

The UNEP Magazine for Youth

TUNZA



for young people · by young people · about young people

Repair Recycle Reuse Reduce



THE 4Rs – A WAY OF LIFE

TUNZA

the UNEP magazine
for youth. To view current
and past issues of this
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United Nations Environment Programme (UNEP)

PO Box 30552, Nairobi, Kenya
Tel (254 20) 7621 234
Fax (254 20) 7623 927
Telex 22068 UNEP KE
E-mail unep@unep.org
www.unep.org

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Director of Publications Nick Nuttall

Founding Editor Geoffrey Lean

Special Contributor Wondwosen Asnake

Youth Editor Karen Eng

Nairobi Coordinator Naomi Poulton

Head, UNEP's Children and Youth Unit

Joyce Sang, Karishma Thethy

Circulation Manager Mohamed Atani

Design Edward Cooper, Ecuador

Production Banson

Cover image www.TheWallpapers.org

Youth contributors Tom Anderson (UK); Chucky Bartolo (Malta); Lauren Blayney (UK); Jovana Dodos (Serbia); Kelvin Doe (Sierra Leone); Tsoggerel Enkhbayar (Mongolia); Kate Guerin Miño (Paraguay); Rachael Harrop (UK); Daniela Karaivanova (Bulgaria); Aareez Khan (UK); Hamzat Lawal (Nigeria); Saba Loftus (Ireland); Moira Pain (UK); Juan Manuel Perea (Colombia); Karuna Rana (Mauritius); Baylee Ritter (USA); Lukus Roberts (UK); Ivana Savic (Serbia); Victoria Wee (Canada); Jonas Alirou Yedidia (Cameroon).

Other contributors Jane Bowbrick; Matt Golding (Team Rubber); Michael Green (Michael Green Architecture); Suzannah Kolbeck (Honey Fern School); Olatunbosun Obayomi (Bio Applications Initiative); Alistair Parvin and Nick Ierodiaconou (WikiHouse); Hamid Shakoor (AVEA); Rosey Simonds and David Woollcombe (Peace Child International); Tristram Stuart (Feeding the 5000); Wayne Talbot (Volvo Adventure); Roy Watkinson (GEO5).

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**Partners for Youth
and the Environment**



UNEP and Bayer, the German-based multinational involved in health care, crop protection and high-tech materials, are working together to strengthen young people's environmental awareness and engage children and youth in environmental issues worldwide.

A partnership agreement, originally signed in 2004 and renewed in 2007 and 2010, runs through 2013. It lays down the basis for UNEP and Bayer to implement the projects under the partnership. These include: TUNZA Magazine, the International

Children's Painting Competition on the Environment, the UNEP Tunza International Youth and Children's Conferences, youth environmental networks in Africa, Asia Pacific, Europe, Latin America and the Caribbean, North America and West Asia, the Bayer Young Environmental Envoy Program and a photo competition, 'Ecology in Focus', in Eastern Europe.

The long-standing partnership between UNEP and Bayer has become a public-private partnership that serves as a model for both organizations.

Be a super-hero!



Jovana Dodos

IT DOESN'T TAKE MUCH ... really. Just devote one second, one minute, one hour or even one day to SAVE THE WORLD. We call it a OneOne.

It would be worth it, wouldn't it?

Save the world? YES, we can!

When Rosa Parks refused to give up her seat to a white person on a bus in Montgomery, Alabama, in 1955, the world changed. Her simple act of defiance became an icon for international resistance to racial segregation. Single simple acts CAN change the world.

So challenge yourself – but be realistic. Set goals that you are likely to achieve. Be inspired by Matt Cutts's video (www.youtube.com/watch?v=JnfBXjWm7hc).

Remember, mighty trees from small seeds grow! Turning off the light when you leave a room won't stress you too much, will it? Or taking a reusable bag when you go shopping, rather than using throw-away plastic bags? Making presents for friends and family might take a bit longer than buying them, but it'll be fun and give loads of satisfaction. Planning a community clean-up or giving up a day a month to work for a local environmental organization or in a local nature reserve will take more of a commitment, so try it for a month and see.

If we all take one small step, the effects could be profound. Remember the butterfly's wings. That small insect just beating its tiny wings in one place could have an enormous impact somewhere else in the world – that's a law of physics!

Our OneOne? We're organizing a campaign to get two local mega-offices to turn off their lights at night. It'll save energy and reduce pollution. Watch this space.

Tell us about your OneOne at <http://tunza.mobi> or tweet your OneOne @GEOforYouth

QUIZ • QUIZ • QUIZ • QUIZ

How good is your environmental knowledge?

Win a printed copy of the *Global Environment Outlook – GEO for Youth!*

Just answer these 10 questions (all the answers can be found in *GEO for Youth* at www.unep.org/pdf/geo_for_youth.pdf).

Send us your answers – by e-mail, or online at <http://tunza.mobi> – by 15 June 2013, and we'll draw the five winners from amongst all correct answers received.

Don't forget to send us your postal address with your entry!

Good luck!

1: How many people are expected to live on the planet in 2050?

a: 8 billion b: 9 billion c: 10 billion

2: Of the 90 key environmental goals agreed over the past 40 years, how many show significant progress?

a: 4 b: 14 c: 24

3: How many people does UN-Habitat estimate are homeless worldwide?

a: 1 billion b: 100 million c: 10 million

4: What percentage of people will be urban dwellers by 2050?

a: 52% b: 67% c: 73%

5: How much more food will be needed by 2050 to cope with growing populations and dietary changes?

a: 30% b: 50% c: 70%

6: Of all the world's species, how many have been described?

a: 1.75 million b: 5.75 million c: 7.15 million

7: How much water can you save in a year by turning off the tap when brushing your teeth?

a: 3,700 litres b: 5,300 litres c: 7,300 litres

8: How much of the planet's surface do large cities occupy?

a: 0.5% b: 1% c: 5%

9: The famous ozone hole is over:

a: the Arctic b: the Equator c: the Antarctic

10: When was UNEP founded?

a: 1972 b: 1982 c: 1992

The future we want

'We, the UNEP Tunza Youth Advisory Council together with participants of the UNEP Tunza International Youth Conference ... present this statement, on behalf of young people of the world, to the First Universal Session of the Governing Council/Global Ministerial Environment Forum (February 2013).

1. We propose that UNEP provide appropriate frameworks and mechanisms to measure the full environmental and social costs of production, thereby enabling consumers to make informed decisions and to encourage fair pricing.

2. UNEP has to lead by example in encouraging financial incentives to promote entrepreneurship that has strong social and sustainability goals among young people.

3. UNEP should help to create a mechanism or space for sharing technologies for research into new technical and social ideas through financial incentives and funding via governments.

4. Education for sustainable development (ESD):

a. governments should introduce ESD in formal education curricula, as well as through informal and non-formal methods of learning from the early stages and with a life-long-learning perspective;

b. together with UNEP, governments and stakeholders should create a database of information on sustainable development that is open, accessible and easily available;

c. programmes should be launched that aim to provide professionals with the appropriate training and skills to conduct their work in a sustainable manner.

