ENGINEERS
AUSTRALIA

ENGINEERS MAKE IT SO.

2010 "Make It So" - *Ideas of Australia*

A brief for Engineering Students to "Make so" in 2011.

Background

The purpose of the “Make it so” competition was to raise the awareness of the Engineering profession across Australia by engaging both engineers and the Australian Public in an ‘ideas’ generation discussion.

Analysis

The competition allowed for ‘freetext’ submissions. Respondents had the ability to submit more than one idea into the competition. The number of ideas submitted totalled 6754. Respondents were both current Engineers Australia members as well as non-members.

The results were then analysed and categorised based on "word frequencies" and "best match” to a category then identified. Word frequencies within ideas were then associated into pairs, excluding filling words such as “the", "and". Descriptive words without a high level of association were also taken out of the analysis e.g. “under” “over”. Words with a high level of association occurring alongside another word of high level association were considered during categorisation e.g. "fossil", which occurs alongside "fuel". Once all high level association words were identified the largest major categories and sub-categories for responses was determined. Ideas were then both automatically (if specific match occurred) and manually (if more generic) added to their categories based on the occurrence of the specific word/word pairs.

12 Weekly Winners during Competition phase

Every week during the Make it so competition, the top 10 most popular ideas for that week, were pulled out into a list and sent to Engineers Australia to select the winner for that week. This idea was “popular” amongst the public.

Week 1	grass (lawn) clippings can be used as a feasible biomass fuel for domestic power generation
Week 2	everyone's roof tiles generate energy from the sun
Week 3	that a universal charger can be used in all the electronic devices to recharge them.
Week 4	my remote controlled key lock has a small display with an indicating arrow towards the car's position so that I can find it
Week 5	new homes built have two separate electricity circuits, one for non-essentials with a main switch to be turned off when leaving the house
Week 6	you can manually wind up rotary clotheslines to slowly unwind thereby creating wind to dry clothes and save on the use of a drier.
Week 7	emergency vehicles have a radio sensor that turns all traffic lights to red for faster, safer passage... similar to railway level crossings
Week 8	a car’s windscreen tint automatically adjusts to the glare conditions, not unlike transition lenses in eye glasses
Week 9	the water meter is displayed inside the home where family members can easily monitor their water usage
Week 10	building structures (i.e. skyscrapers) can be built with a device that absorbs wind energy that passes the structure to reduce carbon emissions
Week 11	a desalination plant can run solely on wind and solar power
Week 12	after an oven is used, the leftover heat (energy) is used to help heat water for hot water systems

Major Idea Categories

In order to analyse all ideas received as a result of this competition, a number of key words were identified and categorised based on the frequency of use. Six major categories and a number of sub-categories were then identified. This section describes each of these major categories and reveals the results in terms of number of responses received.

The Major Categories (Figure 1) identified and ranked in terms of response rate include:

1. Energy – 30% of ideas related to the generation, reusability and cost of energy
2. Water – 20% of ideas related to the creation, accessibility and use of water
3. Cars – 14% of ideas related to motor vehicle design improvements and efficiency
4. Phone –13% of ideas related to device mobility and charging
5. Transport – 12% of ideas related to traffic congestion and public transport of people
6. Domestic – 11% of ideas related to the domestic household environment.

