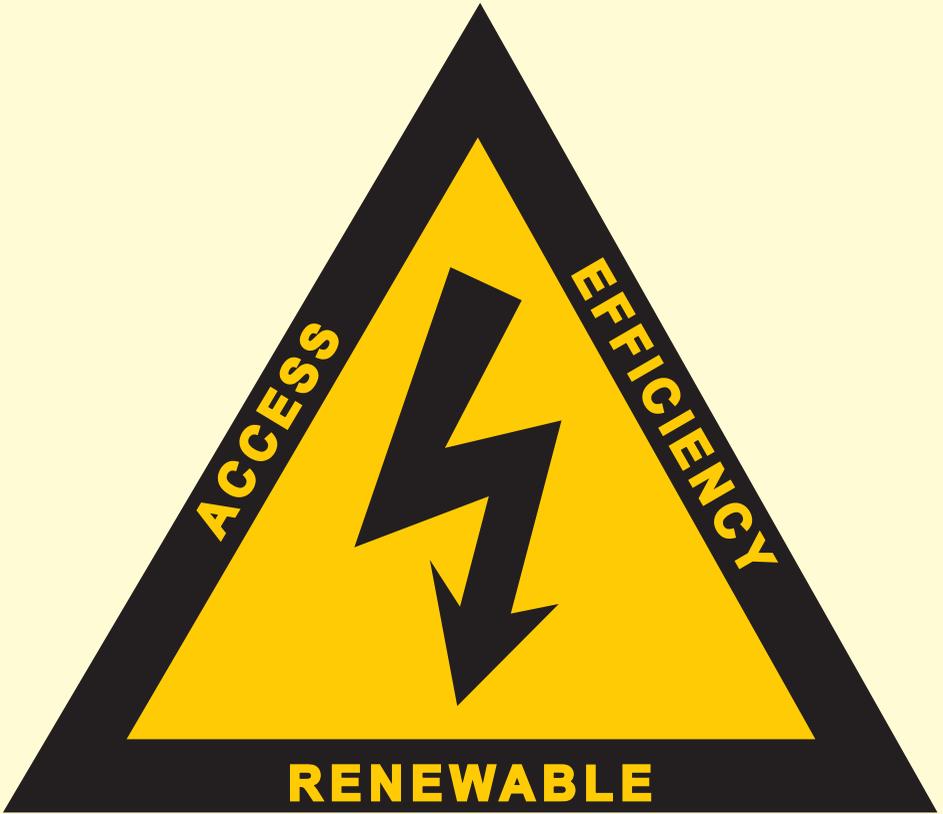




SUSTAINABLE ENERGY for ALL



CAUTION:

All humans need to take action!



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WORLD'S ENERGY DEPENDENCE

Energy (noun) - Ability or power to do work

We all depend on energy for everything we do. Understanding energy can be difficult because we cannot see, hold or touch it. The law of energy states that it cannot be created nor destroyed but can only change from one form to another. Humans have developed technology to convert different energy sources to do work for us to make our life easier. There are two types of energy sources: **RENEWABLE** and **NON-RENEWABLE**. These are often converted into electricity as it is an easy and comfortable way to transport energy.

Here are some examples of how electricity is produced:



...solar panels convert **sunlight**.

...turbines or generators convert stored **water** (i.e. dam).



...turbines convert strong and constant **wind**.

...processes, such as fermentation, convert natural materials called **biofuels**.



...turbines convert captured heat from steam that escapes from deep below the surface of the Earth called **geothermal**.

...boilers burn **fossil fuels**.

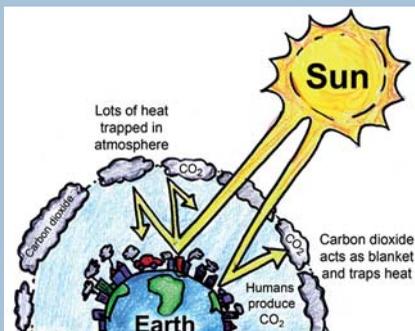


... turbines convert energy created by **nuclear fission**.