5. The participation of youth in decision making:

a. leading by example, UNEP needs

to encourage a system that facilitates young people in decision-making structures that are not tokenistic;

b. UNEP also needs to provide training and enable individuals to develop and share skills for inclusive involvement in other key stakeholder groups.

6. Reforms should be made to national youth councils to allow for a sector dedicated to the environment, aimed at involving youth in environmental policy-making processes and providing proper platforms to engage in capacity building. Where such councils do not exist, steps must be taken for them to be set up.

7. UNEP should encourage all stakeholders to become more transparent and accountable in their work, allowing for citizens, especially young people, to understand the different structures that are working towards a sustainable society.

8. Strict environmental laws must be enforced, with a focus on the removal of negative impacts caused by institutions not adhering to existing laws.

9. Indigenous people and local communities should be involved in all government processes. Adherence to ancestral knowledge should be promoted to improve strategies on sustainable production and consumption.

10. We propose that the Governing Councils of UNEP authorize

experts from the World Health Organization and other relevant official public health institutions/entities to conduct frequent checks on pharmaceutical companies that emit chemical waste that might affect drinking water. Steps should be taken to ensure that companies adhere to their respective environmental policies.

11. Governments should commission the quality mapping of water sources by setting up water-quality monitoring techniques, including low-cost, easy-to-set-up monitoring kits. Furthermore, governments should adopt a water source protection act, ensuring that no untreated wastewater contaminants enter water sources.

12. We call on governments, business, cities and civil society to support several efficient campaigns against food waste and unsustainable consumption. We further call on governments and all sectors of society to cut back on food waste and food loss as a post-2015 development agenda target and establish it as a Sustainable Development Goal.

13. UNEP and governments should support and facilitate youth-led campaigns, such as the Unite for Water Campaign, and projects aimed at preserving ecosystems for water security as well as efficient sustainable water use. It is further requested that the sustainable use of water be put forward as a post-2015 Sustainable Development Goal.'



'focus on what unites us'

ACHIM STEINER told delegates at the opening of the Tunza Youth Conference, 'there is so much to do, and so much we can do'. For the first time, more than 130 young people – budding doctors, engineers, lawyers, and even artists from over 100 countries around the world – assembled at UNEP's Nairobi headquarters,

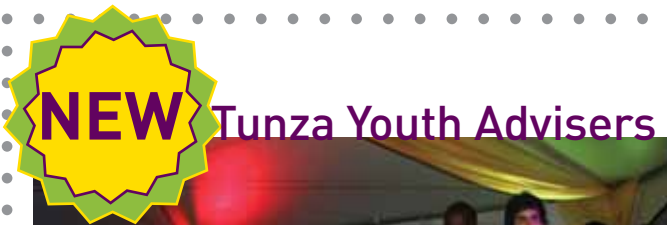
where they were joined by a similar number of young people from all over Kenya.

'The world is full of barriers and obstacles when it comes to sustainable development,' Steiner continued, 'but you, youth, remain a key, powerful engine to address the world's needs.'



TO PROVIDE A FOCUS for the conference and beyond, Saba Loftus, Chucky Bartolo and Karuna Rana (pictured above) launched the youth edition of the *Global Environment Outlook – GEO for Youth*. 'This is not just about the environment and its problems,' they told the delegates. 'It's about acting together for change – it shows there's hope and that successes are happening every day.'

www.unep.org/pdf/geo_for_youth.pdf



UNEP

The election of the new Tunza Youth Advisory Council is always tense, exciting and absolutely vital. There are usually two advisors for each of UNEP's six regions: Latin America and the Caribbean, Europe, Africa, West Asia, Asia and the Pacific, and North America.

The TYACs serve for two years, representing their regions to UNEP, supporting youth networks in their areas, and acting as a focal point for youth activity. Your TYACs for 2013–2015 are:

Latin America and the Caribbean

Pedro Pereira Marques (vivahojeativismo@gmail.com) & Stefan Knights (stefanknights@gmail.com)

Europe

Daniela Karaivanova (danika6@gmail.com) & Simona Zeroska (zeroska_simona@yahoo.com)

Africa

Tom Akampa Israel (ttomas9@yahoo.se) & Ashley van Heerden (ashvanheerden@gmail.com)

West Asia

Basma Dali Ahmad (basmadali@hotmail.com) & Mohammad Elamayireh (mohamad_mazan2007@yahoo.com)

Asia and the Pacific

Jes Ebrahim Izaidin (jes.ebrahim@gmail.com) & Pranav Desai (pranavdesai92@hotmail.com)

North America

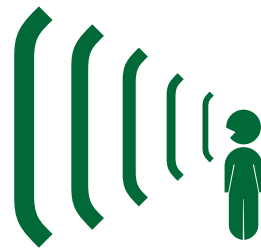
Victoria Wee (vwee@stanford.edu)

So get in touch with your local TYACs – they want to hear from you.



TRISTRAM STUART OF FEEDING THE 5000 (www.feeding5k.org) introduced UNEP's new, year-long campaign to reduce food waste, cherishing not just food itself (though that alone would really make a difference), but also water, fertilizers and pesticides, transport fuels, and the energy used in food processing and cooking. Tristram presented a compelling argument: the world produces more than 4,000 calories a day for every person living in the world, but fewer than 2,000 are actually eaten. The rest is wasted – left rotting in fields and storage facilities, thrown away because it doesn't seem perfect or, like offal, has become unfashionable as food. A lot is also discarded because we've kept it in the fridge too long or we just loaded our plate with more than we can eat. As Tristram pointed out, there is enough food for everyone; we just have to change the way we think.

Voices



from a conference

Getting the attention of law makers – Nigeria

As Nigeria has no clear policies or institutions to address climate change, the Nigerian Youth Climate Action Network decided to get a government bill through the National Assembly. To make this happen, they:

- organized an international press campaign, calling on law makers to act as a matter of urgency;
- launched a social media campaign to flood policy makers' Facebook walls with messages;
- sought the support of radio and TV stations, which featured live discussions on the issues and explored the need to teach people about climate change;
- printed *Turn Down The Heat* T-shirts for young people in Abuja, the capital.

Although the bill got through parliament, it has been waiting for presidential signature since 2010. To make that happen the young people are now seeking 20,000 signatures on an Earth Hour petition that will be forwarded to the President, asking him to act swiftly on the Climate Commission Bill.

HAMZAT LAWAL, the charismatic co-founder of the Network, told TUNZA: 'Partnership is key to our work – we identified individuals, organizations and institutions with an interest in environmental issues and we reached out to them for partnership.'



Hamzat Lawal

Taking national action – Canada

In the winter of January 2012, We Canada's young sustainability advocates went on a two-month coast-to-coast tour: Dialogues and Action for Earth Summit 2012. Their aim was to engage citizens by teaching them about the United Nations Earth Summits and the significance of Canada's role in the negotiations, to consult civil society on the national position for Rio+20, and to provide concrete action platforms to get young people to mobilize their own networks. 'Our volunteer team worked on drumming up media attention through traditional media press releases and appearances and through social media like Facebook and Twitter, as well as the We Canada website (<http://wecanada.org/blog/>),' said the group leader **VICTORIA WEE**. 'Thanks to generous sponsorship, we engaged 7,837 Canadians directly in dialogue from 23 universities, 30 schools, and 3 community centres across 10 provinces and territories – three-quarters of these were young people between the ages of 10 and 25. As a result, more than 1,000 letters were sent to political leaders, demanding that Canada make sustainable development a priority on the federal agenda.'



