Mirboo North Community Energy Hub Prototype Website

Sponsor:
Snowy River Innovation

Colin Burns
Joseph Collins
Paul Johnston
Rebecca Nichols

12/16/2013

Abstract

The purpose of this supplementary document is to provide a visual, offline representation of the prototype website we created for the Mirboo North Community Energy Hub. This is designed as a supportive tool to better illustrate our findings and recommendations. A tree diagram outlines the general layout and navigational characteristics of the website. The sections that follow the sitemap each represent a primary webpage and any of its subpages. Detailed descriptions of the individual pages and features of the website can be found in the Findings chapter of our IQP report. The website can be accessed at the following URL: http://colinburns8.wix.com/mirboonorthenergyhub

Table of Contents

Abstract i

Table of Contents ii

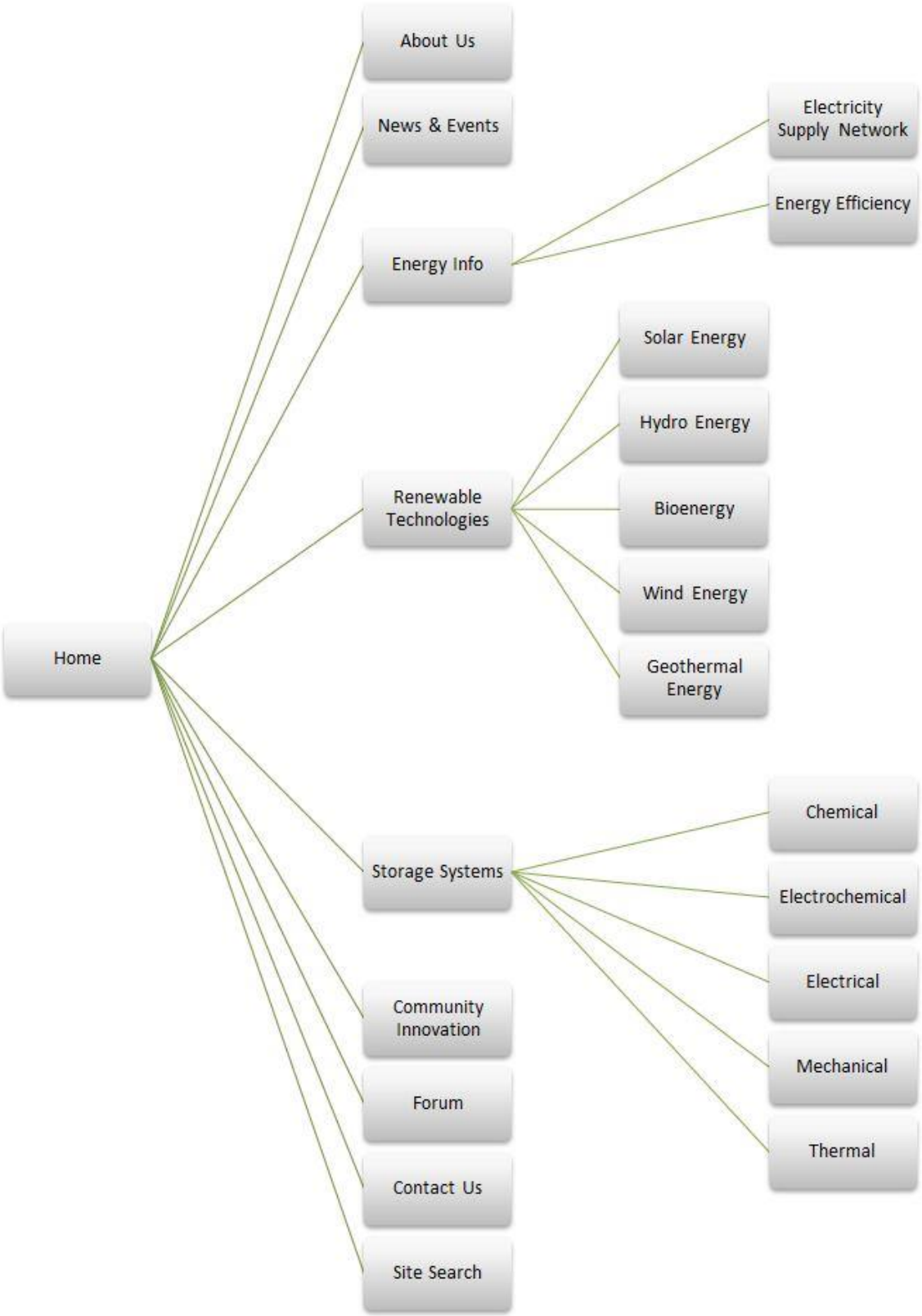
Sitemap Tree Diagram 1

Website Contents 3

- Homepage 4
  - About Us 5
  - News & Events 6
  - Energy Info 7
    - Electricity Supply Network 8
    - Energy Efficiency 9
  - Renewable Technologies 11
    - Solar Energy 12
    - Hydro Energy 13
    - Bioenergy 14
    - Wind Energy 15
    - Geothermal Energy 16
  - Storage Systems 17
    - Chemical 18
    - Electrochemical 19
    - Electrical 20
    - Mechanical 21
    - Thermal 22
  - Community Innovation 23
  - Forum 24
  - Contact Us 25
  - Site Search 26

