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PART OF THE PROBLEM IS THAT SOLAR PANELS ARE COMPLICATED TO RECYCLE. THEY'RE MADE OF MANY MATERIALS, SOME HAZARDOUS, AND ASSEMBLED WITH ADHESIVES AND SEALANTS THAT MAKE BREAKING THEM APART CHALLENGING.

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Nuclear Technologies Must Go To Villages In Big Way



Rajesh Tiwari
 Publisher
 rt@iccsr.org

What is less known to the common people, is the work that all of you do for using nuclear technology in the areas of healthcare, food and agriculture, water resources management and environmental protection

On 11 and 13 May, 1998, India conducted five nuclear tests in the Pokhran ranges of Rajasthan - during the regime of former Prime Minister Atal Bihari Vajpayee. Pokhran-II consisted of five detonations, of which the first was a fusion bomb and the remaining four were fission bombs. On 18 May, 1974, India - during the regime of late Prime Minister Indira Gandhi conducted the Peaceful Nuclear Experiment - and this would be the 44th anniversary of the Pokhran-I nuclear tests.

Last month, as part of a commemorative event, President Ram Nath Kovind was at the Bhabha Atomic Research Centre at Trombay in Mumbai.

Besides, the nuclear deterrence mechanism and aspects of national security and the nuclear power production, the scope is very wide. And we are doing work in this aspect as well.

In fact, the President was very clear when he stressed on the need to take the technologies to the common man as part of the nation building process.

In fact, the CSR could act as a major bridge – and make “Lab to Land” a reality.

“What is less known to the common people, is the work that all of you do for using nuclear technology in the areas of healthcare, food and agriculture, water resources management and environmental protection,” the President stated.

“Research in nuclear medicine is widely used both for diagnostic and

therapeutic purposes. I am told that in the cancer hospitals associated with the Department of Atomic Energy thousands of cancer patients benefit from the applications developed by you. Also, a large number of medical centres are using the radioisotope products supplied by the Department of Atomic Energy both for diagnostics and treatment of patients. I am happy that one of the facilities that I inaugurated today is the Multi-leaf Collimator System developed by BARC. This system will enhance the effectiveness of treatment of tumours,” he went on to add.

We have developed technologies that have helped in purification of water, radiation treatment of municipal waste generated in cities and its conversion to organic manure, conversion of kitchen bio-waste into bio-gas for cooking purposes. Faster adoption of these technologies by different public and private agencies and speeding-up the diffusion of these applications must become a priority area.

The BARC in addition to its nuclear research mandate, also conducts research in other high technology areas like accelerators, micro electron beams, materials design, supercomputers, and computer vision among the few. The BARC has dedicated departments for these specialised fields. BARC has designed and developed, for its own use an infrastructure of supercomputers, Anupam using state of the art technology.

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Dabur Sets Up Jivanti Remedial Education Centre In Tezpur

Moving forward on its development agenda for Assam, the country's largest Science-based Ayurveda expert Dabur India Ltd has established a Remedial Education Centre in Tezpur as part of its attempts to improve literacy levels in the state. The new Jivanti Remedial Education Centre is aimed at supporting struggling learners and weak students in regular schools. This extra support will help students with specific learning deficits cope with the prescribed school curriculum and go a long way in improving the overall literacy levels in the state.

The centre, set up by Dabur India Ltd's CSR arm Jivanti Welfare and Charitable Trust, was inaugurated by a community elder and Ghoramari Gaon Panchayat President Ms. Champa Basumatary. The Remedial Education Centre will special classes for struggling learners and help them catch up to their peers. New batches will be set up every three months and the needy students will be identified with the help of local government primary school teachers. The program will cover four villages: Sesa Panbari, Dhekidol, Chapaguri and Hasara Nepali Basti.