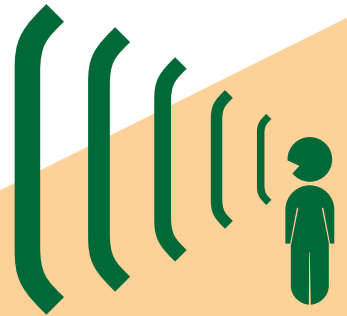
Victoria Wee

Local – national – international

When the question of what to do with unused and unwanted medication was posed, students in Illinois, USA, started the Prescription Pill and Drug Disposal Program (P2D2). Backed by the State of Illinois, Illinois American Water, Covanta Energy and Illinois Indiana Sea Grant, this grew beyond their local area, with the students placing drop boxes in police stations and pharmacies across the USA for people to safely and efficiently dispose of their surplus medicines. P2D2, which won third place in the 2012 Volvo Adventure, is now going international with the Scouts of Brazil, initially in the southern city of Erechim. 'We hope to take P2D2 right across Brazil,' founder **BAYLEE RITTER** told TUNZA, 'and we have ambitions to spread the idea to other countries, forming life-long partnerships with like-minded environmentalists.'



Baylee Ritter





Who's fighting for the environment?

IVANA SAVIC, who led the Rio+20 Major Group for Children and Youth, works for the Ombudsman Office in Serbia. She explains what this kind of administrative process could do for environmental issues.

'Little attention has been paid to the role administrations can play in the enforcement or violation of environmental agreements, environmental rights and human rights in general. But they have a huge influence on the lives of people and on the state of the environment.'

'The administrative system is the place where citizens and governments meet and it is where environmental treaties and standards can be brought to life. Wrongly handled, however, the system can prevent citizens from gaining access to justice and can contribute to environmental degradation.'

'National Human Rights Institutions such as Ombudspersons are independent state bodies with mandates to promote and protect human rights. They also ensure that international obligations are implemented at a national level, and play a critical role in changing the practices of public administration, policies and government in general.'

'As such, they could advance and support environmental mainstreaming, the assessment of laws and procedures from an environmental perspective, and initiate the establishment of a multi-sectoral coordinating body to ensure an integrated approach to the environment and development.'

'That would ensure that the environment is not just the responsibility of specialist ministries, but becomes the concern of all ministries, bodies and organs holding public authority, and recognizes that the environment is at the core of public interest.'

No more dengue deaths – Paraguay

The Mangore Scout Group from Ciudad del Este, Paraguay, set about fighting dengue fever locally – and won the Volvo Adventure Award for 2012. To eliminate the breeding-grounds of the mosquito that spreads the disease, they organized neighbourhood clean-ups and awareness-raising in schools, and taught people how to reuse and recycle wastes. Then in September, Paraguay's president, Federico Franco, asked the group to take its programme to the Ministry of Health so that it could be put into action across the country. 'Now we're working with local authorities and communities on neighbourhood clean-ups in public spaces and disused sites, as well as going from house to house telling people how to prevent mosquito breeding grounds from forming,' group leader **KATE GUERIN MIÑO** told TUNZA.



Kate Guerin Miño

Driving action – Cameroon

The "I Vote for Climate" movement was set up by Actions Vitales pour le Développement Durable to encourage candidates for the Cameroon presidency at the October 2011 elections to include environmental protection in their manifestos. A petition invited the candidates to commit themselves to including climate change and sustainable development in their plans. "I Vote for Climate" was not political and supported no particular party,' organizer **JONAS ALIROU YEDIDIA** told TUNZA, 'not even the "greens"'. Rather, it was a plea to future decision makers to take the environment seriously. The campaign caught the eye of the authorities, including Elections Cameroon – ELECAM, the body that organized the elections – which signed the youth petition.



Jonas Alirou Yedidia

Changing worlds?

by Matt Golding



Matt Golding

BACK IN THE 1980s we spent a huge amount of time fantasizing about possessions – the latest car, bike, disc, film and more. Days would be spent imagining the life we would have if only we owned these things.

In recent years, however, I have been surprised by a slow but growing shift amongst young people towards nonchalance about ownership. Whether it's music, cars, phones, movies or software, young people seem increasingly happy just to value the experience stuff offers rather than the stuff itself.

How has this come about? Maybe in the developed world it's because of abundance; the increased availability of affordable possessions. Or maybe the increased responsibility of looking after so much stuff has worn us down. Maybe the globalization of progress has caused convergence, so that the messages possessions send about us have become less distinct. Or maybe we've just become more hooked on doing things than on having things.

But is this shift in values good for the planet? In some areas, such as car clubs, it is easy to feel confident they're a step in the right direction. If we all were members of clubs, such as City Car or Peugeot's Mu, the world could probably get by with fewer cars.

In other areas it is less clear. Yes, our increasing use of services such as Spotify to access music and movies is resulting in a reduction in the number of CDs, LPs and DVDs made each year. But does this create a net environmental benefit once the need for computers and phones with internet connections, plus the infrastructure that runs them, is factored in?

That said, the environmental benefits of moving away from individual ownership are potentially huge. But to maximize the potential we also need to exercise our power as customers and ensure that what we buy is made to be upgradeable, recyclable, repairable and long lasting.

Take my old laptop: it had an iFixit* rating of 7, meaning you could fix and upgrade it yourself. But the new model's rating is 1, meaning you have to get rid of it when the battery dies or the hard drive runs out of space. Currently both models are on sale with the exact same specifications – apart from the retina screen – so you, the consumer, can choose. If everyone buys the new design, valuing the 3mm thinner machine with an amazing screen over upgradeability, the older, more environmentally benign option is likely to be discontinued.

Even allowing for Moore's Law – stating that the power of technology doubles every two years – it would be great to feel there is a solution to increasingly rapid obsolescence. By changing our value systems from owning stuff to having access to it, and by factoring in that some of our things like computers or smart phones will have more than one function, we could be developing a society that gets more from less.

We, the consumers, have a responsibility to practise and encourage the 4Rs by voting with our wallets when we buy new things.

Matt Golding, co-founder of Team Rubber, is a viral film maker and ad agent.

** iFixit is a free online repair manual that you can also update (www.ifixit.com).*



Only one planet

Living in harmony with the world around us and appreciating just how dependent we are on the natural world are not new ideas. Over the millennia, all sorts of societies have taught them as moral principles.

One Planet Living is a positive vision of a world in which we all live happy, healthy, fulfilled lives within the natural limits of the planet, and still leave sufficient space for wildlife and wilderness.

'One Planet Living will allow us to make a difference on a scale and with the urgency that all of us now know are absolutely necessary.'

Achim Steiner, Executive Director, UNEP



ONE PLANET LIVING – THE PRINCIPLES

Zero carbon – Delivering all energy with renewable technologies and making buildings more energy efficient.

Zero waste – Practising the 4Rs: reusing and repairing where possible, reducing waste, and recycling.

Sustainable transport – Encouraging low-carbon modes of transport to reduce emissions, including walking, biking and using public transport.