Sitemap Tree Diagram

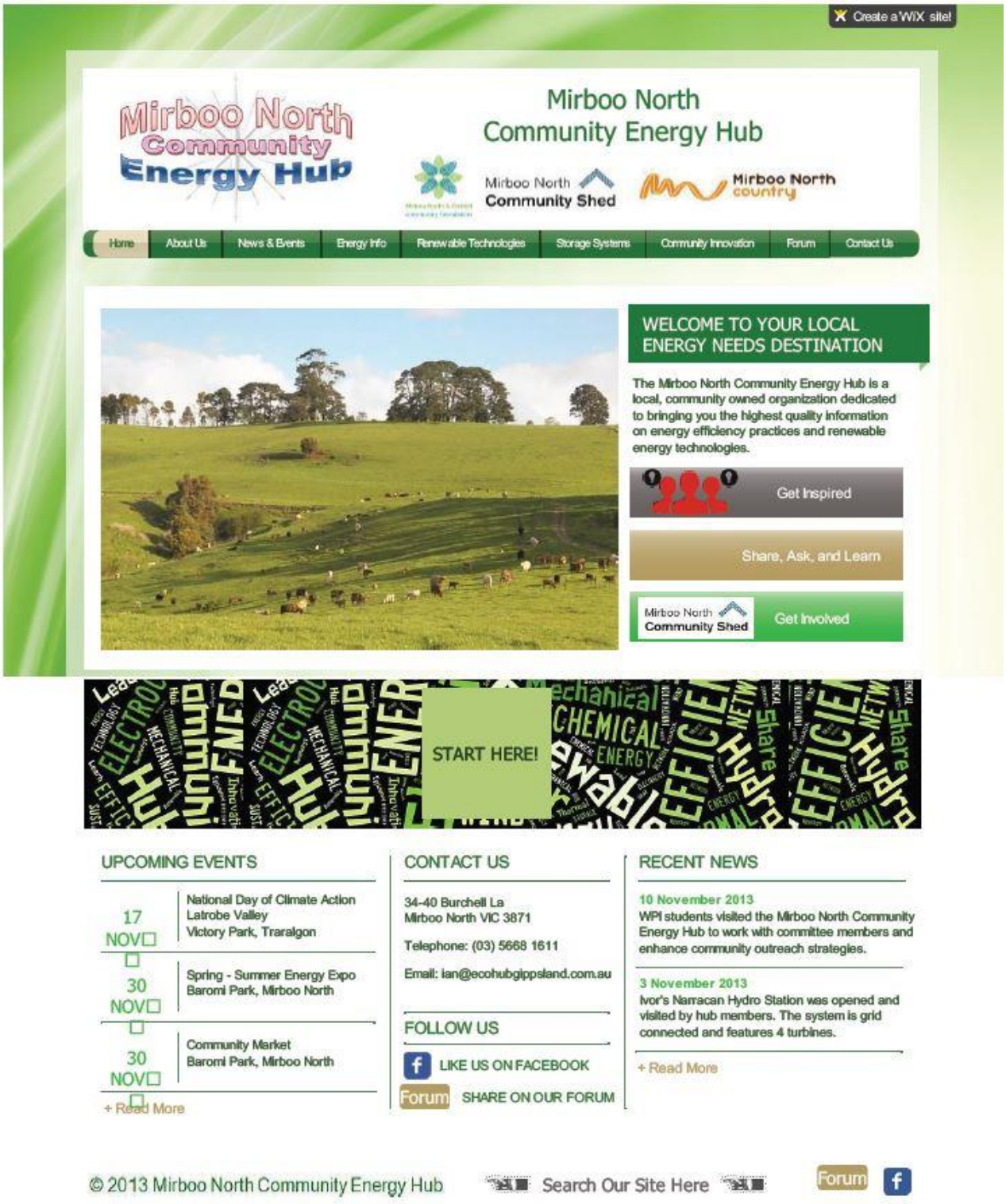
The sitemap tree diagram provides an overview of the general layout of the website. The leftmost level represents the home page. The next level represents the primary webpages that can be accessed through the menu navigation bar. Any branches extending from this level represent subpages that can be accessed through dropdown submenus on the menu navigation bar.


Home
About Us
News & Events
Energy Info
Electricity Supply Network
Energy Efficiency
Renewable Technologies
Solar Energy
Hydro Energy
Bioenergy
Wind Energy
Geothermal Energy
Storage Systems
Chemical
Electrochemical
Electrical
Mechanical
Thermal
Community Innovation
Forum
Contact Us
Site Search

Website Contents

The subsequent sections are formatted in accordance with the sitemap tree diagram, starting with the homepage. They each include a screenshot of the entire webpage to provide an offline archive of our website. This is designed to serve as a visual supplement to the Findings and Conclusions and Recommendations chapters of our IQP report. Please note that there may be slight visual discrepancies between the online webpages and the screenshots shown below. This is simply a result of converting the images to a PDF document.

Homepage


Create a WiX site!
Mirboo North Community Energy Hub
Mirboo North Community Energy Hub
Mirboo North Community Shed
Mirboo North country
Home
About Us
News & Events
Energy Info
Renewable Technologies
Storage Systems
Community Innovation
Forum
Contact Us
WELCOME TO YOUR LOCAL ENERGY NEEDS DESTINATION
The Mirboo North Community Energy Hub is a local, community owned organization dedicated to bringing you the highest quality information on energy efficiency practices and renewable energy technologies.
Get Inspired
Share, Ask, and Learn
Mirboo North Community Shed
Get Involved
START HERE!
UPCOMING EVENTS
17 NOV
National Day of Climate Action
Latrobe Valley
Victory Park, Traralgon
30 NOV
Spring - Summer Energy Expo
Baromi Park, Mirboo North
30 NOV
Community Market
Baromi Park, Mirboo North
+ Read More
CONTACT US
34-40 Burchell La
Mirboo North VIC 3871
Telephone: (03) 5668 1611
Email: ian@ecohubgippsland.com.au
FOLLOW US
LIKE US ON FACEBOOK
Forum
SHARE ON OUR FORUM
RECENT NEWS
10 November 2013
WPI students visited the Mirboo North Community Energy Hub to work with committee members and enhance community outreach strategies.
3 November 2013
Ivor's Narracan Hydro Station was opened and visited by hub members. The system is grid connected and features 4 turbines.
+ Read More
© 2013 Mirboo North Community Energy Hub
Search Our Site Here
Forum

About Us

Create a WiX site!

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

About The Hub

Welcome to the Mirboo North Community Energy Hub

Who are we?

Mirboo North is a tight-knit community of hardworking and passionate individuals. We like to operate our energy hub following those same principles. Each member of the hub is extremely passionate about what they do and works hard to achieve the goals of the community. We are a group of local residents and business owners who share an interest in sustainability. Joining us is as easy as attending a meeting at the community shed.

What do we do?

The hub is an organization that was founded through funding from the Mirboo North and district community foundation. We currently operate out of the local Mirboo North Community Shed. Our goal is to spread information on energy efficiency practices and renewable energy technologies to the community. We also build trusted relationships with renewable energy installers. This will allow us to make more sustainable decisions in our daily lives and give the community a reliable source of installers to consider, if they decide to install a renewable energy source.

Why do we do it?

We do all this simply because we are passionate about sustainability. Creating a more sustainable future is something in which we strongly believe. If we all join together and take action, we can make these goals a reality.

Our Philosophy

We are dedicated to creating a more sustainable way of living for future generations. Through energy efficiency practices and renewable energy technologies, we will be able to limit the human impact on our planet. The future is in our hands and the time to do something positive is now.

Our History

The Mirboo North Community Energy Hub was established in September 2012 to enhance the community's quality of living. We partnered with Snowy River Innovation to finalize a business case in May 2013. Presently we are working to develop our Energy Efficiency Program to better serve the community.

Search Our Site Here

Forum

News & Events

Create a WiX site!

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

News & Events

WPI Student Visit

Posted 14 November 2013

A group of four engineering students from Worcester Polytechnic Institute in the United States visited the Mirboo North community on the weekend of 8-10 of November. The students met with the energy hub committee to discuss community outreach strategies on energy efficiency and renewable energy technologies. Local farmers gave the students their input on how the energy hub could better serve their needs. The students plan to return to Mirboo North for the Spring-Summer Energy Expo to continue working with the energy hub committee.

Ivor's Narracan Hydro Station

Posted 14 November 2013

Energy hub committee members attended the opening of Ivor's Narracan Hydro Station on the 3rd of November. The system consists of 4 grid connected, 8 kW turbines. This came at a $30,000 investment and is expected to have a ten year pay back period.