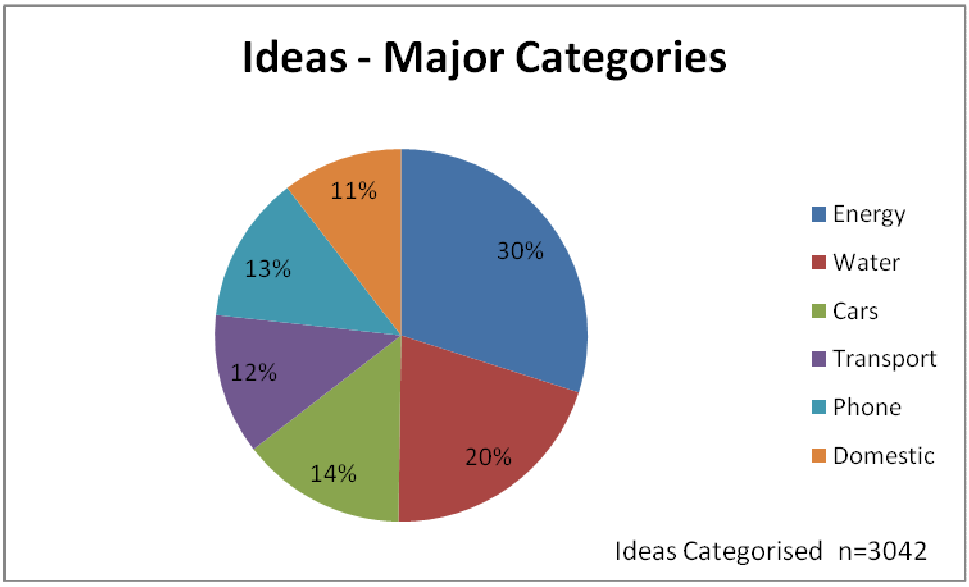

Figure 1. Ideas - Major Categories

Energy

Overview

This chapter reveals the ideas that were categorised within the "Energy" category as relating to the generation, reusability and cost of energy. "Energy" ranked as the top most category across all ideas generated, with 30% of responses falling into one of the sub-categories identified below. Overall, we found that the generation of energy using naturally occurring and regenerating sources was of primary interest. Figure 2 reveals the results for the following Energy Sub-Categories:

1. Solar Energy – 53% of ideas related to two major themes: cost effectiveness and the creation of renewable, accessible and independent power sources.
2. Renewable Energy – 14% of ideas related to creating more renewable energy sources through cheaper alternatives and harnessing what nature has to offer.
3. Efficiency – 4% of ideas related to creating cost effective and efficient sources of energy.
4. Nuclear – 3% of ideas related to creating improvements in the nuclear energy generation, waste disposal and public policies.
5. Wind - 3% of ideas related to the generation of energy leveraging existing infrastructure to harness the power generation attributes of wind as it passes by.

Of all ideas containing ideas best matching the 'energy' category, 23% were miscellaneous.