Sustainable materials – For whatever we do, using sustainable, healthy products, with low embodied energy, sourced locally, and made from renewable or waste resources.

Sustainable water – Using water more efficiently in buildings and in the products we buy; tackling local flooding and water-course pollution.

Local and sustainable food – Choosing low-impact, local and seasonal diets, while reducing food waste.

Land use and wildlife – Protecting and restoring biodiversity and natural habitats through appropriate land use, including in the built environment.

Culture and community – Valuing and reviving local identities and wisdom.

Equity and economy – Ensuring that our economies support fair employment, inclusive communities and fair international trade.

Health and happiness – Encouraging active, sociable, meaningful lives to promote good health and well-being.



ONE PLANET LIVING IN ACTION

'We only have one planet; London 2012 will respect its ecological limits, its cultural diversity and create a legacy for sport, the environment and the local and global community.'

The London 2012 Olympics

The future NOW

Renewable energy isn't the future, it's here. Germany generates a quarter of the electricity it uses from renewable sources, and is aiming for 65 per cent by 2040. So what else is happening, and where?

Steam prospects

The volcanic Rift Valley that runs through Kenya harbours an abundant but barely exploited renewable resource: geothermal power. Currently, two geothermal plants have a combined capacity of 150 megawatts, but one estimate of Kenya's geothermal potential suggests it could increase to 7,000 megawatts, potentially supplying other countries in East Africa. UNEP and the World Bank have initiated the African Rift Geothermal Facility (ARGeo) to promote geothermal research and development in Djibouti, Eritrea, Ethiopia, the Republic of Tanzania and Uganda, as well as Kenya. Until now, the high cost of development has been prohibitive, but increasing demand for power, and its potential, has motivated Kenya to increase its geothermal power generation, with construction of the 280-megawatt Olkaria IV plant currently under way.

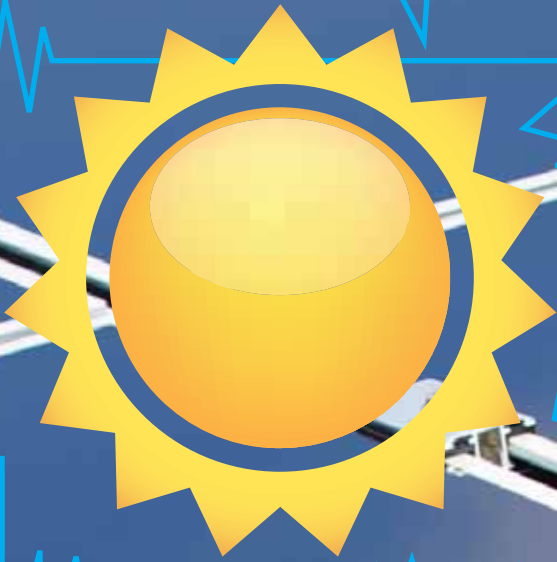
Long-distance power

In Iceland, an overabundance of geothermal and as-yet untapped wind power has Icelanders wondering how to share their energy wealth and profit from it. One idea is to invite foreign, energy-intensive industries such as aluminium smelters, data centres and industrial greenhouses to settle on the island. Another is to build a high-voltage interconnector between Iceland and the United Kingdom to provide clean energy to the UK and other European Union countries.

The long-distance transfer of electric power could help to reassure those who say renewables aren't reliable enough. This is what is at the heart of the Desertec project, which could link a massive solar farm in North Africa to energy-hungry Europe and the Middle East. High-voltage transmission lines are also being considered in Texas, already the largest producer of wind energy in the USA, with a capacity rivalling that of France and Italy. And the state is also developing solar power. The high-voltage lines would carry the renewably generated power from the sparsely populated panhandle to more densely populated areas, both within Texas and beyond its borders.

Smart grids

Long-distance power transmission needs investment in smart grids – updates of the systems that network electricity from various sources, whether power plants, wind farms or energy fed in from home-based solar panels – and route it according to end-user demand. At the same time, feed-in tariffs reimburse domestic generator-consumers for any electricity their home-based system contributes to the public grid. Smart grid technology is gradually being deployed in Europe and the USA, and is under development in Australia, Japan, Thailand, Singapore, the Republic of Korea and China.



Visible benefits

How can we get solar electricity to the people who need it the most? In rural India, hundreds of millions of people rely on polluting kerosene lanterns. In 2007, the Indian non-governmental organization TERI (The Energy and Resources Institute) launched the Lighting One Billion Lives initiative to create a market for locally run solar-power enterprises. Its researchers help manufacturers create affordable lamps that can be sold or rented to villagers, who can then recharge them at local stations. TERI doesn't make money, but creates an economy around the solar-powered charging stations, run by local entrepreneurs. So far, 500,000 homes have been served. TERI is now developing micro grids – 10 or more buildings linked to a solar system, and it is taking its idea to Afghanistan, Myanmar, Pakistan, Kenya, Ethiopia and Sierra Leone.

M. Baunoth/Zoonar.de/Specialist Stock

Where we are with ...

... nanosolar

When nanosolar first made headlines as the hot new technology – film-thin solar cells made of copper, indium, gallium and selenium (CIGS) printed on metal foil – investors took notice, and CIGS companies began to take off. Unfortunately, the technology is still struggling to compete with the manufacturing power and cost advantage of traditional silicon panels being made in China, but it's a fantastic idea and may yet prove to be the answer to low-cost solar energy.

... algal biofuels

While algae are a promising source of carbon-neutral biofuel, with the potential to reduce fertilizer run-off and CO₂ emissions as well as turn sewage into energy, the technology has hit the buffers when it comes to scaling up. Projections that 1 square metre of open pond could produce up to 500 grams of algae a day turned out to be too optimistic, and current technologies require more water and energy than is justified by the amount of fuel produced. However, scientists are not giving up.

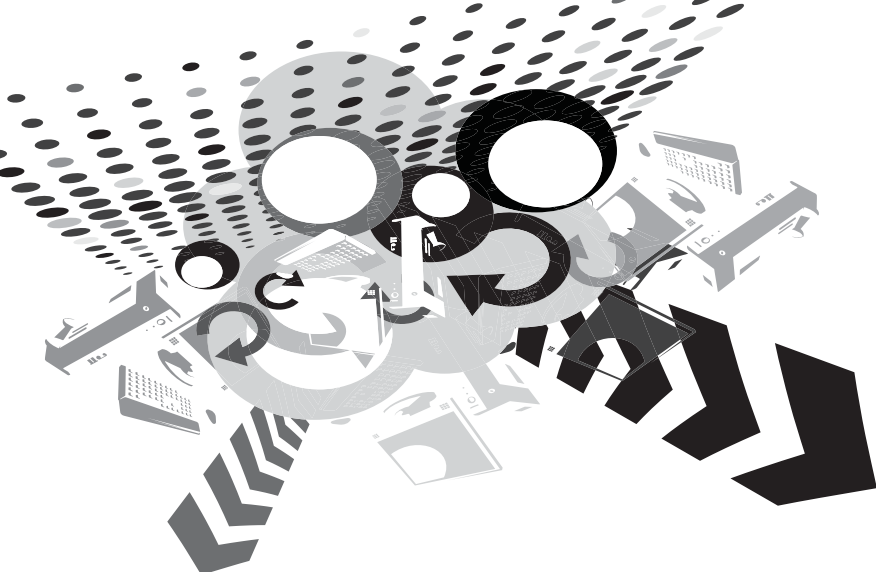
... wave power

Packed with energy, ocean waves are a limitless source of power, so why aren't they powering the world already? Researchers haven't yet managed to achieve high levels of efficient energy conversion – waves aren't consistent or energetic enough to power turbines at the capacity needed for widespread use. Nonetheless, several wave-powered plants, based on a variety of technologies, are generating energy for local use in Scottish islands, Portugal and Oregon, and development continues.