Upcoming Events

SUN 17 NOV, 3pm

National Day of Climate Change
Latrobe Valley
Victory Park, Traralgon

SAT 30 NOV, 8am - 2pm

Spring-Summer Energy Expo
Baromi Park, Mirboo North

SAT 30 NOV, 8am - 2pm

Community Market
Baromi Park, Mirboo North

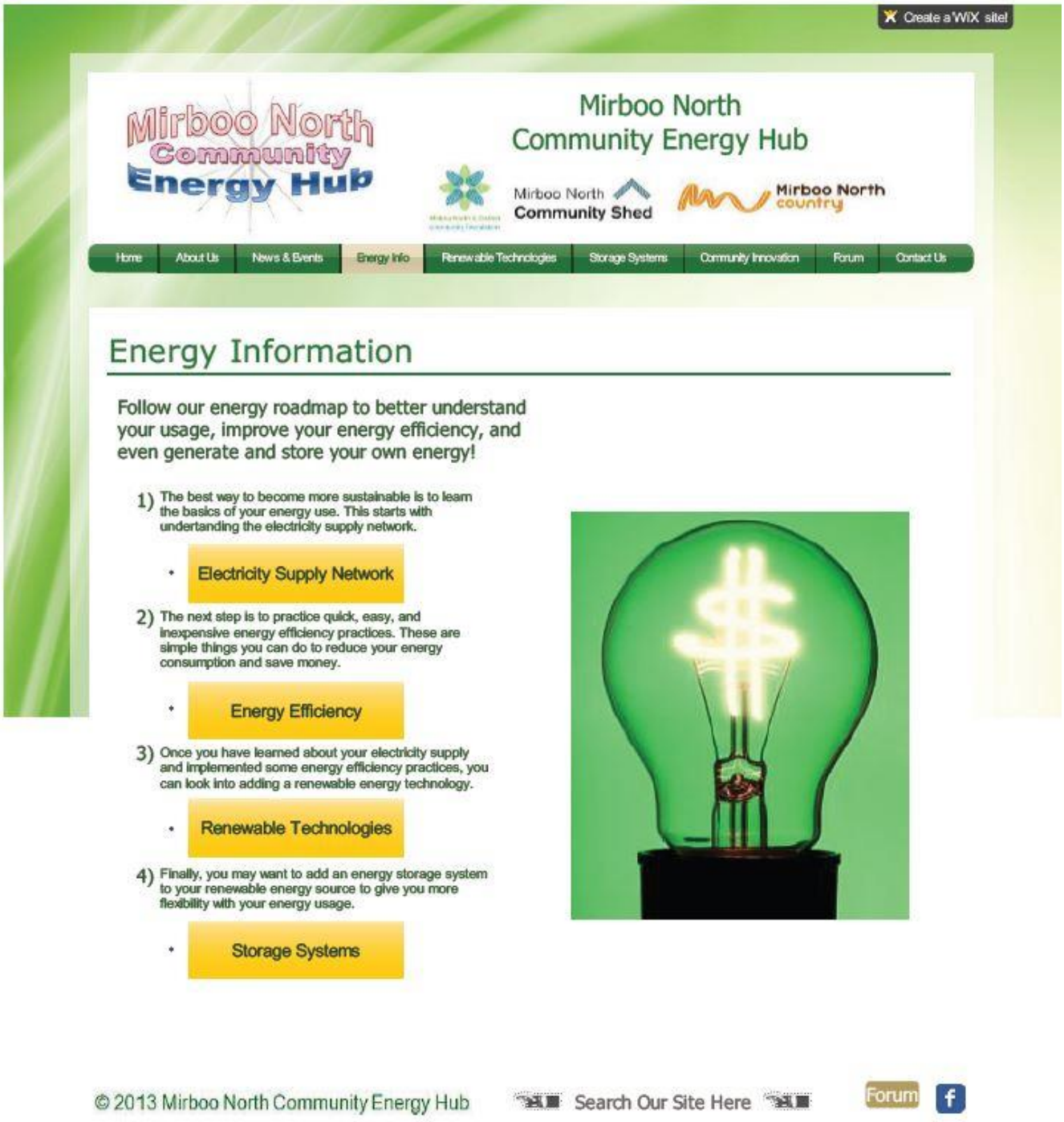
SAT 14 DEC, 8am - 2pm

Community Market
Baromi Park, Mirboo North

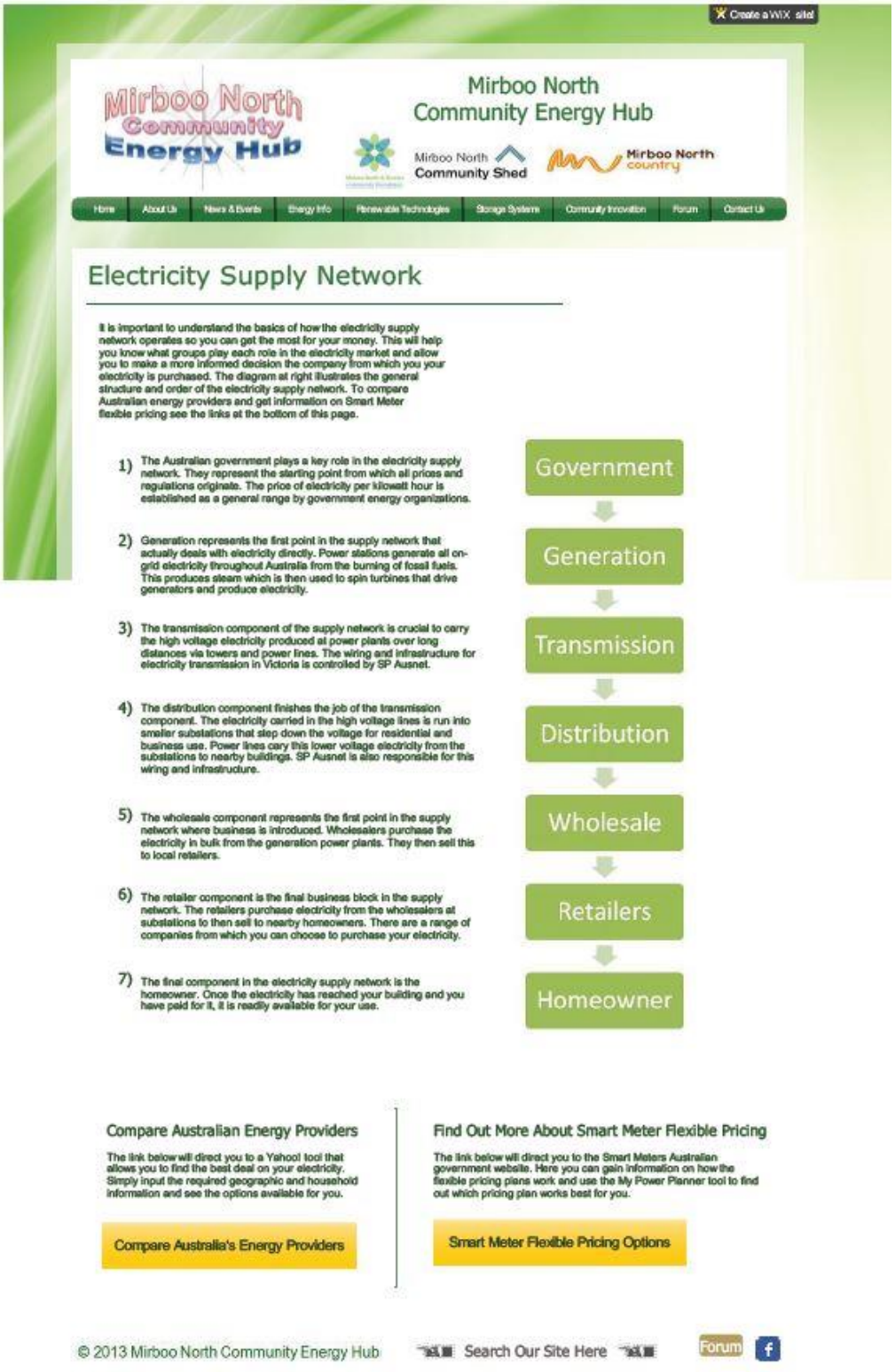
Search Our Site Here

Forum

Energy Info


Create a WIX site!
Mirboo North Community Energy Hub
Mirboo North Community Energy Hub
Mirboo North Community Shed
Mirboo North country
Home
About Us
News & Events
Energy Info
Renewable Technologies
Storage Systems
Community Innovation
Forum
Contact Us
Energy Information
Follow our energy roadmap to better understand your usage, improve your energy efficiency, and even generate and store your own energy!
1) The best way to become more sustainable is to learn the basics of your energy use. This starts with undertanding the electricity supply network.
Electricity Supply Network
2) The next step is to practice quick, easy, and inexpensive energy efficiency practices. These are simple things you can do to reduce your energy consumption and save money.
Energy Efficiency
3) Once you have learned about your electricity supply and implemented some energy efficiency practices, you can look into adding a renewable energy technology.
Renewable Technologies
4) Finally, you may want to add an energy storage system to your renewable energy source to give you more flexibility with your energy usage.
Storage Systems
© 2013 Mirboo North Community Energy Hub
Search Our Site Here
Forum

Electricity Supply Network



Energy Efficiency

the machine's running cost
- Hang clothes outside to dry instead of running the dryer
- Take quick showers instead of baths
- Clean the filters in your air conditioner to prevent it from using extra energy
- Open your blinds when its cool outside to heat your house and close them when its hot to keep your house cooler
- Place heaters away from windows
- Seal off doors to rooms that are not in use
- When leaving your home foran extended time, turn off all electricity and hot water units

High Cost:

- Make sure the walls, ceilings, and floors in your home are properly insulated
- Purchase appliances with a high Energy Star rating
- Invest in a heat pump clothes dryer to replace your electric dryer as it uses half as much energy
- Replace electric hot water heating systems with either high efficiency gas or a solar hot water system
- Put a white roof on your house to keep it cooler in the summer

Financing Outline

The tables below provide examples of updates you can make to your home to increase your energy efficiency and display their corresponding financial implications.

The first column describes what the update is.
The second column shows how long it will take for the update to pay for itself.
***The tables are organized based on this payback period.**
The third column shows what the initial cost of the update is.
The fourth column calculates the yearly savings that the update provides.
The fifth column calculates how much money the update will save you over ten years.