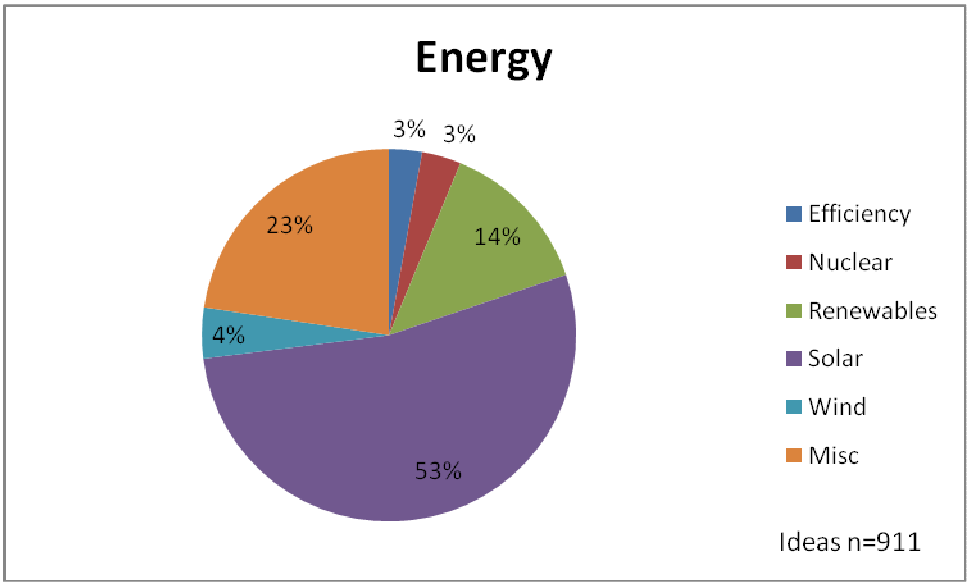

Figure 2. Energy

Top 20 Energy ideas

batteries work on solar energy e g battery for my laptop phone I want to place the batteries under the sun in a few minutes they re ready
National rebate scheme for Climate Smart monitors for every household Seeing energy costs in real time will significantly lower power bills
Fusion Power R amp D is pushed to make Fusion Power a reality working towards solving the energy crisis and becoming a source of clean power
Gyms to generate their own power by using the energy exerted from the circuit elements like bicycles and rowing machines
Get serious about renewable and alternative energy sources We have the technology Don t need to use fossil fuels as main energy source
that instead of just heat sinking laptops REcycle and REuse that energy to extend the battery life
solar panels are cheap enough to allow them to be used by the citizens of developing countries
Cladding of high rise buildings be designed as solar panel especially the east and west sides
a gym dedicated to personal power generation pays people to get fit while producing green electricity
that we can harness the power generated by lightning
Harness movement of air over a moving train to generate electricity for on board usage such as lightings
develop and industrialise geothermal energy technologies so that they can be used as a renewable base load power source
more households can economically install and utilise innovative green technologies to produce their own electricity
Power Coy s focus on making solar equipment In stead of paying for power our bill would be an accumulative acc used for repair renewal
solar panels are cheaper and more efficient
Stirling engine assisted car engines after the car heats up the stirling engine uses wasted heat energy to drive the car saving in petrol
magnetic levitation technologies can become a more common use of energy for transport in modern society as it is a clean source of energy
road raised pavement markers are illuminated by solar powered LED s to improve road visibility at night during rain amp bad weather etc
To create a gym tool that generates electricity so the energy can be transformed for other electrical use
Energy is free and is almost limitless

Water

Overview

This chapter reveals the ideas that were categorised under "Water" and relate to the supply, conservation, accessibility and use of water. Ideas relating to "Water" comprised 20% of all responses. Of these responses, a number of sub-categories are identified below. Overall, we found that the recycling, supply and heating of water were of primary interest. Figure 3 reveals the results for the following Water Sub-Categories:

1. Recycling – 17% of ideas related to the recycle of all waste water and capturing stormwater.
2. Heating – 13% of ideas related to using natural methods for heating water as well as harnessing 'wasted' heat that is generated in the home, but not used.
3. Supply – 12% of ideas related to the supply of water through redirection where any overflow/excess occurs and capturing rain water.
4. Conservation – 7% of ideas related to providing devices in the home to monitor and display water use to drive conservative behaviours.
5. Desalination - 6% of ideas related to creating desalinated water cost effectively for public use utilising natural energy sources.
6. Hydroelectric Generation – 5% of ideas related to using water to generate energy and also conserve or reuse water.

Of all ideas containing ideas best matching the 'water category, 40% were miscellaneous.