"Education is both the means to a better life and a key to ensure overall development of the society. After undertaking development programmes for revamping the school infrastructure in Tezpur, we are now lending a helping hand to the students in their studies. During our community meetings, we realised that some children were poor performers in schools because of the low literacy levels of their parents, impacting their self-confidence. We have started this Remedial Education Centre to support such weaker students by offering



them special tuition classes. This centre will seek to enhance their ability to comprehend things being taught in school, besides improving their confidence and their grades," Dabur India Ltd Head-CSR A. Sudhakar said.

Inaugurating the centre, Champa Basumatary said: "Both parents and teachers play an important role in the growth and development of a child. They need

to understand the specific needs of each child and take corrective measures, wherever required. I am sure Jivanti Remedial Centre will play a strategic role in the overall learning process of students who can't afford private tuition due to their poor financial situation. With remedial classes, students will be able to overcome the barriers and indulge in activity-oriented collaborative learning."

MoU Signed For Student Exchange And Joint Research In Samskrit And Indic Knowledge

Collaboration between MIT School of Vedic Sciences & Kavikulaguru Kalidas Sanskrit University

Sanskrit language and other aspects of Indic knowledge such as Yoga, Ayurveda and natural farming have been increasingly becoming popular off late, among students and professionals alike. The MoU recently signed between MIT School of Vedic Sciences (SVS) and Ramtek-based Kavikulaguru Kalidas Sanskrit University (KKSU) is therefore an important step that will not only benefit the academia, but also promote application oriented research in Indic knowledge.



Exchange and Resource Sharing

With natural synergies between the two institutions, this historic, one-of-a-kind collaboration between Sanskrit scholars and modern scientific educators will bring the necessary complementary skills needed for effective contemporary exploration of Indian knowledge. This will benefit the students as well as the society at large with practical applications of India's traditional knowledge. MITSVS and KKSU have decided to work this out in the following ways.

- **Faculty Exchange:** The MoU will enable the faculty of both institutions to participate in course design, teaching,

research, development and related programs of each other, as allowed by their respective rules.

- **Resource Sharing:** Both institutes will share their facilities and infrastructure to conduct courses, programs, conferences and workshops of mutual benefit.
- **Student Exchange:** The MoU will enable students of both institutions to enrol for courses or work on internship projects offered by the other institution. For instance, MITSVS works on several technology projects requiring deep shastra expertise, which can be contributed by students of KKSU, even as they get trained in modern

technology. Similarly, students of design, architecture, food technology and arts at MIT-ADT University (of which MITSVS is a constituent) could enrol in courses offered by KKSU that are relevant to their projects. Student stipends will be borne by their parent institution.

Joint Research and Courses

The MoU will also pave the way for joint academic and research activities, which will enhance the career prospects of students and add value to the domain knowledge.

- **Joint Research Proposals:** Research would be jointly undertaken through



Where The Water Is

*As the world faces increasing levels of water-related stress, ensuring a constant supply of fresh, drinkable water is a matter of security. Experts from the UN University Institute for Water, Environment, and Health highlight how some countries are embracing unconventional methods to bring water to their peoples, write **Manzoor Qadir** and **Vladimir Smakhtin***



In many parts of the world, there are simply no more conventional freshwater resources available to meet growing demand. Beyond limiting economic development, the lack of sufficient freshwater resources threatens the wellbeing of billions of people by causing conflict, social unrest, and migration. The

only way to address this challenge is by radically rethinking water-resource planning and management in a way that emphasises the creative exploitation of unconventional water sources.

There is a large and growing number of unconventional sources of fresh water with massive potential, beginning with desalinat-

ed seawater or highly brackish groundwater. Already, there are 18,000 desalination facilities in more than 100 countries producing roughly 32 billion cubic meters (8.45 trillion gallons) of fresh water – about one-third of the volume passing over Niagara Falls annually.

Some 44 per cent of global desalinated-water production is taking place in the Middle East and North Africa, and new facilities are being built across Asia, the United States, and Latin America. Annual desalination capacity worldwide is increasing by 7-9 per cent, on average.