Fossil fuels are stored chemical energy in the form of coal, oil or gas. They were created over a long period of time through the compression of dead prehistoric plants and animals.

Nuclear fission occurs when a uranium atom is split. This releases a lot of energy. Uranium is a radioactive heavy metal found underground.

WORLD ENERGY CONSUMPTION AND THE CLIMATE CHANGE CONNECTION



About 3/4 of the world's energy consumption is from fossil fuels which we use to fly airplanes, operate machines, drive cars and to generate electricity. However, when fossil fuels are burned carbon dioxide and other greenhouse gases (GHGs) are released into the atmosphere. These GHGs form a layer in the atmosphere, which acts as a blanket. This is called global warming. Global warming is changing the long-term weather patterns on Earth, which has many impacts on the environment. This is called **climate change**.

GLOBAL ENERGY ACCESS

Access (noun) - Opportunity of using

Currently energy is not universally accessible to everyone. It is estimated that 1.3 billion people lack access to electricity and that 2.7 billion people have no clean cooking facilities. More than 95% of these people live in sub-Saharan Africa or developing Asia. In Namibia rural electrification rates are as low as 30% meaning that up to 70% of Namibians living in rural areas do not have access to modern and clean forms of energy. But this should not be the case as access to modern energy helps development to take place and to reduce poverty. People without access to electricity, for example, are at a disadvantage, as they cannot benefit from many modern technologies and comfort of life.

ENERGY ACCESS ACTIVITY

Directions: Draw a line to match the picture with the correct word:



TRAVEL



INFORMATION



HEALTH AND NUTRITION



PERSONAL COMMUNICATION



EDUCATIONAL OPPORTUNITIES



COMFORTABLE AIR TEMPERATURE

THE ACCESS CHALLENGE

Most people without modern energy are the poor living in rural areas. Governments, especially in the developing world, have not been able to deliver electricity to all areas due to lack of funds and other priorities. Even in areas where people have electricity connected to their homes, many cannot afford to pay for it. Unfortunately, electricity is also unnecessarily wasted through old appliances and lack of awareness. To achieve global energy access for all requires political will and good governance supported by sufficient financial resources and education.

IF THEY DID IT, WE CAN ALL DO IT!

There are some countries that have shown it is possible:



China made electricity available to millions of people in rural areas and is expected to reach universal electrification by 2015.



99% of the **Brazilian** population has access to electricity. 15 million people received it only in the last 8 years.



In the last 35 years, **Vietnam** went from only 5% of the population having access to electricity to 98%.

ENERGY EFFICIENCY

Efficient (noun) - Performing or functioning in the best possible manner with the least waste (of time, effort, money and/or natural resources)

Energy efficiency can be improved by:

~ converting more usable energy from our existing resources

~ using as little energy as possible to reach our goal.

As technology improves and laws are stricter, power plants are becoming more efficient in converting fossil fuels into electricity. Newly designed equipment and household appliances use less electricity to operate.

Households which depend on firewood for energy can save through the use of fuel-efficient stoves.

PUBLIC VS. PRIVATE TRANSPORT ACTIVITY

Many people dream of owning their own car and having freedom to go where they want. But, did you know the average 5-seater car produces approximately 150g of carbon dioxide (CO₂) per km driven? Compare the five people in the red car with the five people in the yellow cars. Who wastes more energy?



$$\frac{0.15\text{kg} \times 350\text{km} \times 1 \text{ car}}{5 \text{ people}} = 10.5\text{kg of CO}_2/\text{person}$$