The final column illustrates the return on investment of the update as a percentage of its initial cost.

Updates	Payback time in years	Added Cost	Annual Savings	10 Year savings	Return on Investment (ROI)
Programmable thermostat	0.6	$127.00	$199.00	$1,994.00	156.5%
Standby Power Reduction	0.8	$22.00	$27.00	$266.00	120.0%
Compact Fluorescent Lighting	0.8	$66.00	$89.00	$886.00	133.3%
Hot Water Heater 'Blanket'	0.8	$28.00	$33.00	$332.00	120.0%
Shower Heads	0.9	$199.00	$332.00	$3,323.00	111.1%
Heating System Tune-Up	1.1	$222.00	$199.00	$1,994.00	90.0%
Seal Duct Leaks	1.5	$498.00	$332.00	$3,323.00	66.7%
Dishwasher	1.5	$22.00	$14.00	$144.00	65.0%
Water Filters	1.9	$222.00	$115.00	$1,152.00	52.0%
Water Efficient Toilets	2	$55.00	$28.00	$277.00	50.0%
	Payback time in years	Added Cost	Annual Savings	10 yr savings	Return on Investment (ROI)
Total Savings and Average Payback/ROI	1.2	$1,461.00	$1,358.00	$13,691.00	99.5%

Updates	Payback Time in Years	Added Cost	Annual Savings	10 Year Savings	Return on Investment (ROI)
Solar Path and Garden Lights	2.1	$415.00	$195.00	$1,950.00	46.9%
Replacing Windows	2.3	$775.00	$332.00	$3,323.00	42.9%
Replacing/Adding Skylights	2.3	$78.00	$33.00	$332.00	42.9%
Insulated Walls	2.5	$831.00	$332.00	$3,323.00	40.0%
Insulated Basement Walls	2.5	$831.00	$332.00	$3,323.00	40.0%
Insulated Ducts	2.5	$498.00	$199.00	$1,994.00	40.0%
Solar Attic Fan	2.5	$554.00	$222.00	$2,215.00	40.0%
Replacement Light Fixtures	2.7	$120.00	$44.00	$443.00	37.0%
Toxic Free Paints	2.8	$78.00	$28.00	$277.00	35.7%
Low Flow Faucets	3	$332.00	$111.00	$1,108.00	33.3%
Water Heater Replacement	3.1	$166.00	$53.00	$532.00	32.0%
Sealed Air Leaks	3.1	$614.00	$199.00	$1,994.00	32.0%
Whole House Water Filters	3.2	$1,108.00	$346.00	$3,456.00	31.2%
Whole House Fans	3.6	$498.00	$138.00	$1,385.00	27.8%
Air Quality House House	3.6	$498.00	$138.00	$1,385.00	27.8%
On Demand Water Heater	3.8	$498.00	$133.00	$1,329.00	26.7%
Furnace Replacement	3.8	$1,268.00	$332.00	$3,323.00	26.2%
Planting Trees	4	$1,329.00	$332.00	$3,323.00	25.0%
Clothes Washer	4.3	$332.00	$80.00	$798.00	24.0%
Recycled Mulch	4.5	$191.00	$42.00	$421.00	22.1%
Using Ceiling Fans	5	$332.00	$66.00	$665.00	20.0%
Insulated Attics and Ceilings	5	$665.00	$133.00	$1,329.00	20.0%
Refrigerator	5	$33.00	$7.00	$66.00	20.0%
Light Sharing	5	$55.00	$11.00	$111.00	20.0%
Heat Pumps/AC	5	$1,707.00	$222.00	$2,215.00	20.0%
Greywater - Small Scale	5	$323.00	$66.00	$665.00	20.0%
Bamboo Floors	5	$582.00	$116.00	$1,165.00	20.0%
Cork Floors	5	$582.00	$116.00	$1,165.00	20.0%
Window Treatments	5	$582.00	$116.00	$1,165.00	20.0%
Carpeting	5.6	$310.00	$55.00	$554.00	17.9%
Rain Water Collection	6	$133.00	$22.00	$222.00	16.7%
Composting	6.5	$360.00	$55.00	$554.00	15.4%
Decking	6.5	$936.00	$153.00	$1,529.00	15.4%
Thru Wall Room to Room Fans	6.6	$73.00	$11.00	$111.00	15.2%
Air Quality by Room	6.6	$277.00	$42.00	$421.00	15.2%
Sun Tubes	6.7	$332.00	$50.00	$499.00	15.0%
	Payback Time in Years	Added Cost	Annual Savings	10 Year Savings	Return on Investment (ROI)
Total Savings and Average Payback/ROI	4.3	$18,356.00	$4,862.00	$48,670.00	26.8%