Recent studies show that, though the cost of irrigation with desalinated water remains higher than with conventional fresh water, it is declining. A couple of decades ago, desalinated water cost more than \$5 per cubic meter (264 gallons); today, it costs less than \$0.50.

A second promising alternative source of fresh water is fog: a vertical mesh can be used to capture moisture from the air, with the droplets accumulating in a tank or distribution system. Given that fog is very

WHAT WILL HAPPEN TO SOLAR PANELS AFTER THEIR USEFUL LIVES ARE OVER?

Part of the problem is that solar panels are complicated to recycle. They're made of many materials, some hazardous, and assembled with adhesives and sealants that make breaking them apart challenging.

Solar power is having its hockey stick moment. Since the early 2000s, the amount of solar panels being installed worldwide has been growing exponentially, and it's expected to continue to do so for decades. By the end of 2015, an estimated 222 gigawatts worth of solar energy had been installed worldwide. According to a recent report (PDF) from the International Renewable Energy Agency, that number could reach 4,500 GW by 2050.

But the solar panels generating that power don't last forever. The industry standard life span is about 25 to 30 years, and that means that some panels installed at the early end of the current boom aren't long from being retired. And each passing year, more will be pulled from service – glass and metal photovoltaic modules that soon will start adding up to millions, and then tens of millions of metric tons of material.

"It's not too far off that those are going to be coming off line, and we're going to have a waste management issue," said Garvin Heath, a senior scientist at the National Renewable Energy Laboratory and a solar power expert. "It's fair to say that it's starting to become more widely recognized as an is-

sue that we're going to need to start working on pretty soon."

The solution many are looking to is recycling. But the ability to handle the coming flow of PV modules is not yet sufficient. "There's some infrastructure," Heath said. "I wouldn't say it's especially well established at this point."



Part of the problem is that solar panels are complicated to recycle. They're made of many materials, some hazardous, and assembled with adhesives and sealants that make breaking them apart challenging.

"The longevity of these panels, the way they're put together and how they make them make it inherently difficult to, to use a term, de-manufacture," said Mark Ro-

bards, director of special projects for ECS Refining, one of the largest electronics recyclers in the U.S. The panels are torn apart mechanically and broken down with acids to separate out the crystalline silicon, the semiconducting material used by most photovoltaic manufacturers. Heat systems are used to burn up the adhesives that bind them to their armatures, and acidic hydro-metallurgical systems are used to separate precious metals.

Robards said nearly 75 percent of the material that gets separated out is glass, which is easy to recycle into new products but also has a very low resale value. Not only that, but what's available to recycle is something of a moving target. As solar panel technology improves, manufacturers are slowly finding ways around using components that would have value to recyclers, such as copper and silver.

"So the underlying commodity value of these things keeps going down," Robards said. The less value a recycler can extract, the less incentive there is to recycle.

Despite the challenges, ECS has been ramping up its photovoltaic recycling capacity. "It's a semi-decent growth area these next few years but exploding about 2020

India's Air Pollution Plan Is A Disappointment

India, one of the countries worst affected by air pollution, has come out with a draft of a new action plan but the plan is deeply flawed, writes Joydeep Gupta



Over the last few years reporting on India's air pollution crisis has dominated the news. The state of its capital city, Delhi, and the health costs of living in it, have been declared a 'national crisis'. Not only that, but scientists report that the air pollution is now set to affect weather patterns, including the monsoon, which provides the critical rainfall that has kept South Asian civilisation going for thousands of years. Pollution from

India even reaches the Hindu Kush Himalayas, causing smog and environmental damage in the fragile region. The problem, of course, is not just India's. Bangladesh's capital city, Dhaka, is also struggling to deal with the menace. And in Pakistan, a lack of measuring units means that there is not even a real understanding of the crisis.

In India itself, the issue peaks just before the winter, as stubble burning leads to Delhi being blanketed in smog. The problem,

though, is a all-year one, and not just one for Delhi. It seems the problem may be just as large, if not larger, in the smaller cities, except a lack of measuring units and less media attention, means that it is often ignored.

