-show-rousing-support-for-pope.html?_r=0
- http://ecowatch.com/2015/06/28/climate-march-rome/
- http://www.ipsnews.net/2015/06/rome-march-celebrate-popes-call-for-urgent-climate-action/
- http://tns.thenews.com.pk/moral-response-to-climate-change/#.Va4r1qSqqkp

Blogs:

- http://blogs.reuters.com/faithworld/2015/07/02/inter-religious-march-in-rome-demands-action-on-climate-change/
- http://settingsinmind.blogspot.in/
- http://hafsite.org/blog/a-plea-for-sand-inspires-action-against-climate-change/
- http://ourvoices.net/evoke/blog/one-earth-one-family/view

Banks Should Lend World's Top 500 Cities At Least $1bn to Tackle Climate Change – New Climate Economy (NCE) 2015 Report

The article is available at : http://www.sustainablecitiescollective.com/david-thorpe/1087342/banks-should-lend-world-s-largest-500-cities-least-1bn-tackle-climate-change-nc?utm_source=feedburner&utm_medium=email&utm_campaign=Sustainable+Cities+Collective+%28all+posts%29 .

Multilateral development banks, donors and others should lend the world's top 500 cities at least US$1 billion to help them implement low carbon urban development strategies by 2020, according to the New Climate Economy 2015 report.

This report, published today by the Global Commission on the Economy and Climate, puts action by cities to tackle climate change at number one of 10 priority options which together, if implemented fully, could save up to 96% of all the carbon emission reductions required to keep global warming within 2°C by 2030.

The Global Commission on the Economy and Climate

The Global Commission was commissioned in 2013 by the governments of seven countries: Colombia, Ethiopia, Indonesia, Norway, South Korea, Sweden and the United Kingdom. The Commission has operated as an independent body and has been given full freedom to reach its own conclusions.

Chaired by former President of Mexico Felipe Calderón, the Commission comprises former heads of government and finance ministers, and leaders in the fields of economics, business and finance, including Sir Nicholas Stern, Ingrid Bonde, Chief Finance Officer and Deputy Chief Executive Officer, Vattenfall AB, Sharon Burrow, General Secretary of the International Trade Union Confederation and Suma Chakrabarti, the president of the European Bank for Reconstruction and Development.

The report's findings

The report argues that with renewable energy becoming so cheap, and the unique set of political opportunities this year, momentum to tackle climate change successfully is strong.

It identifies 10 key areas of opportunity for stronger climate action which will also bring significant economic benefits and together could achieve at least 59% and perhaps as much as 96%, if all the options were taken up, of the emissions reductions needed by 2030 to keep global warming below 2°C.

The 10 areas cover three key economic systems:

- Cities, land use and energy;
- Resource efficiency, infrastructure investment and innovation, with action by businesses and investors;
- Reducing admissions from international aviation and shipping and phasing down hydrofluorocarbons.

It argues that cities, if they implement all 10 recommendations, will be responsible for 3.7 Gt CO2e emissions per year in 2030.

Its first recommendation is that the world's cities should accelerate low carbon development.

It says they should all commit to developing and implementing low carbon urban development strategies by 2020, using the framework of the Compact of Mayors. This would let them prioritise policies and investments in public, non-motorised and low emission transport, building efficiency, renewable energy and efficient waste management.

It reiterates the mantras, familiar to readers of this website, that compact, connected and efficient cities can generate stronger growth and job creation, alleviate poverty and reduce investment costs, as well as improving quality of life through lower air pollution and traffic congestion.

Better, more resilient models of urban development are particularly critical for rapidly urbanizing cities in the developing world.

International city networks, such as the C40 Cities Climate Leadership Group, ICLEI (Local Governments for Sustainability) and United Cities and Local Governments (UCLG), are scaling up the sharing of best practices and developing initiatives to facilitate new flows of finance, enabling more ambitious action on climate change.

It argues that to facilitate this it is urgently necessary for multilateral development banks, donors and others to develop an integrated package of at least US$1 billion for technical assistance, capacity building and finance to support commitments by the world's largest 500 cities.