Updates	Payback Time in Years	Added Cost	Annual Savings	10 Year Savings	Return on Investment (ROI)
Dual flush Toilets	6.7	$186.00	$25.00	$498.00	15.0%
Smart Roofs	6.7	$2,215.00	$332.00	$8,846.00	15.0%
Insulated Double Walls	7.5	$997.00	$133.00	$2,658.00	13.3%
Radiant Floors	7.5	$4,431.00	$609.00	$12,184.00	13.8%
Thermal Mass - Floors	7.5	$3,323.00	$443.00	$8,861.00	13.3%
Southern Overhangs	8	$1,595.00	$199.00	$6,203.00	12.5%
Solar - Hot Water	8.9	$2,769.00	$310.15	$6,203.00	11.2%
Geo-thermal	10	$33,230.00	$3,323.00	$66,460.00	10.0%
Cross Ventilation	10	$1,329.00	$133.00	$2,658.00	10.0%
Southern Orientation	10	$1,329.00	$133.00	$2,658.00	10.0%
Green Roofs	10	$8,861.00	$886.00	$17,723.00	10.0%
Water Conservation/Retention Large Scale	10.2	$2,437.00	$239.00	$4,785.00	10.0%
Solar - Electric	10.8	$14,400.00	$1,329.00	$66,460.00	9.8%
	Payback Time in Years	Added Cost	Annual Savings	10 Year Savings	Return on Investment (ROI)
Total Savings and Average Payback/ROI	8.7	$77,082.00	$8,094.15	$103,997.00	11.80%

Renewable Technologies

Solar Energy

Create a WIX site

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

Solar Energy

What is it?

Solar energy is energy obtained from the sun's rays. This can be used for electricity generation through photovoltaic (PV) panels or heating through evacuated tube hot water systems.

How does it work?

PV panels are installed on a rooftop or structure that is readily exposed to direct sunlight. The panels then collect the sun's rays and output direct current (DC) electricity. This passes through an inverter to change the current to alternating current (AC) which can be used in the house. This system is connected to your current smartmeter and the power grid. When more electricity is needed than the PV panels can supply, elecricity is drawn from the grid through the meter as normal. When more electricity is generated from the PV panels than you are using, the excess electricity runs through the meter backward out to the grid. This causes your meter to turn backwards and reduce your electricity bill.

Evacuated tube systems are installed on a rooftop or structure that is readily exposed to direct sunlight. The water in the bottom of the tubes is then heated until it rises to the top of the tubes. Once it reaches the required temperature, it moves to a storage tank. As water in the tank cools it flows from the bottom of the tank back to the bottom of the tubes to be reheated. The heated water in the tank can then be drawn into the house for regular use. If you desire a temperature hotter than the system can attain, a gas or electric booster will further heat the water from the tank as it moves to the house.

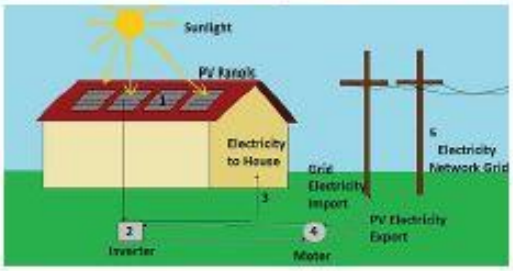
Advantages:

- generates free electricity
- zero-emission
- can turn your bill into a check
- payback period is only 5-7 years
- units are easily installed in a few hours

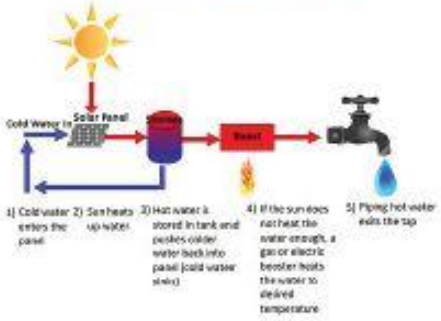
Disadvantages:

- requires constant exposure to sunlight
- size restrictions limit PV systems to 4.5 kW
- inverters must be replaced every 10 years
- panels are usually replaced every 25 years

Solar PV System



Solar Hot Water System



Back to Renewable Technologies

Next - Hydro

Search Our Site Here

Forum

Hydro Energy

Create a WIX site

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

Hydro Energy

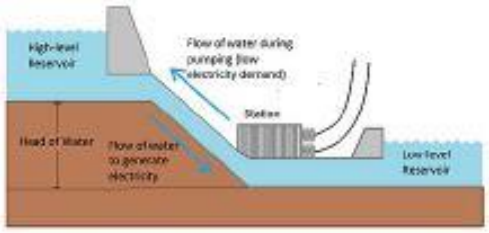
What is it?

Hydro energy is energy generated from the force of water moving through a turbine. A hydroelectricity system consists of a reservoir atop a hill, a dam to regulate the flow from this reservoir, and a series of turbines and generators.

How does it work?

Water from a low source (a stream or pond) is pumped through a pipe uphill into a reservoir that sits atop a hill. The pump can be powered by another renewable energy source (free electricity) or by the grid during off-peak hours (reduced price electricity). The water in the reservoir can then be released whenever electricity is needed, particularly during peak hours. This water runs downhill through a turbine. The force of the water rotates the turbine. The rotating turbine is used to drive a generator that produces electricity that can be used in the house. The amount of electricity generated is dependent on the height from which the water is falling, the volume of water flowing through the turbine, and the size of the turbine.