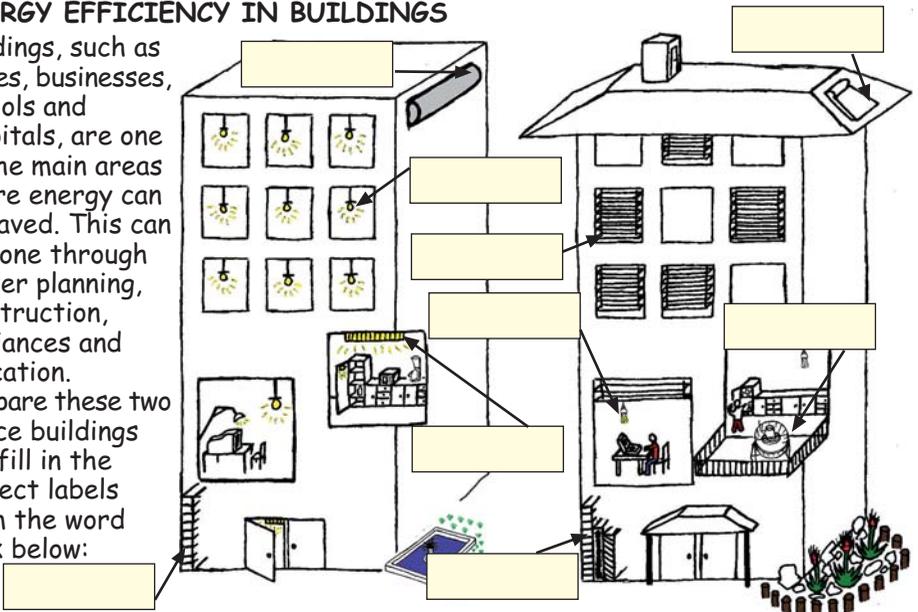


$$\frac{0.15\text{kg} \times 350\text{km} \times 5 \text{ cars}}{5 \text{ people}} = 52.5\text{kg of CO}_2/\text{person}$$

ENERGY EFFICIENCY IN BUILDINGS

Buildings, such as homes, businesses, schools and hospitals, are one of the main areas where energy can be saved. This can be done through better planning, construction, appliances and education.

Compare these two office buildings and fill in the correct labels from the word bank below:



Word bank:

electrical water heater, solar water heater, incandescent light bulb, energy saver light bulb, thin wall, insulated wall, solar cooker, air conditioner, window screens

RENEWABLE ENERGY

Renewable (adjective) - Anything that can be used again or replaced

Only about 15% of the world's energy is currently produced from renewable energy sources. To reach sustainable development, more renewables need to be included in the energy mix that supplies the world's growing population and demand. Renewable energy can be used directly or converted to fulfil our energy needs, especially when used together with increased energy efficiency.

SUCCESS STORIES IN USING RENEWABLES



Tsumkwe Solar/Diesel Hybrid Project, Namibia
Tsumkwe is a rural settlement in an off-grid area 270 km away from the closest access point for electricity. Until 2011, a diesel generator provided electricity 14 hours/day. Today Tsumkwe has electricity 24 hours/day of which 200 kW is produced by solar panels and is stored in batteries. A diesel generator provides back up when needed.

From Bush to Electricity, Namibia

The Combating Bush Encroachment for Namibia's Development (CBEND) project has installed a 250 kW bush-to-electricity power plant on a commercial farm near Otavi. Invader bushes are thinned out in the area to supply a renewable fuel source. The electricity is produced through wood gasification and is fed directly into the national grid. Ohorongo Cement Factory in Otavi is using invader bush to fire the kilns substituting a considerable amount of coal.



Cars Running on Sugar Brazil



More than 2/3 of all cars in Brazil run on pure ethanol or an ethanol-petrol mixture. Ethanol is made from sugar cane unlike traditional petrol and diesel, which is made from fossil fuels. This has improved the local air quality in Brazil's urban areas and reduces overall GHG emissions.

Leading Wind Producer Denmark

About 19% of the national energy consumption in Denmark is produced from wind power in 2008. Denmark is the world leader in wind energy and the largest exporter of wind turbines. The Danish have plans of increasing energy from renewables to 35% in 2020 and to 100% in 2050.



The sun is free of charge!

The sun provides us with 20 000 times more energy than the entire planet needs everyday. We can use the sun's energy directly for many of our household energy needs. For example, we can use solar cookers and ovens to cook our food and heat the water for household use. This will help reduce carbon emissions and deforestation, as people will not need as much firewood.