Where in the world ...?

Ever wondered where, exactly, the world's solar and wind power are produced, and where there is potential? A global atlas of solar and wind data has been launched by the International Renewable Energy Agency (Irena). This web portal provides resource maps from technical institutes around the world, which can be overlaid with additional information such as the location of protected areas, roads and infrastructure. It is designed to help identify solar and wind resources for planners and investors looking to develop them into clean power.

www.irena.org/globalatlas



YOU ... making stuff with stuff from stuff



Suzannah Kolbeck

MINIMALISM IN ACTION

Want your own house? Twelve-year-old Sicily Kolbeck, from Georgia, USA, was inspired by Deek Diedricksen's TV show *Tiny Yellow House* and others in the 'tiny house' movement, which encourages people to build homes with small footprints, both literally and virtually. So she started building her own 12-square-metre house from repurposed and recycled materials. It's complete with solar panels, a composting toilet, a loft and a kitchen. Sicily goes to a school that allows free-range learning, and she is studying physics, design, engineering and maths, all of which contribute to her project.

Follow her building adventures:
www.tinymaison.blogspot.co.uk

RUBBISH RADIO ... WELL, YES

When we need electronics, most of us head to the shops. But when 15-year-old Kelvin Doe – aka DJ Focus – of Freetown, Sierra Leone, wanted to build a radio station, he salvaged rubbish from bins to make his own batteries, transmitters and generators. The self-taught engineer recently came to global attention when his project – a radio station created entirely from rubbish – won a local high-school innovation challenge and he became the youngest person ever to be invited to the Visiting Practitioner's Program at MIT.

[www.youtube.com/
watch?v=XOLOLrUBRBY](http://www.youtube.com/watch?v=XOLOLrUBRBY)



Paula Aguilera/MIT Media Lab



WIN-WIN-WIN SYSTEMS

'In the past, I retrofitted a conventional septic tank into a biogas plant. Now I'm working on a biogas plant to be incorporated into city infrastructure, combining the street grid, water management and energy systems to simultaneously treat household wastewater, create a green cooking fuel and provide clean water for Lagos, Nigeria. Consider a block of 80 streets. These can be divided into 10 units of eight streets each, with the septic tanks of each group of streets linked to a central waste system or biogas plant. The biogas produced can be used to run gas engines that pump clean freshwater from bore holes to households. Each community unit can run its own closed, decentralized, easy-to-fix system. And because this qualifies as a clean development mechanism, it can be used to sell carbon credits as a source of revenue.'

Olatunbosun Obayomi, Lagos, Nigeria

IT DOESN'T HAVE TO BE TOXIC

'My goal is to create a company that uses waste copper slag to generate valuable products while removing a threat to the environment in my region. The copper industry in Colombia produces an average of 8,000 tonnes of waste each year – of which approximately 10 per cent is copper slag, a toxic waste. This harms lung function and results in respiratory disease. It is also poisonous to plants and affects pH levels in rivers and lakes. I am working to transform the slag into a resource by developing it as a raw material to be used in industry, saving money while reducing environmental pollution. Through a process called powder metallurgy, which blends and bonds the powders of various metals, copper slag can be used as a replacement for commercial copper powders in industrial products.'

Juan Manuel Perea, Colombia, BYEE 2012



Phbcz/Dreamstime.com

“Don’t just sit there! DO something!”

Cartoon by Daniela Karaivanova (Bulgaria), TYAC for Europe



INSPIRED BY AFRICA

‘When a group of us from the Isle of Man, UK, took a trip to Gambia, we saw how climate change is affecting the people of sub-Saharan Africa: soil erosion, salination and falling water tables. When we got back to Queen Elizabeth II High School, we had to do something. We came up with ways we could save water and electricity, cut carbon emissions and reduce paper use – each linked to something we’d seen in Gambia. For example, we learned that women cook on wood fires, which gives them lung cancer. So we used recycled newspapers to make briquettes, shredding and soaking them, then pressing them – they’re carbon neutral and don’t smoke as much as wood or coal. We distributed the briquettes to people at Christmas, particularly the elderly.

‘Our trip to Gambia also inspired us to use rainwater instead of tap water whenever we can, while our vegetable garden



Volvo Adventure

raises awareness of the carbon footprint of food. We hope to inspire people and remind them that our actions anywhere have an effect on the global system.’

Moira Pain, Rachael Harrop, Lauren Blayney, Aareez Khan and Tom Anderson (Volvo Adventure 2012 finalists), Queen Elizabeth II High School, Isle of Man

Food for thought

by Lukus Roberts

EVERY YEAR, around 1.3 billion tonnes of much needed food, perfectly fit for consumption and worth approximately US\$ 1 trillion, fails to feed people. Reasons vary: in developed countries, a staggering 90–115 kilos of food per person is thrown out each year, while in the developing world, waste is more generally the result of crop disease and loss during storage, before it ever gets to a consumer.

Genetic modification (GM) is still controversial; some fear that when people start ‘playing God’ an apocalypse will follow. However, bioscientists believe that by making the most of progress in our understanding of crop chemistry and coupling this with what is now known about GM technology, not only can we begin to tackle the issue of mass food waste, we can do it safely and with little or no risk to the environment.

Prolonging useful life

Genetic manipulation of enzymes – proteins that carry out specific tasks in biological processes – is one way in which bioscientists hope to reduce the amount of food going bad before it reaches consumers. An enzyme that can extend the shelf life of fresh bread, for example, has recently been manufactured. There’s a bonus, too: for every 1,000 tonnes of bread produced using this enzyme, 50 tonnes of CO₂ equivalents are saved thanks to waste reduction. ▶

Preventing disease

Poor crop yields can be the difference between life and death for many. Diseases such as bacterial leaf blight in rice are responsible for yield losses of 20–80 per cent: in India alone, this disease damages 6–7 million hectares of growing rice each year. By introducing bacterial- or insect-resistance genes into crops, scientists have demonstrated how to combat these devastating and wasteful losses. ▶

Dig in!