Hydroelectric Generation System



Advantages:

- free or reduced price electricity
- zero-emission
- built in storage system
- easy integration into farm irrigation systems

Disadvantages:

- requires nearby water supply
- need external power source to run pump

Previous - Solar

Next - Bio

Search Our Site Here

Forum

Bioenergy

Create a WIX site

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

Bioenergy

What is it?

Bioenergy is energy created from organic matter called biomass. Biomass consists of plant or animal material that can be used in combustion or chemical processes to generate biogas or biofuel. Biogas is collected as a by-product of anaerobic digestion. Biofuels are formed from chemical conversion processes that produce ethanol and biodiesel. The diagram at right shows the wide array of possible fuels, processes, and products of bioenergy.

How does it work?

There are several methods of generating bioenergy. A common biochemical process is anaerobic digestion. This process works by feeding organic matter (manure) into a tank. This matter is then decomposed by bacteria in the tank. The solid matter, biochar, sinks to the bottom of the tank and can be burned for heating. The liquid in the tank, effluent, can be pumped out to a secondary reservoir that can be used for irrigation. The gas released from the decomposed organic matter rises to the top of the tank and is passed through a meter to measure its volume. This gas can be burned to power generators to produce electricity or simply in a furnace to produce heat.

The most common process for generating bioenergy is combustion. In combustion processes, biomass is burned to produce heat. This process releases carbon dioxide and water as well as smoke and ash. The emissions from burning biomass are less harmful to the atmosphere than those released from burning fossil fuels because they are derived from organic matter that would otherwise naturally decompose.

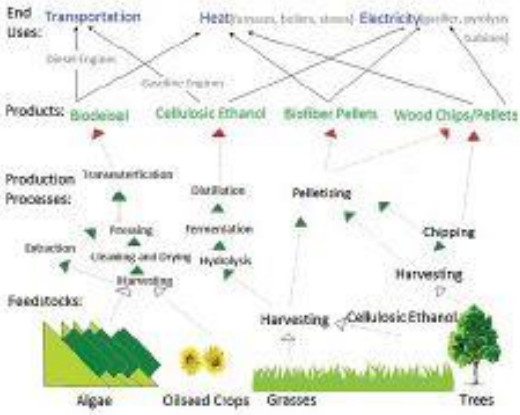
Advantages:

- fueled by waste materials
- produces solid, liquid, and gas products
- emissions are less harmful than fossil fuels

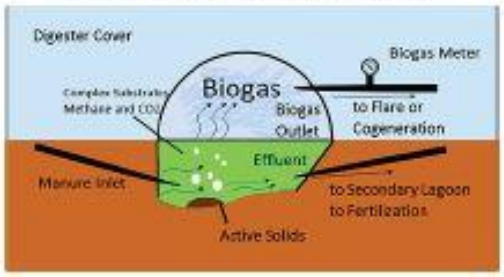
Disadvantages:

- requires large mounts of biomass fuel
- fuel can be variable quality

Bioenergy Flowchart



Anaerobic Digestion of Manure



Previous - Hydro

Next - Wind

Search Our Site Here

Forum

Wind Energy

Create a WIX site

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

Wind Energy

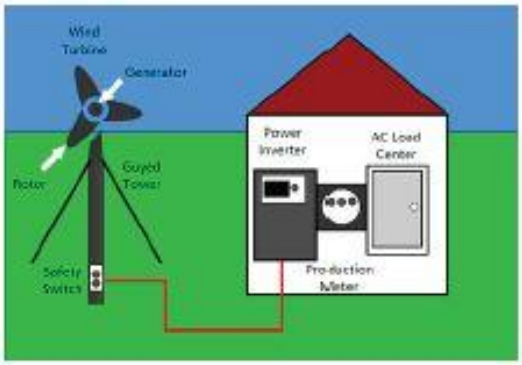
What is it?

Wind energy is energy obtained from wind currents. A typical electricity generation system consists of the turbine, its supports, a safety switch, an inverter, a production meter, and a load center.

How does it work?

Winds of a high enough speed spin the blades of the turbine. The required wind speed is dependent on the type and size of the turbine. A turbine that is sufficiently elevated and away from any obstacles will result in the highest production. The rotating turbine then powers a generator which produces direct current electricity. This DC electricity is run through an inverter to produce AC electricity which can be utilized in the house. The electricity is run through a production meter to monitor how much electricity has been produced by the turbine. There is also an AC load center which allows for fluctuations in electricity generation by storing a small amount of power in batteries for when generation is low.

Small Scale Wind Turbine System



Advantages:

- generates free electricity
- zero-emissions
- low operational costs
- require only a small plot of land

Disadvantages:

- requires constant wind stream
- produce noise

Previous - Bio

Next - Geothermal

Search Our Site Here

Forum

Geothermal Energy

Create a WIX site

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

Geothermal Energy

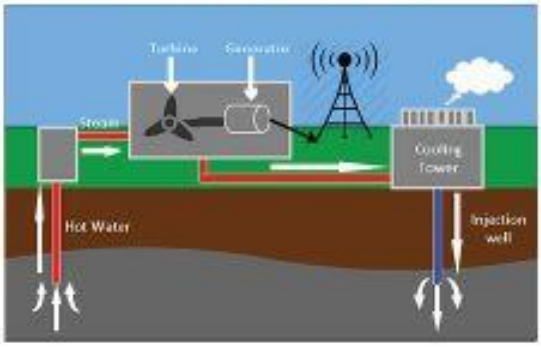
What is it?

Geothermal energy is energy obtained from the heat beneath the surface of the Earth. These systems consist of a collection pipe deep underground, a turbine, generator, and injection well.

How does it work?

The collection pipe extracts hot water from natural channels between rocks deep beneath the Earth's surface. This hot water is then further heated into steam. The steam is pushed through a turbine which drives a generator. The generator produces electricity that can be fed into the grid. The steam could also be used to supply heating for a house. The waste steam is moved to a cooling tower to convert it back to water. The cooled water is then reinjected deep beneath the surface to be reheated for extraction.

Geothermal Power Plant



Advantages:

- generate free electricity
- low emission
- constantly available supply

Disadvantages:

- generally requires larger scale operations
- pipes require continuous maintenance
- energy cannot be transferred over long distances

Previous - Wind

On to Storage Systems

Search Our Site Here

Forum

Storage Systems

Chemical

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

Chemical Energy Storage

What is it?

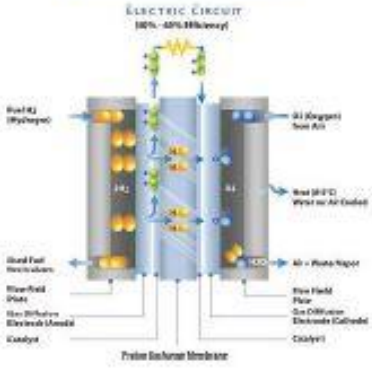
Chemical energy storage involves storing energy in chemical fuels that can later be burned to perform mechanical work and produce electricity.

What are some examples?