There was, therefore, great expectations from a National Clean Air Programme (NCAP) drafted by India's Ministry of Environment, Forests and Climate Change. It is open to public comments till May 17. Unfortunately it is such a poor draft that it needs a fresh look after consultations with independent experts as well as victims of air pollution. This is especially important at a time when the World Health Organisation has stated that of the 15 cities in the world with the worst levels of air pollution between 2010 and 2016, 14 were in India.

A significant part of the 19-page draft NCAP is taken up with contesting and belittling studies of this kind, especially when such studies are carried out by international organisations. When it comes to air pollution, this is in consonance with the state of maximum possible denial in which the ministry, the Central Pollution Control Board (CPCB) and state pollution control boards have been living for years.

With more and more Indians falling prey to respiratory diseases, and doctors in

3 Ways Businesses Can Show Governments They're Taking Action On Climate

Companies sharing their stories of progress included consumer goods company Unilever, U.K. telecommunications giant BT, furniture maker IKEA and Indian industrial conglomerate Mahindra Group, according to Jennifer Austin, Policy Director, We Mean Business

In this critical year for climate action, more forward-looking businesses are stepping up – helping to deliver the goals of the Paris Agreement and supporting ambitious climate policy.

By demonstrating their own success and sharing their experiences with policymakers, businesses are helping give governments the confidence to create the ambitious, clear and comprehensive policy signals that will spur investment in the low-carbon transition. Here's how:

1 Showcase action on climate

One key way that companies can give policymakers the confidence to increase their own climate ambition is to showcase how they are taking concrete action and creating a positive change in the real economy.

This was evident at the U.N. Climate Conference in Bonn this May, when businesses, governments and civil society organizations from around the world gathered to share stories of their progress as part of the Talanoa dialogue. The ongoing exchange,

which followed a tradition of non-confrontational storytelling from COP President Frank Bainimarama of Fiji, is intended to take stock of climate efforts and share experiences and lessons learned along the way.

Companies sharing their stories of progress included consumer goods company Unilever, U.K. telecommunications giant BT, furniture maker IKEA and Indian industrial conglomerate Mahindra Group. The stories they told show how they are pursuing low-carbon growth strategies, often with significant cost savings along the way, which should build confidence for national governments to move further and faster. During the dialogue, BT Head of Sustainable

Companies sharing their stories of progress included Unilever, BT, IKEA and Mahindra Group.

Business Policy Gabrielle Giner shared the company's experience of taking bold climate action and increasing ambition:

"In 2016, BT achieved our previous science-based target to reduce our carbon emissions intensity by 80 percent on 1996/97 levels four years early and saved [\$298 million] through driving efficiencies in our networks, data centers and buildings in the process. The business case for climate action is clear.

"Our new 1.5 degree science-based target means that by 2030, BT plans to decarbonize our business by ... 87 percent against a 2016/17 baseline. This means we plan to change our fleet of 33,000 vehicles into low-carbon vehicles and change how we heat our buildings, for example."

Mahindra Group's Anirban Ghosh shared his story of the company's target to plant a million trees each year.

During one project, Mahindra worked with coffee growers in a remote part of India to help indigenous tribes grow better coffee and earn higher incomes.

"It has become the largest organic coffee growing effort in the world with the prod-

Magma Truckers Well Being Initiative



Magma's Truckers Wellbeing initiative is a program developed for the 360 degree development of the Truck driver's community. We have been linked to this community since long and have observed that it is the most under recognized community so far. Their lifestyle is poor and so is their attitude towards it. Magma has identified transport nagars in the country which are generally packed with trucks parked at any given point in time. Such location are ideal for the implementation of the project.