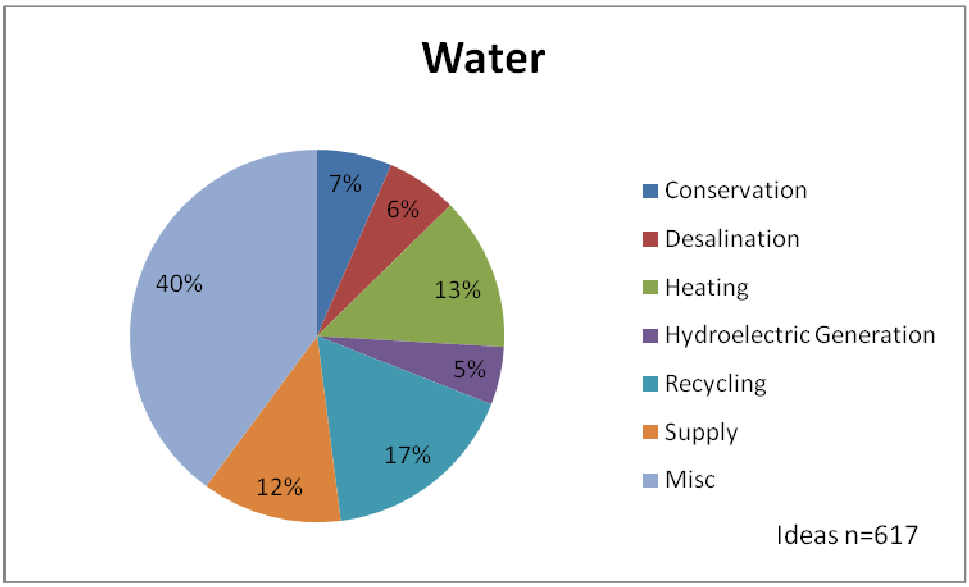

Figure 3. Water

Top 20 Water ideas

everyone in the world has access to clean water
that water bottles are made from biodegradable plastic like shopping bags
my rainwater tank doesn't grow mosquitoes
that everyone on this planet is accessible to clean water
after an oven is used the left over heat energy is used to help heat water for hot water systems
it is cost efficient to fit every house with solar panels wind turbines and recycled water to make each house entirely sustainable
that water mains send out a signal telling exactly where they have burst or broken using water flow as the source of energy
salt can be efficiently removed from water with low energy requirement compared to current De sal but still produce large quantity of water
that when the shower is turned on the perfect mix of hot and cold water comes out immediately depending on preference
that a gage is connected to the water tap or hose that records how many liters of water is coming out to make us aware of our consumption
we provide solar powered desalinisation and purifying units to third world countries so we can all have access to clean healthy water
the water meter is displayed inside the home where family members can easily monitor their water usage
a portable water a treatment plant and associated power supply can be air lifted into disaster areas
any storm water drain outlets have miniature turbo generators which can power short term electricity needs during heavy rain and storms
A biological device that enables the direct conversion of salt water to fresh water Like the glands that Seagulls have
clean water is free for everyone so that we don t have to pay for it
That I can easily monitor live household water electricity and gas consumption from a dashboard easily viewable from within my kitchen
water isn't wasted whilst I wait for hot water to arrive at the tap
that drinking water is not used in toilets
urban waste water is recycled and treated to provide fresh water to cities

Cars

Overview

This chapter reveals the ideas that were categorised under "Cars" relating to their environmental impact, safe use and technology enhancements. Ideas relating to "Cars" comprise 14% of all responses. Of these responses, a number of sub-categories are identified below. Overall, we found that their environmental impact was of primary interest. Figure 4 reveals the results for the following Car Sub-Categories:

1. Green – 40% of ideas discussed alternative fuels, suggestions on car designs and methods to increase 'green' behaviours in drivers.
2. Speeding– 30% of ideas discuss methods to control vehicle speed, drivers speeding and improve monitoring and awareness to increase safety.
3. Safety – 22% of ideas discuss improvements to restraints, car design and car materials.
4. GPS – 8% of ideas relate to improving the benefits of having a GPS as well as making them safer and easier to use.