Gasoline, diesel, natural gas, and propane are some common forms of energy stored as chemical fuel. Each of these can be burned to produce heat or perform work. However, these are all fossil fuels so when they are burned they release damaging gases that destroy our environment.

Biodiesel and ethanol are newer forms of chemical fuel that are made from organic matter in place of fossil fuels. Ethanol is an alcohol fuel that is generally made from the sugars in corn and barley and mixed with gasoline in low concentrations. Special engines are required to run on higher concentrations of ethanol. Biodiesel is a fuel made from vegetable oils, fats, and greases and can be used in any standard diesel engine.

Hydrogen is a potential fuel source in the future as it is the only chemical fuel that is carbon-free and zero-emission. This is a high cost fuel and requires engines built specifically for its use.



Advantages:

- long storage periods
- able to be transported long distances
- biodiesel can be used without engine modification
- biodiesel is biodegradeable
- biodiesel produces less air pollutants than fossil fuels
- hydrogen is carbon-free and zero-emission

Disadvantages:

- fossil fuels damage the environment
- ethanol requires special engines
- hydrogen has high production costs

Back to Storage Systems

Next - Electrochemical

Search Our Site Here

Forum

Electrochemical

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

Electrochemical Energy Storage

What is it?

Electrochemical energy storage is a way to store energy for electrical use in a device that can convert electrical work into chemical free energy.

What are some examples?

Batteries are the most widely used electrochemical storage devices. Typical batteries supply electrical energy from the chemical reactants contained within them. They come in a range of sizes for countless applications and are divided into primary and secondary groups. Primary batteries are single use and limited to supplying the energy contained in one unit. While secondary batteries have the same small storage capacity as primary batteries, they are able to be recharged so they can use this capacity multiple times.

Fuels cells are a more advanced type of electrochemical storage device. They are similar to batteries with the exception that the chemical reactant fuel is not stored in the battery cell; it is drawn in from an external source. This prevents the fuell cell from being limited to the small storage capacity of a battery.

Advantages:

- long storage life
- provide portable electrical power
- secondary batteries are rechargeable

Disadvantages:

- high cost
- batteries have small storage capacity

Previous - Chemical

Next - Electrical

Search Our Site Here

Forum

Electrical

Create a WIX site

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

Electrical Energy Storage

What is it?

Electrical energy storage systems store electricity in devices by means of static charge.

What are some examples?

Capacitors are the most widely used device for electrical energy storage. They store energy on the surface of metal electrodes and are able to work with extremely high currents, but only for very short periods of time.

Supercapacitors are a larger version of capacitors that use a thin layer of electrolyte to store an electrical charge. They are able to work for longer durations than capcitors, but they can only work with lower currents. They typically operate above 90 percent efficiency.

A larger electrical storage device is the superconducting magnetic energy storage (SMES) system. These machines send a current through a superconducting coil to store large amounts of electricity. They are capable of releasing megawatts of power and operate at over 95 percent efficiency.

Advantages:

- capacitors can handle high currents
- supercapacitors can work for long durations
- SMES systems carry huge amounts of power

Disadvantages:

- capacitors have a short usage period
- supercapacitors can only handle low currents
- SMES systems are very high cost

Previous - Electrochemical

Next - Mechanical

Search Our Site Here

Forum

Mechanical

Create a WIX site

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

Mechanical Energy Storage

What is it?

Mechanical energy storage systems use kinetic and potential energy to generate on-demand electricity.

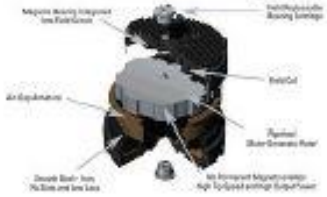
What are some examples?

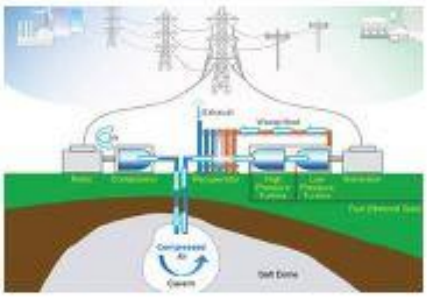
Flywheels are a simple mechanical energy storage device that operate by conserving energy and momentum. A rotor is accelerated to maintain rotational energy. The system then slows when energy is drawn from it and speeds up when energy is stored in it. This allows for quick responses in energy production and make flywheels good for black out backups.

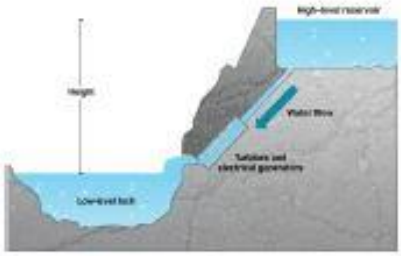
Compressed air energy storage (CAES) is a storage system that is used with wind turbines. The turbines push compressed air into a holding tank underground. When there is a lack of wind and its resulting energy production, this compressed air can be released to power the generator and continue to produce electricity.

Pumped storage hydro (PSH) is a storage system that is combined with hydroelectricity systems. Water is pumped uphill into a holding tank by using free power from a renewable source or by using electricity from the grid during off-peak hours. Water can then be released from the tank and run through a turbine to generate electricity during peak hours.

CleanSource® Flywheel Technology







Advantages:

- flywheels can deliver energy in very short time increments
- CAES provides long term storage
- PSH provides long term storage
- PSH can be intergrated into irrigation systems

Disadvantages:

- flywheels are much less efficient than other methods
- CAES systems are inefficient
- PSH requires water turbines

Previous - Electrical

Next - Thermal

Search Our Site Here

Forum

Thermal

Create a WIX site

Mirboo North Community Energy Hub

Mirboo North Community Energy Hub

Mirboo North Community Shed

Mirboo North country

Home | About Us | News & Events | Energy Info | Renewable Technologies | Storage Systems | Community Innovation | Forum | Contact Us

Thermal Energy Storage

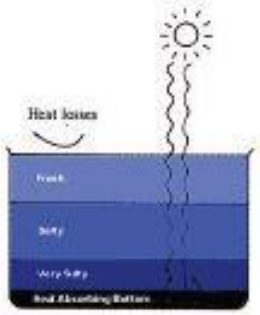
What is it?

Thermal energy storage systems use sunlight or excess thermal energy to provide heat or electricity.

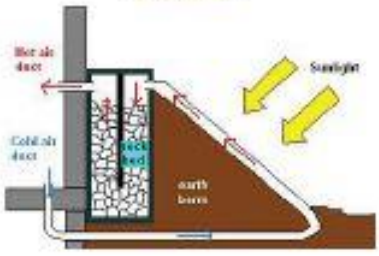
What are some examples?

Solar ponds are a common collection system of the sun's rays. The pond is comprised of water divided into three layers; each layer has a different salt content. This allows the lowest level (with the highest salt concentration) to reach near boiling point temperatures. This water can then be run into a building for hot water or used for heating or electricity production.