SUSTAINABLE ENERGY 4 ALL

Sustainable (adjective) - Capable of being maintained at a steady level without exhausting natural resources or causing severe ecological damage



UNITED NATIONS INTERNATIONAL YEAR OF SUSTAINABLE ENERGY FOR ALL (SE4ALL)

2012 was declared as the SE4ALL year to recognise that the world is faced with a growing energy crisis. Access and efficient use of energy is important for all countries to achieve the Millennium Development Goals (MDGs) and reduce greenhouse gas emissions. The objectives of the year are to:

- ~ ensure universal access to modern energy services;
- ~ double the global rate of improvement in energy efficiency;
- ~ double the share of renewable energy in the global energy mix.

One of the main outcomes of SE4ALL is to improve knowledge of current energy practices and to produce a baseline report. This will allow progress to be measured in the coming years.

For more info visit: www.sustainableenergyforall.org

ADDRESSING THE MDGs AND SUSTAINABLE DEVELOPMENT

Promoting improved access, efficiency and renewable energy will work towards reaching all of the MDGs.

Sustainable energy can revitalize our economies, strengthen social equity and catalyse a clean energy revolution that benefits all humanity. Acting together, we can open new horizons today and help power a brighter tomorrow.

UN Secretary General Ban Ki-Moon

THE FUTURE WE WANT



That was the slogan for the United Nations Conference on Sustainable Development also known as "Rio+20" held in June 2012. World leaders, along with thousands of participants

from around the world, came together to discuss how we can reduce poverty, advance social equity and ensure environmental protection on an ever more crowded planet to get to the future we want. Some of the outcomes were to:

- ~ launch a process to establish sustainable development goals;
- ~ strengthen the United Nations Environment Programme and establishing a new forum for sustainable development;
- ~ promote corporate sustainability reporting measures.

What is sustainable development?

There are many different definitions and understandings of the goals and methods to implement sustainable development. The most commonly accepted definition is still from over 20 years ago:

Development that meets the needs of the present generations without comprising the ability of future generations to meet their needs.

PERSONALITIES IN CONSERVATION

Name: Kudakwashe (Kuda) Ndhlukula

Organisation: Renewable Energy and Energy Efficiency Institute (REEEI), Polytechnic of Namibia

Position: REEEI Co-ordinator

Numbers of years on the job: 5 years



What is REEEI?

The Renewable Energy and Energy Efficiency Institute (REEEI) is a national energy institute at the Polytechnic of Namibia with a mandate to promote sustainable energy development in Namibia. It was officially launched in October 2006 following the signing of a cooperation agreement between the Polytechnic and the Ministry of Mines and Energy.



What is the main aim of REEEI:

The Institute aims to be a comprehensive, demand driven, national information and networking hub providing the public and private sectors academic institutions and the public at large with information, knowledge and expertise with respect to renewable energy and energy efficiency through coordinated research, development and education.

What are the challenges REEEI is facing?

The main challenges that REEEI presently faces are related to funding for capital projects for its expansion. Space to operate from and funding to initiate and support research with national impact is very limited.

What are REEEI's challenges to achieving Sustainable Energy for All?

The challenges to attain "Sustainable Energy for All" are not REEEI's alone but are national. "Sustainable Energy for All" is a United Nations led new global initiative engaging governments, the private sector, and civil society partners globally with the goal of achieving sustainable energy for all, and to reach three major objectives by 2030: 1) ensuring universal access to modern energy services, 2) doubling the rate of improvement in energy efficiency, 3) doubling the share of renewable energy in the global energy mix. The three objectives are the same that REEEI has and continues to strive to meet for Namibia.

What is your message to the Namibian youth?

The 0-25 years age group constitutes 59% of Namibia's population. Twenty years from now these people will be mature adults and the objectives for Sustainable Energy for All are expected to be reached by then. The youth should therefore participate fully in shaping the future they want and we believe it's the future, which is socially, environmentally and economically sustainable.

TAKING ACTION: Energy 4 Buildings

The **Namibia Energy Efficiency Programme in Buildings (NEEP)** is a national project implemented by REEEI on behalf of the Ministry of Mines and Energy (MME) with the support of the Global Environment Facility through the United Nations Development Programme. Its aim is to reduce Namibia's energy related greenhouse gas emissions through the nationwide adoption of energy efficiency technologies and practices in the built environment.