If this were done, then, in total, low-carbon urban actions available today could generate a stream of savings up to 2050 with a value in current terms of US$16.6 trillion, and could reduce annual GHG emissions by 3.7 Gt CO2e in 2030.

In addition, with $1 trillion a year invested in clean energy and energy efficiency being raised to the global best, further savings and job creation can be achieved:

Scaling up clean energy financing to at least US$1 trillion a year could reduce annual GHG emissions by 2030 by 5.5-7.5 Gt CO2e.

Globally, enhanced energy efficiency investments could boost cumulative economic output by US$18 trillion to 2035, increasing growth by 0.25–1.1% per year.

Aligning and gradually raising national efficiency standards could reduce annual GHG emissions in 2030 by 4.5–6.9 Gt CO2e.

Carbon pricing

It argues that one of the key mechanisms would be effective carbon pricing which should be adopted by all developed and emerging economies, together with phasing out fossil fuel

subsidies. Businesses are increasingly calling on governments to implement carbon pricing, and over 150 now use an internal carbon price (typically around US$40/t CO2 for oil companies) to guide investment decisions.

National infrastructure policies and the G20 Global Infrastructure Initiative, which also profoundly affect cities, should include climate risk and objectives.

The report notes that around US$90 trillion in infrastructure investment is needed around the world by 2030, mostly in developing countries, to meet their needs.

And to satisfy the requirement that all of this be done with minimal greenhouse gas emissions research, development and demonstration in low carbon technology must be boosted.

Low carbon growth policies should be adopted by all major businesses, with short and long-term emissions reduction targets and corresponding action plans.

Salient features of Jeremy Rifkin: Book : The Third Industrial Revolution : Highlighted by Dr Yumkella in his presentation on 20th July, 2015.

Rifkin claims that fundamental economic change evolves with the confluence of a new **communication technology** and a new form of **energy supply**.

- The **first industrial revolution** (19th century) was caused by the convergence of steam-power and letterpress printing.
- The **second industrial revolution** (20th century) can be attributed to electric communication and the combustion engine.
- The **third industrial revolution** (which is – according to Jeremy Rifkin – currently happening in the 21st century) **is triggered by the co-occurrence of the internet and renewable energies.** Both these elements promote the development of the local, collaborative and lateral societal and economic structures of the green economy.

The foundation of the green economy consists of 5 pillars, each of which only functions in combination with the others:

1. Transition from fossil to **renewable energies**
2. Transformation of all buildings into **mini generating plants**
3. Development and build-up of **energy storage technologies and capacities** (e.g. hydrogen)
4. Capitalizing the internet technology for the development of a **smart and bi-directional (peer-to-peer) energy-sharing-grid**
5. Transformation of the transportation system to **electric plug-in and fuel cell vehicles**

The book has an overall **positive undertone, especially when the world is** pretty much disillusioned and frustrated about politics in general and environmental/ climate policy in specific.

The book will remind the reader of the fact that climate change is hardly questioned in Europe anymore and that there are (slow and small) steps into the right direction.

Paris call to conscience on climate

The article is available at :
http://www.preventionweb.net/english/professional/news/v.php?id=45207&a=email&utm_source=pw_email .

Mankind's relationship with nature was the focus of the Climate Summit of Conscience in Paris, hosted by French President Francois Hollande. With the UN climate conference just months away**, faith leaders, Nobel laureates, economists and artists from around the world gathered in the French capital to show that protecting the planet is more than a matter of science.**

President Hollande said: "The root cause of environmental degradation and climate change is a way of life, a mode of production, a mode of consumption that is not compatible with human development."

Senator Legarda said: "I come from a country that is 0.3 percent emitter of carbon in the world and yet we are one of the most vulnerable nations as you have seen and witnessed with Typhoon Haiyan in 2013. Being a vulnerable nation that is not the cause of this vulnerability, we hope that the Philippines will be the first to show the outcome of this Summit," said Legarda in her speech for the Summit's Fourth Plenary: Inspiring the World to Care—Igniting the Will to Act for the Climate.