Rock heat storage systems use the thermal properties of rock to provide heated insulation for buildings. The rock can be warmed by the sun and then further heated by electric heaters. The rock retains this heat for a longer duration than water and can provide heating for buildings.



Solar Air heater



Advantages:

- low cost, low maintenance systems
- zero-emission
- solar ponds can be used for hot water, heating, or electricity
- rock heat storage provides natural insulation

Disadvantages:

- solar pond requires land area for a body of water
- rock heat storage is only for heating

Previous - Mechanical

Search Our Site Here

Forum

Community Innovation

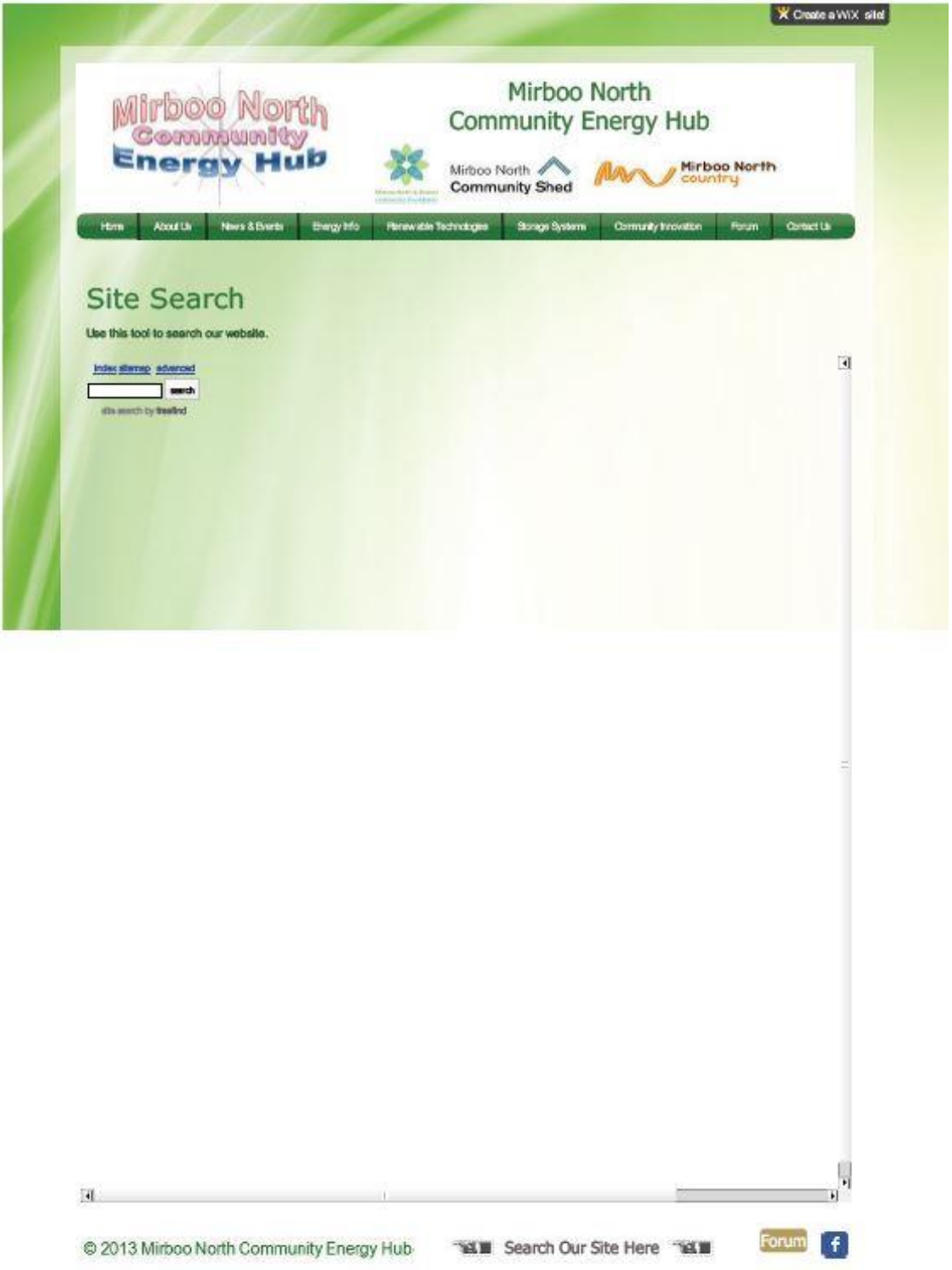
Forum


Create a WIX site
Mirboo North Community Energy Hub
Mirboo North Community Energy Hub
Mirboo North Community Shed
Mirboo North country
Home
About Us
News & Events
Energy Info
Renewable Technologies
Storage Systems
Community Innovation
Forum
Contact Us
Phone
Subject
Send
Bob
Solar Panel Rebates
Anonymous
Feedback
Anonymous
If you're looking at this...GIVE SOME FEEDBACK ON THIS WEBSITE!
mirboonorthc
New Website
© 2013 Mirboo North Community Energy Hub
Search Our Site Here
Forum

Contact Us


Create a WIX site
Mirboo North Community Energy Hub
Mirboo North Community Energy Hub
Mirboo North Community Shed
Mirboo North country
Home
About Us
News & Events
Energy Info
Renewable Technologies
Storage Systems
Community Innovation
Forum
Contact Us
Contact Us
Mirboo North Energy Hub
34-40 Burchell La
Mirboo North VIC 3871
Phone: (03) 5668 1611
Co-ordinator, MNCEH
Ian Southall
Phone: (04) 1359 0220
Email: ian@ecohubgippsland.com.au
Chairperson, MNCEH
Diana Mueller
Phone: 5668 7297
Email: mueller.diana.a@edumail.vic.gov.au
Member, MNCEH
Graeme Wilson
Phone: 5668 4267
Email: delburn1@hotmail.com
Visit Us
Driving Directions
From Melbourne:
Take M1 towards Citylink Tollway/S.E. Suburbs
Turn right onto C469
Turn right onto B460
Turn left onto C455
From Canberra:
Take B23 towards NSW
Continue on B23 into VIC
Turn right onto A1
Continue onto M1
Exit onto B460 towards Mirboo N/Leongatha
Turn left onto C455
Get Involved!
For more information on how you can participate in the hub, contact us directly by filling out the provided form.
Name
Email
Subject
Message
Send
© 2013 Mirboo North Community Energy Hub
Search Our Site Here
Forum

Site Search


Create a WIX site
Mirboo North Community Energy Hub
Mirboo North Community Energy Hub
Mirboo North Community Shed
Mirboo North country
Home
About Us
News & Events
Energy Info
Renewable Technologies
Storage Systems
Community Innovation
Forum
Contact Us
Site Search
Use this tool to search our website.
index
sitemap
advanced
search
© 2013 Mirboo North Community Energy Hub
Search Our Site Here
Forum