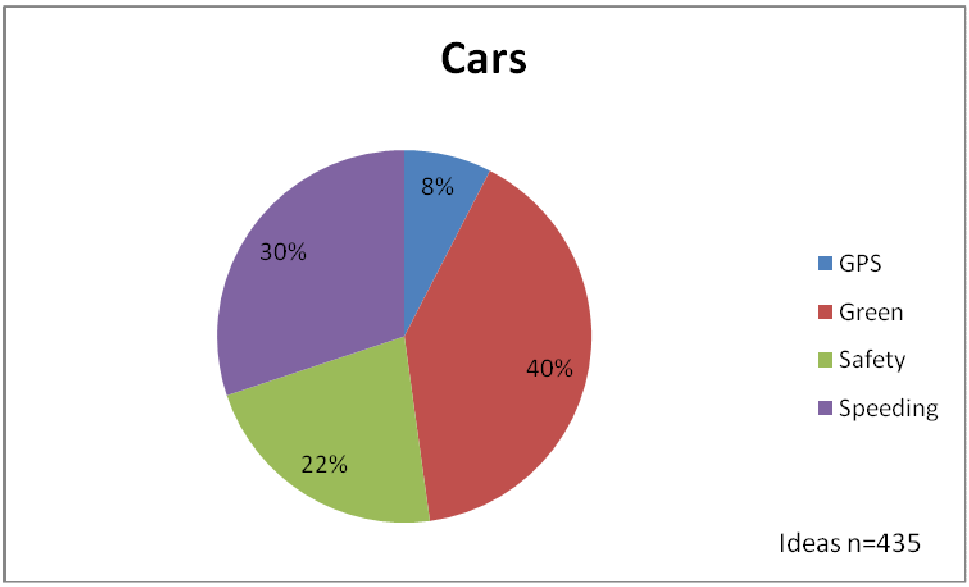

Figure 4. Cars

Top 20 Cars ideas

that there are more high speed efficient trains between major centers e g Hobart amp Launceston Fewer cars less accidents less pollution
my car speedometer always displays the maximum legal speed limit through a correlated GPS location database and RFID tagged zones
cars be fitted with speedometer lock that senses speed limit
Vehicle glass that automatically adjusts to changing light Keep you car cooler eliminate glare reduce the need for A C which saves fuel
modular electric car that can be changed to suit the purpose 2 seater sports car 8 seater people mover ute 4wd van etc
car drivers automatically receive speed limits that change to suit road conditions eg lower for night wet weather and poor visibility
that all cars have electronic speed limiters installed which are triggered by entering a school zone during school hours
cars can automatically adjust air pressure in tyres by sensing road conditions helping to save fuel costs
that my car knows the speed limit at all times through GPS or road transmitters and alerts me when I approach exceed the speed limit
car owners have affordable access to a device that reduces emissions and increases efficiency of their existing vehicle
An environmentally friendly hybrid car powered by a diesel engine amp 4 electric motors Electric Motors No Gearbox Less Emissions
a low tyre pressure warning system for motor vehicles Will results in increased fuel efficiency and safety
hydrogen fuel is efficiently produced from water and safe to use in cars
car GPS navigation systems include parking info rate time limit etc and when the time is up a text message is sent to the drive
non structural car components can be made from plastic instead of steel to save weight and reduce emissions e g like the boot lid and bonnet
Car tyres have 3 strips starting at green and wearing down to red in order to show wear better to drivers so that roads are safer when wet
Transition windows for cars Increased sunlight would tint the windows more at night tint would reduce to enable clearer safer vision
cars have a black box that records all driver actions and vehicle stats eg speed for later review by police employers or parents
police can fire a GPS into a car and track it rather than those dangerous car chases that get people killed
that a car have a sensor to read a speed limit sign and automatically set the speed limit alarm in the car

Phones

Overview

This chapter reveals the ideas that were categorised under “Phones” which discuss improvements to their mobility, and charging. Ideas relating to “Phones” comprise 13% of all responses, of these two sub-categories are identified below. (See Figure 5)

1. Mobile – 35% of ideas related to alternative and enhanced uses for mobile phones.
2. Charging– 14% of ideas related to improving the ability to charge phones more conveniently, with greater efficiency and safety.

Of all ideas containing ideas best matching the “Phone” category, 51% were miscellaneous.

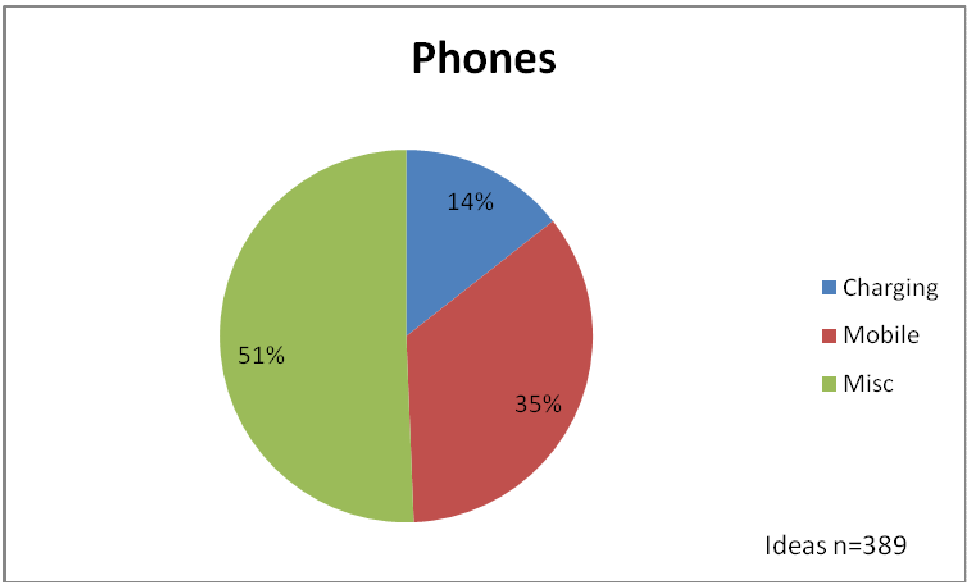

Figure 5. Phones

Top 20 Phones ideas

mobile phones are automatically linked together so that reception is increased
when calling 000 from GPS enabled mobile phones the operator is informed of your coordinates
keys and remote controls can be linked to my mobile so I could call them when they go missing
mobile phone and other chargers consume no power when physically disconnected from the device
Self charging mobile phone batteries like the self winding watch
mobile phones are not a health hazard and can be re used in an eco friendly manner
A phone with a screen that folds out larger like paper and stiffens with electric current
that seats in lecture rooms incorporate earphone ports to amplify the sound from the lecturers microphone and filter out BG noise
the internet amp telephone communication can be conveyed through electrical power lines No separate power amp communication cable is required
that a mobile phone can be used as a proximity key for your car using Bluetooth or similar
our mobile phones can be charged by our movement reducing our power usage
a small sized thin light weight phone computer camera at least 10MP tv that can fold out has huge storage and is easy to use
Mobile phones can recharge themselves from the kinetic energy of the user when walking moving
that I can charge my car the same way I charge my phone so I wouldn't have to use petrol anymore
that I can automatically donate the unused portion of my mobile phone cap every month to charity through premium SMS
Install GPS units on all public buses Develop an iphone application to identify the location of your bus and its estimated time of arrival
mobile phones do not emit radiation and cause cancer and feel safer using them
that mobile phones have a kinetic emergency battery charger built into the battery which trickle charges when you walk around
that the kinetic energy produced from the motion of running can be converted into electrical energy to charge mobile electrical devices
we can harness the kinetic energy from everyday exercise to charge our mobile phones and MP3 players