During our training we observed that these truckers are flying visitors at these transport hubs and come from remote loca-

tions to serve a particular consignment. According to the recent study, One person dies every 3.5 minutes in a road accident which occurs every 1 minute in India. On an average about 5 lakh road accidents kill about 1,50,000 people in India every year (source: Report by Ministry of Road Transport & Highways). Amongst the vehicle category, heavy vehicles accounted for the highest share in road accidents at 22.6% and also killed more people – about 28.7% of the total deaths occurring from road accidents.

Transport Sector consumes more than 50% of Petroleum Product. Road transport is the biggest diesel-consuming segment accounting for about 64 per cent of diesel consumption in India. Out of the total die-

sel consumed by road transport, trucks and buses account for about 77 per cent and hence in view of conservation of Petroleum product Transport Sector is a crucial sector. India has approximately 5 million truck drivers. On an average a trucker drives anywhere between 8000 – 10000 kilometres in a month, becoming vulnerable to eye sight issues, unhealthy eating habits, posture problems, common ailments of cough and cold due to fatigue, and the danger of HIV. Apart from this the transport nagars scores very low in terms of hygiene and proper sanitation facility. Many of the locations either have no or poor sanitation facility for the drivers and their helpers.

Considering these parameters we came up with this project of Trucker's wellbeing initiative and called them the Highway Heroes.

The goals of the project are to train and recognize the unrecognized segment of India who help us get our daily needs to us – The Truckers who drive the long highways continuously for day so that we can be at ease. Primary objective was to generate the awareness and alertness of safe driving habits so that the numbers of fatal road accidents can be reduced which is a long term impact from this project.

Objective is to train them on –

1. Training on improving the driving skill of the drivers
2. Safe driving tips to reduce the number of accidents that take place on the Indian highways.
3. Help them know how to save fuel, which

Green And Healthy Buildings Are An Integral Part Of Green Cities

As the demand for more sustainable building options increases, green and healthy building construction is becoming increasingly profitable and desirable within the global construction market, says Fleming Voetmann, Vice President of Public Affairs, International Copper Association (ICA)



Cities are at the heart of modern living. It is estimated that by 2050 more than two-thirds of the world's population will live in cities, suggesting an unprecedented wave of urban growth.

Smart and green cities hold the key to a sustainable and low-carbon future. With modern technology, energy-neutral buildings are possible. These buildings are bet-

ter for our planet, reduce the global water footprint, minimize waste and significantly increase recycling. Most important, these buildings contribute to better cities for people, with better urban spaces and more efficient transportation.

More than 30 percent of the global greenhouse gas emissions emitted by cities are generated by buildings alone, according to National Geographic. As a micro-

cosm for modern living, buildings are not only the physical building blocks of a city, but the places where most urbanites spend their time.

To fulfill U.N. Sustainable Development Goals 7 and 11 and to create greener and more sustainable cities – resilient against emerging socioeconomic and environmental pressures – we vitally need green and healthy buildings.

What does it mean to build a green and healthy building?

There is no one definition of what constitutes a green and healthy building (PDF), but overall these buildings – in their design, construction and operation – reduce or eliminate negative impacts on the environment, improve public health for building occupants and may even require less upkeep due to greater durability and energy efficiency.

Support for sustainable buildings and sustainable cities is growing. As the demand for more sustainable building options increases, green and healthy building construction is becoming increasingly prof-

Are The SDGs Unsustainable?

Asia Pacific is failing to achieve the SDGs. But this reflects humanity's collective failure, and is the fault of the SDGs themselves, writes Nigel Howard.



Women carry water to their homes in rural India. More than 1.4 billion people in Asia Pacific still live in poverty, social disparities are widening and growth remains inefficient and wasteful.

The Asia Pacific region is failing to meet almost two-thirds of the targets set by the United Nations' Sustainable Development Goals (SDGs), according to a recent report by the UN.

The report found that the world's most populous region has fallen behind on 37 out of 57 SDGs' targets.

But how can anyone be surprised?

Asia Pacific has the largest population of people clawing their way out of poverty, while the developed world ruthlessly exploits them for our own well-being.