Nick Weinberg



Nick Weinberg

Ron Finlay calls himself a renegade gardener. When the artist and resident of South Central Los Angeles got fed up raising his sons in a ‘food desert’ of fast-food joints and liquor stores, he decided to plant a vegetable garden on the strip of land between his house and the street. Result: the city of Los Angeles issued a warrant for his arrest. He fought it, and the city reversed its position, and now even supports his growing urban gardening project – LA Green Grounds. He leads ‘dig-ins’ offering practical support, and provides gardening tips online. His aim is to plant blocks of gardens in LA and build health-food cafés in recycled shipping containers, turning the food desert into a food oasis.

lagreengrounds.org

Looking good

Particularly in more affluent regions, people are picky about the food they buy and eat. Bananas must be curved just-so, carrots straight, and apples must have no brown blemishes. Around the world, farmers who supply major international supermarkets throw away many tonnes of food just because it lacks good looks. Now, however, techniques such as RNA interference or 'gene silencing' are being mobilized to 'switch off' genes that cause browning, promising to maximize the number of 'attractive' apples and thus reduce loss. ▼

Upping nutritional content

Can less be more? Could bioscience save lives? Golden rice has been designed to produce up to 23 times the amount of beta-carotene usually found in rice; beta-carotene is an essential precursor of vitamin A, and vitamin A deficiency kills almost three quarters of a million children under five each year. Trials are also under way to increase the mineral and antioxidant content of fruit and vegetables, with studies suggesting that consumers might be willing to pay a little more for such nutritionally enhanced foods. These developments could allow more people worldwide to receive all the nutrients they need to live healthy lives, without the need to increase the area of agricultural land. ▶

Moving on

We will all have to change our attitudes to what we eat and the way food is produced if we are to conserve our planet and protect and expand our resources. An acceptance of biotechnology, including GM, as an everyday part of our lives is likely to be critical in this. After all, most of us would be more than happy to receive stem-cell therapy if we became ill enough to need it.

Lukus Roberts is working on a PhD in molecular and cellular parasitology and immunology at Imperial College, London.

High-density growth



THE LAST PLACE you'd expect to find organic farming is Hong Kong, one of the most densely populated cities in the world and full of high-rise buildings. Lack of green space means people who want to grow food typically do it on their balconies. Yet there is a small organic urban farm movement growing here, with people establishing community gardens in city outskirts, and even in tiny spaces between buildings. The Castello Organic Farm is a community garden at the foot of a skyscraper, started by a few residents interested in permaculture. Since 2003 it has served as a laboratory for teaching residents about composting, planting fruit trees, growing herbs and more.

www.geocities.com/tswong2007/COF_Site.html



ZiggyMasale/CC-BY-SA 3.0

A place to live

WHAT EXACTLY IS A SUSTAINABLE CITY?

There's no fixed standard, but ideally it would have plenty of green space, be efficiently laid out with mixed-use zones, use renewable energy such as solar and wind, offer efficient public transport as well as safe pedestrian and cycle routes, have urban gardens, and feature high-density living to get more efficient use of resources.

It can be done – Curitiba, Brazil, ticks all of these boxes. With its many green spaces, excellent public transport system and use of hydropower, among other features, it has been considered a model of sustainable urban planning since the 1960s. More recently, UNEP and LivCom awarded the Livcom 2011 award for most liveable community to Songpa, a district of Seoul (Republic of Korea) near the famous Gangnam district. Its 690,000 residents enjoy a citywide bike rental system and 116 kilometres of cycle paths, 140 green parks covering one third of the land area, four waterways and solar power plants.

More and more sustainable cities are under development around the world...



Stegano/PD

Green Leaf, Bangladesh

GREEN LEAF – or *Shobuj Pata* in Bengali – located next to Bangladesh's crowded capital city of Dhaka, features native vegetation in the form of green spaces and plant-covered walls and roofs to combat heat, filter air pollution and keep interiors cool. Rainwater is collected to keep the vegetation lush. The community, which will house 10,000 people together with a convention centre, a mosque, a school and retail facilities, is due for completion by 2015.

Masdar, Abu Dhabi, United Arab Emirates

ZERO-WASTE, ZERO-CARBON and car-free, Masdar City is a 6-km² sustainable city, designed to meet One Planet Living standards and due for completion by 2025. The city, which will house 50,000 people, is being built entirely with renewable materials such as sustainably produced wood and bamboo. Solar panels will provide electricity, including for desalination plants and cooling, and transport will include personal electric pod-like cars on guided railways.

Chengdu Tianfu District Great City, China

IN A TWIST ON THE STAND-ALONE ECO-CITY, the CTDGC will be made up of multiple towns radiating out from the city of Chengdu, with only trains to connect them! Opening in 2020, each town will be densely populated: 80,000 residents will live in 18-storey tower blocks built in a circle, within which no point will be more than a 15-minute walk away. Each town will be surrounded by a green belt, and developers plan to cut landfill by 89 per cent, wastewater by 58 per cent, and energy use by 48 per cent compared to standard Chinese cities of a similar size.



Shobuj Pata

innovations



Shobuj Pata

Defino Sisto Legnani/Wikihouse



The DIY home

What if we could build our own houses? Wikihouse – a resource started by architects Alistair Parvin and Nick Ierodiaconou – is a freely shared library of 3D models. Anyone anywhere in the world can download files to cut out a kit of parts using conventional locally sourced building materials such as plywood. The pieces are modular and are joined using wedges and pegs. All you need is a mallet. Once the lightweight frame is lifted into place, two or three people can assemble a small house within a day. Insulation, wiring, plumbing and so on can be added using locally sourced materials. The project is in its early stages, but prototypes have been built around the world, including in Christchurch, New Zealand, which recently suffered destructive earthquakes, and in Rio's *favelas*.



Shobuj Pata

Michael Green Architecture



Wooden skyscrapers

Why do we build skyscrapers from greenhouse-gas-intensive concrete and steel rather than CO₂-absorbing wood? Architect Michael Green argues that we could use a fire-resistant wood material known as cross-laminated timber. It looks a lot like plywood but is much stronger, and can be made from fast-growing, sustainably produced timber as well as from wood otherwise ruined by such pests as the mountain pine beetle. Green points out that wood structures are able to withstand earthquakes (many of Japan's ancient pagodas are still standing) and are water-resistant (wood has long been used for the foundations for bridges).

Shobuj Pata



Reduce, repair, reuse, recycle

Pedal POWER

BICYCLES play an iconic and indispensable role in keeping our planet green while getting us from here to there. But their potential as a sustainable tool is going way beyond transport. Check out these projects that elevate the humble bicycle to a platform for useful reuse!



Matteo de Mayda/Maya Pedal



Alfa bike/www.funbri.com

Priti bikes, Panama

A customized hotrod has long been the province of young men trying to make an impression. In Panama, where bicycles are a low-cost mode of transport, a youth subculture is creating uniquely modified bicycles pieced together from recycled items including horns and headlights. The results are 'priti baiks'. 'Priti' doesn't translate as 'pretty', but rather describes an ingenious and striking grace – vibrant expressions of creativity and pride.

www.jose-castrellon.com

The Alfa bike

Want an ultra-sustainable vehicle? You could go out and buy a reconditioned bike. Or you could buy one made of recycled cardboard at a production cost of \$9 per unit. After several years of painstaking research and development, Israeli inventor Izhar Gafni has created the Alfa, a recycled cardboard bike with no metal parts that weighs less than 10 kilos and is driven by a belt system, making it easy to maintain. The bike is still at a prototype stage but is set for manufacture within the year. The designer is also working on a motorized version, as well as on a cardboard wheelchair for non-profit groups.