Transport

Overview

This chapter reveals the ideas that were categorised under "Transport" relating to the use of Public services, Rail networks, and Traffic congestion. Ideas relating to "Transport" comprise 12% of all responses. Of these responses, a number of sub-categories are identified below. Overall, we found that traffic congestion was of primary interest. Figure 6 reveals the results for the following Transport Sub-Categories:

1. Traffic – 34% of ideas related to reducing traffic congestion.
2. Rail– 28% of ideas primarily discusses improving the reliability of the rail network.
3. Public – 13% of ideas related to encouraging people to use public transport by making it more reliable, efficient and cost effective.

Of all ideas containing ideas best matching the 'Transport' category, 25% were miscellaneous.

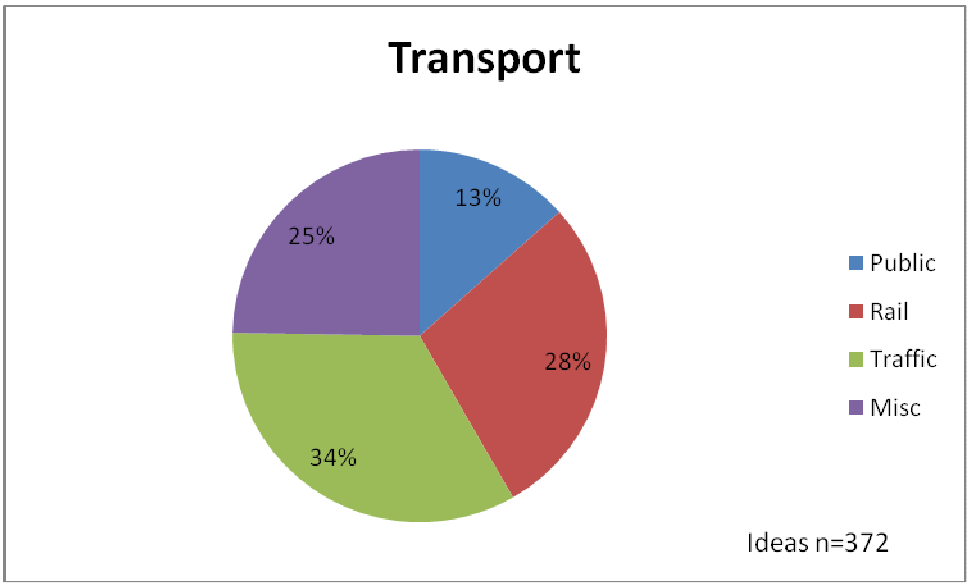

Figure 6. Transport

Top 20 Transport ideas

TRAINS and TRAMS are FASTER and NEVER STUFF UP yet they HOLD HEAPS of PEOPLE
public transport such as buses and trains have wifi internet capabilities allowing people easy access to surf the net and check emails
Satellite navigation devices have overlays for other transport network options incorporating e g train and bus timetables cycle routes etc
Australia has a high speed railway Network Faster transport for less energy
Providing wifi access on public transport by setting up wireless routers on buses train carriages and ferrys
An integrated and automated traffic management system which adapts to all conditions to provide the most efficient flow of traffic
Automated system in vehicles predicting the traffic flow ahead reducing the speed of the vehicle not having to stop saving energy and time
train tickets are replaced by transit recharge cards which can be recharged anywhere No more tickets in the bin no more long queues
that cars are aware of their surroundings and are able to prevent accidents improve traffic flow and make way for emergency vehicles
that traffic no longer emits toxic fumes that we all inhale on a daily basis
that mobile phones not only iPhones can incorporate applications to notify public transport users the time of arrival of any given bus
that an international holiday promotes public transport use within CBD areas by offering free rides for passengers
a system implemented on train stations where people are able to know before their train arrives how many people are in each carriage
gps tags on trains buses trams ferries etc that feed onto web in real time making train location viewable to commuters
passenger cars would drive in auto drive mode and provide an optimal traffic management and safe travel solution
public transport is as convenient and private as a car eg a separate road or lane with hundreds of little self driving electric pods
why don t our passenger rail gates default as open and close if you don t submit a ticket Do you know how many more people you can move min
Japanese Style BULLET TRAIN needed along the east coast of Australia to link Brisbane Sydney and Melbourne with a branch to Canberra
a public transport system that can run effectively thus reducing the need for cars
A unified public transport system in Sydney that uses a tag similar to e tag on toll booths to improve ticketing in rail ferry and buses