Following the developed world models of GDP growth means only part of the population reaps the benefits of development, leaving countries without the luxury of acting on SDG goals such as climate change, life below water, and life on land, as they try

to grow wealth to meet the exploitative demands of the developed world.

Whatever progress might seem to have been made in the short-term, our collective failure on climate change and biodiversity represent an existential threat, and the fault is the SDGs themselves.

There seem to be three major problems with the SDGs:

1. Failure to acknowledge the exploitation of the developing world by the developed world

Although it is comfortable to believe that the rising tide raises all ships, globalisation has shown to increase inequity and exploitation of the poor by the wealthy.

Reducing poverty, Goal 1 of the SDGs, requires economic growth and employment (Goal 8), creating a tension between meeting domestic needs and producing for export. Global market competition gives the developed nations access to the cheapest sources of exports, allowing them to exploit developing nations and prolong their poverty.

2. The goals are wide ranging, interconnected and riddled with contradictions

Production for export requires a density of

Can Technology Keep Farmers In Farms?

The fourth industrial revolution and the technologies it has brought with it has boosted productivity and created jobs in certain sectors. How can the world leverage technology to improve agriculture, the one sector that has lagged behind?

Automation and other technologies have created more jobs in sectors such as information and communications technology (ICT) or business process outsourcing (BPO), but the same is untrue for agriculture.

Speaking at the Technology for Inclusion conference, Carolyn Florey, technology for development lead of International Rice Research Institute (IRRI) said there is a net loss for jobs in agriculture because of technology.

Automation, for example, is replacing jobs in the agricultural sector with machines, as seen in the case of the United States where 40 per cent of the labour force was in agriculture in 1900. That number is now closer to 1 per cent, she said.

Technology has also given rise to better paying jobs in urban areas, which in turn has led to a labour drain from rural communities. “The youth are leaving farms to go to urban areas in search of opportunity. This trend will continue as wages are lowest in the agriculture sector in Asia,” Florey told an audience from the ICT, BPO, government, and agricultural fields at the conference held at the Asian Development

Bank (ADB) in Ortigas Centre, Pasig City in the Philippines.

This was one finding reported in ADB’s latest publication, entitled *How Technology Impacts Jobs*, unveiled at the conference. The report reveals there have been



Despite farmer migration, agriculture will remain a top employer in Asia for some time to come, which is why technology has to be tapped to increase its productivity, says the ADB.

shifts in employment from sectors with low productivity and pay like agriculture, to sectors with higher productivity and pay, such as the service sector, as economies develop.

Despite rural-urban migration, the report states that by 2030 the sector will still employ 21 per cent of the workforce in Ban-

gladesh, 43 per cent in the Laos, and 28 per cent in Myanmar, even at the current rate the youth are leaving the industry.

The 368-page report stated: “It is therefore vital that productivity and earnings in the [agriculture] sector be raised to tackle the challenge of worsening inequality in the region.”

Florey said there must be support to get the right technologies to make agriculture more productive, income-generating, efficient and attractive for youth to stay on farms. “There’s a good amount of evidence that if you’re using sustainable practices and proper crop management and you have information about how to do that, we are able to increase productivity and keep farmers in farms.”

Technology can improve farmer productivity not simply through mechanisation, but also offering high-yielding crop varieties, and improved irrigation, fertiliser, and pesticide practices.

Pioneering Water Solutions For The World

Over the past decade, eight scientists and organisations have been honoured with the Lee Kuan Yew Water Prize for their breakthroughs in water innovation. Here's how the prize continues to benchmark the best work worldwide in improving the supply, quality and safety of water, says Feng Zengkun



Many governments have made great strides in fighting cholera, an infectious disease that causes severe diarrhoea that can lead to dehydration and even death, thanks to the work of American microbiologist Rita Colwell.

In the 1970s, she found that the bacterium that causes cholera can occur naturally

in aquatic environments associated with plankton, even though it was thought to be incapable of surviving more than a few hours outside of a human host.