XYZ, Cape Town, South Africa

Many people in rural South Africa have no access to motorized vehicles or public transport. In an effort to meet these communities' needs, the South African Bureau of Standards (SABS) commissioned a gearless bicycle design that could be built from standard parts or locally accessible materials and would be repairable in rural villages. Cape Town-based design company XYZ (which also did the commercial design of the Baygen wind-up radio) took this good idea one step further by responding to the call with a modular bike design. Spokes, frames and wheels are prefabricated, and the rest of the bike can be filled in according to instructions with any available material – recycled scrap wood or metal, for example. The modular vehicle can be assembled in a variety of ways to suit the user's needs. Parts can be rearranged into a tandem bike, a tricycle, and even two bicycles connected to a central platform for carrying cargo such as market goods or water, opening up opportunities for entrepreneurship. <http://dddxyz.net>

Maya Pedal, Guatemala

When is a bike more than a bike? When it is the basis for pedal-powered machines. Maya Pedal, a Guatemalan non-governmental organization, takes discarded bicycles donated by the USA and Canada and transforms them into 'Bicimáquinas' – pedal-powered machines offering electricity-free tools to rural Guatemalans, aiding sustainable entrepreneurship. The Bicycle Rope Water Pump draws water at up to 37.8 litres per minute from wells and boreholes as deep as 30 metres. The Bicycle Blender makes smoothies, grinds grains, and helps manufacture soaps and shampoos. The Bicycle Nut Sheller shells nuts at 3 kilos per minute. Maya Pedal fabricates the machines in its own workshop using concrete, wood and metal and old bikes. It also publishes its designs online so that anyone around the world can make use of them. Current prototypes include a pedal-powered metal sharpener, washing machine, electricity generator, soil plough and wood saw.

www.mayapedal.org



Recycling: making it work

EVERY YEAR, Bayer Young Environmental Envoys (BYEEs) take a tour of AVEA, a municipal waste management facility in Leverkusen, Germany, led by Hamid Shakoor. Envoys from Africa, South America and Asia are unfailingly stunned by the level of citizen participation in waste recycling. TUNZA asked Hamid to explain what makes German recycling so successful.



Bambulla/Dreamstime.com

AVEA



Markhunt/Dreamstime.com

What motivates citizens to recycle so thoroughly?

The AVEA centre is a service for people living in Leverkusen, and is additional to regular collections of normal and bulk waste and reusable materials. Each day, we take in recyclable materials for free, but charge for wastes that require extra processing. This motivates people to separate reusable materials from general waste.

Is there policy to support this?

In Germany, efforts to separate and recycle reusable materials began in the late 1960s and early 1970s. It started with separate collections of recyclable glass bottles and combined collections of paper, cardboard, newspapers and magazines. But the volume of household and commercial waste rose very rapidly, reaching a peak in the early 1990s. Germany was on the brink of a waste disposal crisis, so politicians acted to modernize laws. These now set out the target hierarchies: avoidance; sorting; recycling; ecological disposal of residue.

Legislation also made it compulsory for municipalities to advise and support citizens. For example, in Leverkusen, a waste hotline is available for residents. We run public information events, including opportunities to visit waste companies and plants, and give lessons on the environment and waste in schools. Germany also requires that waste officers work with industry and trade on recycling and disposal.

How does Germany avoid sending waste to landfill? Is waste exported, or is it all processed at home?

Since June 2005, it has been illegal in Germany to send

untreated household, commercial or industrial waste to landfill. Mixed waste can only be deposited in authorized landfill sites after incineration or treatment in mechanical-biological plants. Incineration is all done in Germany and, actually, limited volumes of residual waste are also imported from neighbouring European countries.

How do you handle plastics?

The retail and wholesale sectors have a range of take-back systems for plastic, composite and metal foodstuff and beverage packaging. Once collected, this waste is sorted and fed into material recycling systems in Germany. Some is then exported as secondary raw material. In the construction industry, PVC waste is collected separately and sent for recycling either in Germany or in neighbouring European countries.

What is your impression of the BYEEs you've worked with?

The BYEE visits are a real thrill. The Envoys are all so interested in how Germany's waste management is organized at the municipal level, and how it relates to environmental and climate protection. And they are very receptive to new ideas.

I'd like to send them all a message: what works in Germany can work in other countries, but not necessarily everywhere – directly transferring the German waste management model might not have the desired results. So explore what works in Germany, but adapt it to the local social, economic and socio-economic circumstances, and integrate it with existing waste management systems.



7 masters of invention

HERE'S A CHALLENGE: next time you think you need to buy something, look around and see if you can make it first. Everything can be given a use if you are inventive: bricks, pallets, planks, tyres, hosepipes, shoes, jars, tins. There is no limit to what you can make, and the sense of satisfaction is priceless. It's never been a better time to learn how to enjoy life without having to acquire new stuff. Here are some ideas to get you started.



Garden gear

Gardens are the perfect place for recycling. Old bathtubs and sinks make excellent frog ponds. Frogs eat the slugs and snails that can demolish your vegetables, and ponds also provide a watering hole for birds and other small animals. Locate a shady spot, and sink your tub there in late winter or early spring, in time for the breeding season. Plant native vegetation around the pond for shelter and to attract insects, and add some boards, rocks, or logs to allow frogs to climb in and out. Allow vegetation to fall in to provide warmth and cover. Ideally, let the pond fill with rainwater, but if you must use tap water, let it stand in another container for a week to ensure it is free of chlorine. Shipping pallets make for tidy compost heaps: simply attach four pallets using garden wire or metal brackets on bare ground, and add hinges if you'd like your bin to be able to swing open for frequent access to compost. Top it off with an old blanket to help speed up the process.

iStuff

It's hard to deny our love for electronic gadgets, but the 'essential' bits and pieces sold to accessorize them are expensive and resource heavy, and take up landfill space. Fortunately, creative people are coming up with ingenious make-it-yourself instructions all the time. For example, why buy a tablet cover when you can make a minimalistic one from cardboard? Score a piece of cardboard to fit around your tablet, cut a hole for the camera, and cover with your choice of fabric, sewing or using glue. Sew elastic inside the cover to hold the tablet, and use another piece of elastic to boost the sound on your iPhone? Get a piece of bamboo, cut a slot on top and tuck your phone in. Putting the phone itself in a single paper cup works, too, as do two ear-pieces from headphones tucked into the bottoms of two paper cups – in stereo. The simplest answer: put your phone in a small round bowl, and let its curves amplify the sound.



Oil can orchestra

The village of Cateura, Paraguay, is literally a dumping ground, a slum built on a landfill. Every day, its 2,500 families make a living from recycling rubbish. When Paraguayan ecological technician and trained musician Favio Chávez decided to give the village children music lessons and form an orchestra, he soon realized there were not enough instruments. Then he hit upon the idea of making instruments from the waste beneath their feet. People gathered materials – oil cans, tin, wooden pegs, bottle caps – and a local craftsman fashioned them into cellos, violins, flutes and saxophones. Today, the children have music, and Chávez has formed the Recycled Orchestra, an ensemble performing around the world. *Landfill Harmonic*, a documentary about the orchestra, will be released in 2014; meanwhile, the story gained fame when the documentary's preview video went viral on Facebook (www.youtube.com/watch?v=fXynrsrTKbl).