The four main outcomes are:

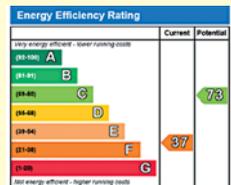


ENERGY AUDITING CAPACITY: This project has trained about 60 energy practitioners from the electricity supply industry to be specialised energy auditors.

How can this help me? Certified energy auditors can assess the energy efficiency of your building. They can give advice as to how to make it more energy efficient thereby saving money and reducing demand on energy.

APPLIANCE LABELLING SCHEME: This project aims to have appliances labelled with their energy consumption.

How can this help me? Many times, we buy appliances and are not aware how much energy they actually use. This impacts the environment and our own finances.



BUILDINGS CERTIFICATION PROGRAMME: This project aims to develop building standards that include energy efficiency standards.

How can this help me? This would improve the energy efficiency standard of buildings that are available for sale or rent.

GREEN BUILDING COUNCIL OF NAMIBIA (GBCNA): This is a voluntary body aimed to promote and facilitate green building practices.

How can this help me? This GBCNA will improve networking and promote professional development in the building industry. Check out the World Green Building Council @ www.worldgbc.org.



DID YOU KNOW?

According to a Namibian government cabinet decision, public institutions are now required to install solar water heaters (SWH).

Do you own a SWH? If not, go to REEEI, Ministry of Mines and Energy and an Energy Shop to learn more!



TAKING ACTION: Access 4 All

ARE YOU CONNECTED?

Is your home connected to the national electricity grid? If not, will it be in the near future? Namibia is a large country with few people. This makes supplying electricity to all using a national grid very challenging and not economically viable. In 2007, MME designed and launched the **OFF-GRID ENERGISATION MASTER PLAN (OGEMP)**:



- ~ To promote off-grid energy;
 - ~ To promote the use of renewable energy resources;
 - ~ To improve the quality of rural life through provision of energy services.
- REEEI is taking action through Energy Shops and the Solar Revolving Fund.



An Energy Shop is usually an existing business that stocks and sells renewable and energy efficient products into their range of products and services. It works together with REEEI and suppliers to market and stock sufficient supply of products for its customers. REEEI currently launching up to 180 shops within the next 20 years.

the map to see if there is an Energy Shop already in your area.



CAN I ALSO BUY RENEWABLE ENERGY PRODUCTS IN OTHER PLACES?

Of course, renewable energy and energy efficient products are not just limited to Energy Shops.

Check out the map for the symbol to see where this other organisation, such as Elephant Energy, is selling renewable energy products in Northern Namibia.

No energy products shop in your area yet?

Go to your local supplier and ask for sustainable energy products today!

Solar Revolving Fund

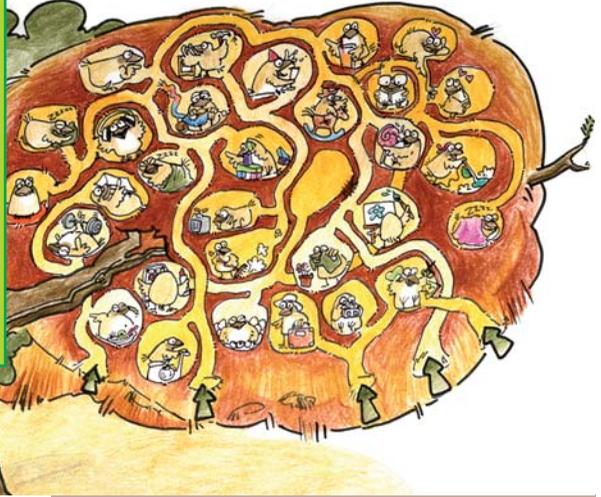


Do you want to purchase a solar water heater? Do you not have enough money for it today? Some renewable energy products unfortunately are more expensive upfront although it will save you money in the long run. The Solar Revolving Fund helps individuals to obtain loans to purchase renewable energy technology products. Applications can be obtained from MME offices nationwide, certified Energy Shops or downloaded: www.mme.gov.na