In the 1980s, her laboratory also discovered that bacteria can be alive and cause harm even though they cannot be cultured, contrary to popular belief at the time. This breakthrough showed that the methods

used then to determine the safety of water were inadequate, changing the world's understanding of clean water and pushing governments to improve those methods.

For her work, Prof Colwell, who is a distinguished university professor at both the University of Maryland at College Park and John Hopkins University Bloomberg School of Public Health, was awarded the 2018 Lee Kuan Yew Water Prize.

Now awarded once every two years in the lead-up to the biennial Singapore International Water Week (SIWW), the Lee Kuan Yew Water Prize honours outstanding contributions by individuals or organisations towards solving the world's water challenges through innovative technologies, programmes or policies. Each laureate receives \$300,000, a certificate and a gold medallion, and delivers the Water Lecture at the SIWW.

"I am truly honoured to be this year's recipient of one of the most prestigious global water accolades, and I am confident that the pioneering spirit and innovative mindset represented by the prize will further encourage future generations of talents to realise our shared goal of providing access to safe water for all," she said.

Elvis, Aliens And Solar Power

How a remote Australian town found itself at the vanguard of a global revolution.

The radio transmission set off from the Sea of Tranquility on the near side of the Moon. In a little more than one second, it crossed the 200,000 miles separating Earth from its nearest celestial neighbour, racing toward its final destination. But, before heading on to Mission Control in Houston and then to televisions around the globe, it visited a rural Australian outpost, where the operators of 200-foot radio telescope listened to those fateful words ring out.

“That’s one small step for man, one giant leap for mankind.”

Chart a map of human history, and you will find Parkes, Australia at the precise centre, drawn equally toward the old and the new, the past and the future.

Parkes is home to the radio telescope that beamed Neil Armstrong into living rooms everywhere – a facility later deployed by no less than Stephen Hawking in the search for extraterrestrial life. But the town of less than 12,000 is principally an agrarian community, comprised of farmers who raise cattle and grow wheat, more connected to the ground beneath their feet than the stars above their heads.

Even its relationship to art and music betrays a certain timelessness. Parkes is both the birthplace of one of Australia’s leading country music artists and the site of its biggest Elvis festival.

It was here, where, faced with a years-long drought that desiccated farms and depleted farmers, Parkes looked once again to the future. Locals responded to the Big Dry not with complacency or fatalism, but by strapping on their rhinestones and building one of the largest solar farms for a thousand miles.

“We had just been through what we referred to as the Millennium Drought, and people were very concerned about climate



The Parkes radio telescope at Parkes, a rural community in New South Wales, Australia, which, embracing a pioneering spirit, found itself at the front of a global revolution.

change and the effect it was having on our community,” said Parkes Mayor Ken Keith, a high school science teacher turned sheep farmer who has served on the Parkes Shire Council since 1983.

“You can do as much preparation as you can for a drought – put away stored fodder

and so forth to feed your livestock – but there comes a time when, if the drought goes longer than 12 months, then it gets very difficult to justify buying additional food to keep animals alive,” he said, explaining that when fields go dry and barren, cattle and sheep go hungry, and farmers are forced to sell their livestock.

“It does have an effect on the economy,” he said. “The North Parkes copper mine was very important to a lot of farmers during that Millennium Drought, because a lot of people were able to get some employment there driving trucks and things at the mine to keep them afloat at the farm.”

In the wake of the drought, the town committed itself to the fight against climate change. The council brought homeowners together to buy rooftop solar panels in bulk and installed photovoltaic cells on public buildings. Most impressively, the council laid out plans for a \$105 million solar farm that would power up to 21,000 homes. “It actually adjoins my property, so I get to look at it every day from the hill on my place,” Keith said.

Parkes has plans for two more solar installations nearby, a move driven as much by worries about climate change as by the high cost of power. “We will nearly be able

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