Hack this chair

There was a time when furniture was hand-crafted, well-made, and meant to last for generations. Times have changed: today, companies like IKEA have popularized trendy, stylish, functional houseware that is so inexpensive that people treat it as disposable. But other people's rubbish is your gain: whether from the dump or your local charity shop, second-hand furniture can be an excellent source of materials. A good place to find inspiration is www.ikeahackers.net, a website where people upload ideas and instructions for modifying IKEA houseware to make even more creative and useful pieces – a TV stand into a toddler's play bench, shelves made into dolls houses, chairs hung on the walls to serve as wardrobe rails, soap dishes made from slotted spoons, lamps made from box graters, and kitchen cupboard doors made into a room divider. Jules, the young woman who runs the site from Malaysia, also posts her own DIY experiments on her personal blog (jules.ikeahackers.net).



Car comfort

Mongolian B. Davaajantsan's all-natural, handmade car seats exemplify the 4Rs. In a country where nearly every part of a sheep is valued and used, he collects their ankle bones, and binds them together to give drivers something that's both comfortable to sit on and keeps them aware and alert. It's not a quick process – each seat uses more than 800 bones, which have to be boiled with herbs for up to eight hours to make them smell good. After that Davaajantsan paints them with special colours he makes from flowers and grasses. Then all the bones have to be drilled and sewn together. The result is a seat that massages you as you drive and keeps you cool in the summer. Given the hours of work involved, the seats, which weigh up to 8 kilos, sell for \$150 each, but Davaajantsan guarantees them for 10 years.

Bottled light

People without access to electricity often live in houses built very close together, so it stays dark even when the sun is shining. A group of MIT students solved this problem by filling 2-litre bottles with water and fitting them into the roofs of homes so that the lower half protrudes from the ceiling. The water refracts the light of the sun, providing illumination equivalent to that of a 55-watt light bulb. A little bleach poured into the water keeps it clean and clear. Solar light bottles first came to prominence in the Philippines, where the MyShelter Foundation distributed them with the cooperation of Manila's government under the Isang Litrong Liwanag ("A Liter of Light") project. The idea has now caught on around the world, including in Brazil, Cambodia, Egypt, Guatemala and India. Try it for yourself! <http://aliteroflight.org>



Churn, churn, churn

No power? No running water? Dirty clothes? Try this DIY washing machine designed by Michael Perdriel for use in rural, off-grid settings. The washer comprises a container – such as a wooden or plastic bucket, or any deep container with a wide mouth – a net bag, and a lever-driven shaft held by a wooden frame. Pumping the lever agitates the bag up and down, while plastic cones at the top and base of the bag squeeze the clothes as they are pulled in and out of the water. A version of this design is being used in Hyanja, Nepal, but it would be suitable for any environment. Use biodegradable detergent, and recycle the water in your garden afterwards. For full instructions, visit www.make-digital.com/make/vol18/?pg=62#pg62



Reduce, Reuse,
Recycle, Repair

Metals

Reusing scrap steel (compared to starting from scratch) reduces:

- mining wastes by 95 per cent
- air pollution by 85 per cent
- water pollution by 75 per cent
- energy use by 75 per cent
- water consumption by 40 per cent.

Around 80 per cent of steel is recycled, which is good news for the environment.

OLD SHIPS DO NOT DIE

... they are recycled.

India, Turkey, China, Pakistan and Bangladesh are the world's leaders, recycling 80 per cent of all ships scrapped in 2010. As Dilip Barua, Industries Minister of Bangladesh observed: 'Shipbreaking is vital to us as it supplies much-needed steel and iron for our domestic market.'

This is an important source of metals – not just steel, but others including gold, aluminium, copper and lead –

Choose recyclables!

Bevanward/Dreamstime.com

Hugo de Wolf/36Clicks Creative

Yes, we CAN

THE NUMBERS ARE STAGGERING. In the USA alone, 300 million metal cans are used every day – that's one for every person. Two thirds are aluminium, the rest steel. Try to visualize how many that is in a year – 110 billion cans weighing more than 1.5 million tonnes from one country alone.

Metals, however, including aluminium and steel, can be, and actually are, endlessly recyclable, with virtually no loss of volume or function. That's lucky as known reserves of some metals are running low, and even where they're still plentiful, mining and smelting them usually involves huge use of energy and the production of vast quantities of waste.

Around the world, the percentage of both aluminium and steel that's recycled is high: Brazil recycles more than 85 per cent of its aluminium cans, Japan 82.5 per cent, while in the USA 61 billion cans were recycled in 2011.

but it's also controversial as it can be both polluting and dangerous. However, in 2009 the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships was agreed to ensure that this valuable recycling does not pose unnecessary risks to human health, safety or the environment.

Since the 1980s, steel manufacturers and engineers have worked to get more from less. Our cars, built with new steels, are stronger than in the past but are also up to 25 per cent lighter, reducing energy consumption while making them safer. If we built the Eiffel Tower using the steel of today, we'd need just 33 per cent of the amount used in 1889.



Find those phones!

WEEE!

WORLDWIDE, we generate about 40–50 million tonnes of waste electrical and electronic equipment (WEEE) each year. Much of this contains critically important and valuable metals that are in short supply. But the recovery efficiency for the most precious of these, even in mature, developed markets, is alarmingly low:

- mobiles 0–5 per cent
- desktop computers 0–40 per cent
- laptops 0–15 per cent
- TVs and flat screens 0–15 per cent
- rechargeable batteries from mobiles and laptops 0–15 per cent.

Actually, we aren't even collecting it properly – in Europe just 40 per cent of WEEE is collected, and for many other regions we just don't know. Yet WEEE should be a valuable source of rare metals, particularly in the face of rapidly growing demand for electronics. Recycling materials that otherwise have to be mined really does reduce our ecological footprint.

So look out those so-sad phones, consoles, MP3 players, computers and chargers; you know they're lurking at the back of your drawers and cupboards! Find those stray batteries that never quite made it to a bin. Get them to an organization that'll recycle them efficiently. Many manufacturers offer this service. Or just look on the web: you'll be surprised how many opportunities there are.



Out of sight, out of mind?

When we throw out stuff...

...this is how long it can last in landfill*:

A banana skin – till next week

A paper bag – till next month

Cotton or orange peel – for about 6 months

An old woollen sock – till next year

A milk carton – till 2018

A cigarette butt – till 2022

A nylon jacket or leather shoes – till 2050

A tin can – till 2060

An aluminium can – till 2100

Disposable nappies – till 2500

Plastic bags – till 3000

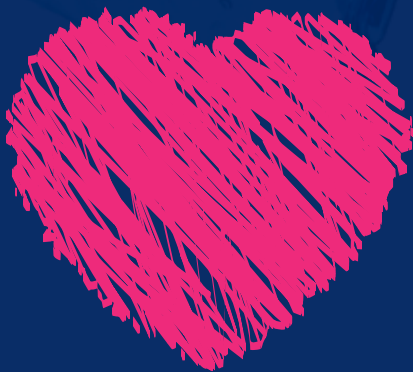
**A plastic jug – till the year 1000000
(yes – one million!)**

A glass bottle – till 1500000

A styrofoam cup – for ever!

But all these are recyclable – even the banana skin!!

WE



to



*estimates vary along with conditions