TAKING ACTION: Learning 4 Nature

Plants and animals have adapted to be as energy efficient as possible. We too can take action in our own lives to reduce the amount of energy that we use. Check out what the Sociable weavers do to be energy efficient:

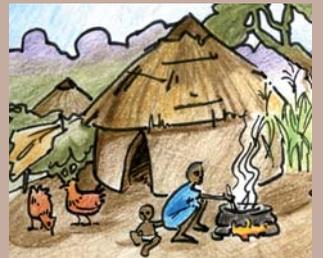
Sociable weavers build a large nest for up to 300 birds. In the cold winter, the birds huddle together to create warmth. In the hot summer, the birds all roost in their own compartments to stay cool. These well designed and constructed nests keep the average nest temperature between 20-30°C year round. This is called insulation.



EASY HOME INSULATION TEST

Today many conventional houses have no insulation. By building our houses with insulation like the Sociable weavers, we can save additional energy costs of using fans, heaters and fires and live at a more comfortable average temperature of about 20-25°C. Use the chart below:

Traditional houses are made of materials that are good insulators and are therefore energy efficient. Can you identify and name the natural materials that are good insulators?



Area:	Insulation check:	Improve insulation:
Building materials:	Using your hands, feel the temperature of walls of your house? Is the temperature inside and outside the same or different?	Plant a tree that blocks the sun in summer and allows it to warm the house in winter.
Windows and Doors:	Take a piece of thin string and slowly move it along closed window and doorframes. If the string moves, then there is a gap allowing hot or cold air to escape.	Close off gaps in windows. Prevent draft under doors with long sandbags.
Ceiling and roof:	Does your house have ceilings? What colour is the roof?	Install a ceiling. Paint roof with a reflective colour such as white.

HOLDEN'S HANG-OUT



Dear Readers,
Chinga and Nzovu have retired. After ten years, they are back in the bush and have handed over the duty of answering your environmental questions to me. Thanks guys!



Let me introduce myself. Holden Mole is the name. NaDEET's my hangout spot. I love Namibia. My number one job is to get the basics - my food, water and shelter. "Education is the key" - I know everyone says it, but it is true. So if you don't know, ask me.

Holden Mole, NaDEET, PO Box 31017, Pioniers Park, Windhoek
email to admin@nadeet.org or post them on NaDEET's Facebook page

Dear Chinga and Nzovu,

I fail to understand why grass starts new growth as soon as it's burned, even in dry seasons.

From Loide in Outapi

PS. Could you perhaps provide us with your email address, as it takes sooo much time to put our questions on paper and post them? I personally think emails are convenient to all ages.

Dear Loide,

Grass, like other plants, have a root system. When the top is burned, the grass needs to "fight back" to stay alive. It does this by using its stored energy to grow. Even in dry seasons, grasses will have stored energy and moisture. If a fire is very intense or fires are too frequent then it is of course possible that the grasses or other plants will die as their energy reserves



have been used up. Fire is an important function in ecosystem health, but it should be carefully planned in managed areas as it can lead to other problems such as biodiversity loss, desertification and climate change.

Holden Mole

PS - Thanks for asking about email. Good idea! Feel free to send me your questions via email too. Send them to admin@nadeet.org and I will get them. Check out the back page about our planned new email distribution.

UPDATE FROM LAST ISSUE



NAMIBRAND NATURE RESERVE IS NOW AFRICA'S 1ST GOLD TIER- INTERNATIONAL DARK SKY RESERVE

CONGRATULATIONS TO VICTORIA KANKONO ...
...the WINNER of contest from our "Night Sky" Bush Telegraph about a story of the moon.



1st place winner: Eco Media Awards "Publishers House" category 2010

Official youth magazine of the Roan News

Written: Viktoria Endjala
Edited: Viktoria Keding
Graphics: Jule Piloth, DRFN



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Namibian Energy Efficiency
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NaDEET Centre: A Sustainable Living Experience

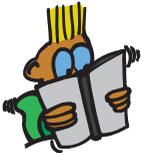


NaDEET Centre offers week-long programmes for school, youth, educator & adult groups in the Namib Desert.

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