The Senator, who chairs the Senate committees on Environment and Natural Resources, and Climate Change, stated her commitment to launch a Summit of Consciences for the Climate in the Philippines.

"I will write a memo to President Benigno Aquino III and we will initiate and launch in all the cities and municipalities, barangays, and state universities and colleges all over the country our own Summit of Consciences for the Climate," she said.

Martin Palmer, Secretary General of the Alliance of Religions and Conservation (ARC), one of the organizers of the Summit, was impressed with the Senator's commitment, "Can I just welcome that extraordinary commitment to take this 'Why Do I Care?' to the Philippines and may this be an example for many other countries here to follow."

Former UN Secretary-General Kofi Annan stressed that "The earth is not ours; it is a treasure we hold in trust for our children. We must be worthy of that trust."

France's Minister of Ecology, Segolene Royal, and Cardinal Turkson of the Pontifical Council for Justice and Peace, and many other speakers, highlighted the need to progressively decrease use and dependence on fossil fuels, especially coal, and shift to renewable energy.

Meanwhile, UN Secretary-General Ban Ki-moon, through a message delivered by Janos Pasztor, Assistant-Secretary-General on Climate Change, said that "**Climate change is the defining challenge of our time. It affects us all, but it does not affect us all equally. We have a profound responsibility to protect and assist the world's poorest and most vulnerable people and to pass on to future generations a planet that is thriving and healthy."**

During the Summit, the Call to Conscience for the Climate was signed by over 40 religious, cultural, environmental and political leaders present in the event and will be presented to each Head of Delegation at the COP 21 in Paris this December.

CALL FOR PAPERS, EXTENDED ABSTRACTS, POSTERS, WORKSHOPS AND TUTORIALS: World Congress on Sustainable Technologies (WCST-2015) ; Technically Co-Sponsored by IEEE UK/RI Computer Chapter; 14-16 December, 2015, London, UK

The World Congress on Sustainable Technologies (WCST-2015) is a multidisciplinary congress, bridging efforts across the natural, social and engineering sciences, the environment and development of communities. The congress covers a wide spectrum of topics that relate to sustainability, which includes technical and non-technical research areas. It also encourages sharing new knowledge in the field of sustainable technologies and the environmental impacts.

The mission of WCST-2015 is to provide the opportunities for collaboration and reflection that have the potential to greatly enhance the infrastructure and capacity for conducting and applying art, science and technology for sustainability. The WCST bridges the gap between academia and industry by creating awareness of current development in sustainable technologies.

The topics in WCST-2015 include but are not confined to the following areas:

- **Sustainable Energy Technologies**
- **Renewable Energy Managements, Economics and Environmental Impact**
- **Education**
- **Green Computing**
- **Sustainable Building Design**
- **Sustainability and Policy**
- **Waste Management**

All the accepted papers will appear in the proceedings and modified version of selected papers will be published in special issues peer reviewed journals.

To submit a paper/extended abstract, please email your paper/extended paper to papers@wcst.org

Please email your Workshop/Tutorial proposal to stw@wcst.org

Please email your poster to poster@wcst.org and demo@wcst.org

Important Dates:
* Extended Abstract (Work in Progress) Submission Date: August 10, 2015
* Notification of Extended Abstract Acceptance/Rejection: August 20, 2015
* Full Paper Submission Date: September 01, 2015
* Notification of Paper Acceptance/Rejection: September 10, 2015
* Camera Ready Paper Due: November 01, 2015
* Workshops and Tutorials Submission Date: August 15, 2015
* Notification of Workshop and Tutorial Acceptance: August 25, 2015
* Poster/Demo Submission Date: July 20, 2015
* Notification of Poster/Demo Acceptance: August 15, 2015
* Proposal for Industrial Presentation: August 30, 2015
* Notification of Industrial Presentation Acceptance: September 15, 2015
* Early Registration Deadline (Authors only): October 15, 2015
* Late Registration Deadline (Authors only): November 15, 2015
* Late Registration Deadline (Participants only): December 10, 2015
* Conference Dates: December 14 - 16, 2015

For further details, please visit www.wcst.org

Renewables in India: Bringing it All Together by BRIDGE TO INDIA.

The article is available at : http://www.bridgetoindia.com/blog/renewables-in-india-bringing-it-all-together/#more-3663

Recently, the Ministry of New and Renewable Energy (MNRE) released a draft of the "National Renewable Energy Act" (refer). Along with the proposed amendments to the Electricity Act 2003 and the National Tariff Policy 2005 (refer), this act will create structural policy changes to help increase the share of renewables in India's energy mix. In the first section, the document describes in detail how institutional structures would be created.

However, it is the subsequent sections that have caught our attention. This is our take:

- **National, uniform and mandatory regulations will govern renewable purchase obligations**
- **A "National Renewable Energy Fund" will be created and a fixed portion of the National Clean Energy Fund will be directly channelled into it**
- **There will be guidelines for renewable energy procurement, including but not limited to competitive bidding processes**

The first interesting point relates to getting India's states on board. The Renewable Energy Act envisages that the central government and each state government will formulate a renewable energy policy and a renewable energy plan. As a part of a "National Renewable Energy Plan" a framework would be created for a national, uniform and mandatory renewable purchase obligation (RPO) trajectory for all obligated entities. Currently, each state fixes its own trajectory for RPOs and solar RPOs that have been set still relate to the earlier, lower national target of 3% (it is now 10.25%).

This is in addition to earlier changes of the Electricity Act and Tariff Policy amendments, where provisions have been made for imposing fines for non-compliance and easy pass through of costs through tariffs for effective compliance.

We understand that the fundamental problem that power is a concurrent subject still remains. However, the central government has several levers that it can use to get states to toe its line. Availability of funds and a clout in fuel supply, power generation and power transmission through central government owned companies are examples of such levers. In the past, the push for renewables from the central government has not been as strong as it seems now. Usually, state governments do not have a lot of incentive in deviating too far from the central government policies. We are hopeful that this on-going effort will yield results on setting up and implementation of obligations.

A second interesting point relates to India's National Clean Energy Fund (NCEF). This fund is provisioned by an INR 200 cess on every ton of coal used in the country (the cess was just doubled in the last budget in February this year). The fund has a current corpus of INR 170 billion (USD 2.6 billion) (refer). However, only a small portion of this fund has been made available for renewables. In the past, it was used mostly for fiscal troubleshooting with very little transparency.

The new Renewable Energy Act now proposes to set aside a fixed portion, yet to be determined, of the funds for a separate National Renewable Energy Fund, primarily under control of MNRE.

A third noteworthy suggestion relates to creating a more uniform project allocation process. Currently, most allocations in the country are based on tariff bidding against benchmarks set by various regulatory commissions. The proposed amendments to the National Tariff Policy 2005 provides for a provision for obligated entities procuring solar power on a cost plus basis from

conventional power generators who need to meet their Renewable Generation Obligation (RGO).

This can have huge implications on the solar market in India. In light of this, the draft Renewable Energy Act states that the ministry would publish guidelines for procurement mechanisms, including but not limited to competitive bidding processes.

With the proposed amendments to the Electricity Act 2003, the National Tariff policy 2005, the announcement of National Renewable Energy Act 2015, the expected announcements on the national and state Renewable Energy Policies and Renewable Energy Plans, a near complete demand creation framework for renewables is being formulated at the central government level.

It seems that this entire framework will require at least until the middle of 2017 to become operational. Until then, the government wants to provide an early push and allocate up to 15,000 MW of solar projects under the current framework.

China's shift from coal to hydro comes at a heavy price

The article is available at : http://www.thethirdpole.net/chinas-shift-from-coal-to-hydro-comes-at-a-heavy-price/?utm_source=third+pole+newsletter&utm_campaign=38049da5d2-Tibetan+plateau+faces+%E2%80%9Cecosystem+shift%E2%80%9D&utm_medium=email&utm_term=0_43686cf8d5-38049da5d2-46416721 .

Government hopes hydropower can wean the country off dirty fossil fuels and meet renewable energy targets, but new dams will mean a big environmental toll. Hydropower will help reduce coal use in smog-ridden eastern cities but will cause major disruption in western provinces, say critics.

As outlined in China's national climate plan, submitted to the United Nations last month, the country's aim to peak greenhouse gas emissions by 2030 or sooner will rely heavily on a shift from coal to use of non-fossil fuels.

To many, that would seem a clear win for the environment in coastal megacities and mining areas, where air, water and soil pollution are a potent toxic legacy of China's long-term addiction to fossil coal.

But China's target to use non-fossil fuel sources for around 20% of its primary energy consumption by 2030 will likely prompt a fresh round of dam building in ecologically fragile Tibetan regions of China, particularly in impoverished western areas.

Hydropower is responsible for far fewer greenhouse gas emissions than coal. But shifting away from coal in favour of water-driven electricity entails major risks.

These include the low generating efficiency of hydropower, heightening the need for back-up coal power during sustained periods of low rainfall, weak grid systems and potential for large dams on international rivers to spark conflict with neighbouring countries.

Hydropower – a green saviour?
Hydropower is China's second-largest energy source after coal and the country's installed hydropower capacity is set to rise to 350 gigawatts (GW) by 2020, up from 300 GW today. The country is already home to half the world's 80,000 dams, more than the US, Brazil and Canada combined.

Chinese authorities hope that a large-scale rollout of hydropower can help reduce toxic smog that has triggered public outrage and health scares both at home and abroad.

Hydropower has already helped slow growth in China's greenhouse gas emissions, some experts claim. China's coal use fell by nearly 8% in the first four months of this year – in part, says Greenpeace, due to power fed into the grid by hydro plants since brought online.

"Hydropower is one of the main ways for the power sector to replace fossil fuels, save energy and reduce emissions," points out Zhang Boting, deputy secretary general of the China Society for Hydropower Engineering.

China is already the largest dam builder in the world, but its vast hydropower resources are underdeveloped compared with its potential, meaning the country is overwhelmingly reliant on coal, says Zhang.

If China exploited its remaining hydropower resources it could meet a fifth of China's peak energy demand and displace about 1.3 billion tonnes of coal, he adds.

The most enthusiastic advocates of new dams in China say the country can almost double its current hydropower capacity to 540 GW by 2050.

High price for clean air

Replacing coal with hydropower may lead to cleaner air for citizens on the east coast, but there will be a high environmental price to pay for people who live in the more remote and ecologically fragile south-west, where at least 80% of the new dams will be built.

Chinese environmentalists have called for an urgent halt to large hydro projects, pointing out that the country's dash for dams has already destroyed river ecosystems, fish habitats and raised fears about safety in earthquake-prone regions.

The concentration of dams will be particularly dense on the Jinsha (upper Yangtze) River, where cascades equal to five times the 22.5 GW capacity of the Three Gorges dam are proposed. These dams will not only hold back water flow but also silt, heightening risk of major subsidence in the Yangtze delta and floods around major cities such as Shanghai.

Other cascades will pack China's last free-flowing international rivers – such as the Mekong and Brahmaputra – which will stem water flow and could spark tensions with India and south-east Asian countries downstream.

Scepticism

There is anecdotal evidence that for every new hydropower dam built in the south-west, an additional coal-fired power plant is also constructed, often as back up. Guizhou province has built more coal-fired generating capacity than hydropower to ensure a stable supply of power in the dry season. Sichuan, Guangxi and Yunnan are doing the same.

Waste and inefficiency

China's installed capacity in hydro is impressive, but its contribution to the country's overall energy mix is far more modest. Due to rushed construction and other industry problems, Chinese dams are highly inefficient, with an average capacity factor of 31% – about two-thirds the world average. Capacity factor refers to the amount of electricity produced compared to the installed capacity

And since the bulk of new hydropower plants will be built in remote mountainous regions of the

south-west, electricity has to be transferred vast distances to manufacturing hubs of southern China – meaning a lot of electricity is lost along the way.

China could be losing enough hydroelectricity to power the UK and Germany for a year as a result of poor planning and weak grid infrastructure, Reuters recently reported.

Meanwhile hydropower development has further spurred energy-hungry and polluting industries, as provincial governments try to absorb the extra electricity generated in remote areas. One example is the Lijiang aluminum refinery, which is close to one of China's top tourist destinations in Yunnan.

In addition, extreme weather caused by climate change may mean generating power from unpredictable river flow becomes increasingly unviable in the future. In 2011, extreme drought caused hydropower output in Yunnan to drop by half; more than 1,000 dams in central China were forced to suspend operations.

2050 roadmap

But despite the high financial and environmental costs, hydropower will play an essential role in any low carbon future, argues Darrin Magee, a US academic and energy specialist who has been working with the Rocky Mountain Institute, Lawrence Berkeley National Labs and the Chinese government think-tank, Energy Resource Institute (ERI), to explore the future of renewable energy.

The radical 2050 roadmap – published in April this year – predicts China could get almost 86% of power generation from renewable energy by 2050. ERI sits in China's National Reform and Development Commission, the country's powerful planning ministry, and is responsible for drawing up energy strategy in the 13th Five-Year Plan (2016-2020). The ERI's views often carry a great deal of weight in policymaking circles.

In a well-managed grid system, hydropower can replace coal by providing a baseload power and smooth out vagaries of the sun and wind – since these plants would be able to be switched on and off in a matter of minutes, Magee explains.

If renewables and hydropower are to displace coal, smart grid technology will have to be deployed to curb surges in demand and avoid the need to run extra coal plants.

China's State Grid Corporation aims to have a nationwide smart grid by 2020 – which will allow real-time electricity prices to be transmitted to homes and factories and encourage greater efficiency.

There are still some major hurdles, however. The rules to get renewables onto the grid and bring predictability to how dam operators will dispatch electricity haven't yet been enacted.

"The biggest challenge right now is that the dispatch and operation rules remain very opaque," Magee says. "Currently rapid releases of water in dam reservoirs to meet poorly predicted peak loads lead to landslides and erosion around reservoirs and negative impacts downstream," he adds.

China's power grid system is in desperate need of a major overhaul, but making the necessary changes remains a tough slog. The central government's efforts to break down the current monopoly practices, hive off grid company revenues from the sale of power, and a move to force grid companies to prioritise renewables over coal and their own assets have dragged on since the

1990s.

More efficiency, less power
In the long term, encouraging consumers, factories and cities to consume less electricity could render new dams obsolete.

For example, an ERI study estimates that replacing incandescent bulbs with more efficient LED lighting by 2020 alone could save as much electricity every year as the Three Gorges Dam produces.

Chinese policymakers are beginning to realise the potential of switching to energy-efficient light bulbs on an industrial scale, Magee points out in a recent paper published in the Copenhagen Journal of Asian Studies.

Improving the efficiency of pumps and fans across the industrial sector could reduce electricity use by 20%, equivalent to the amount of hydroelectricity produced by all of China's powered-up dams in 2013, the paper estimates. Pumps and fans matter, since they are estimated to consume half the world's industrial demand for electricity.

A number of major hurdles remain. First is the question of who pays for the upfront costs of efficiency upgrades. One idea is to allow companies to sell the electricity they have saved through efficiency measures back to the energy market.

Second, excessively cheap energy and electricity prices in China means consumers are less frugal. Weak prices also deprive utilities of the necessary revenues to plough back into energy efficiency measures.

That means that if power suppliers have too little impetus to compete on price and efficiency, China will end up adding more expensive and environmentally destructive hydropower projects to an ever wasteful and dysfunctional grid system.

Many thanks to all who contributed to this issue of Update!

If you have items to feature in the Updates, please send it to Solution Exchange for the Climate Change Community at : se-clmt@solutionexchange-un.net.in