Domestic Environment

Overview

This chapter reveals the ideas that were categorised under "Domestic Environment" relating to heating, automation and control of home devices. Ideas relating to "Domestic" comprise 11% of all responses. Of these responses, a number of sub-categories are identified below. Overall, we found that saving power and heating was of primary interest. Figure 7 reveals the results for the following Domestic Sub-Categories:

1. Power and Heating – 22% of ideas within this sub-category discuss methods for salvaging and reusing energy within homes to make them more efficient and less dependent upon external sources with the ability to feed back into public grids.
2. Automation and Control– 17% of ideas within this sub-category discuss automation of a home to improve occupant's security & safety, comfort, convenience and ease of use
3. Wireless and Remote – 5% of ideas related to utilising wireless and remote devices to improve convenience in the home environment.

Of all ideas containing ideas best matching the "Domestic" category, 56% were miscellaneous.

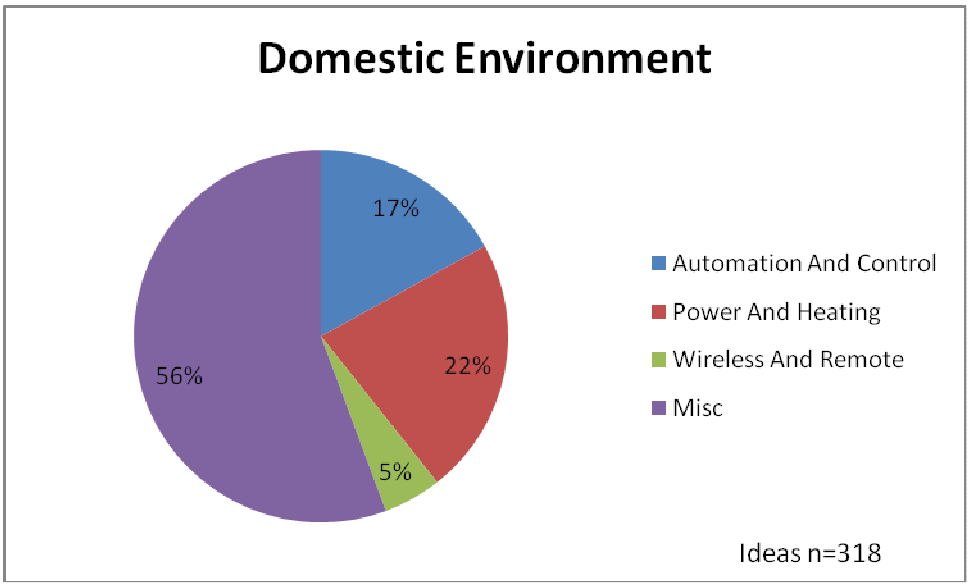

Figure 7. Domestic Environment

Top 20 Domestic Environment ideas

if a device can automatically sense the power factor of my house and correct it it ll reduce my electricity bill
that affordable modular engineered house for the underdeveloped countries
Central locking for the home
i can expand the rooms in my house that i am using and contract the ones that are not being used
that everyone can work from home without commuting to office and work site
that houses are protected quickly in bushfires and people can leave their houses with peace of mind
that summer heat is absorbed by houses and stored for heating during cooler months
government subsidies for bicycles Encouraging everyone to leave the car at home and ride more Helping themselves and the environment
a switch that turns everything in the house off except the fridge to save standby power when sleeping or going on holiday
a fire resistant blanket or cover can be put over a house just before a bushfire hits
house and lot are very affordable in Australia for most of us
new homes built have two separate electricity circuits one for non essentials with a main switch to be turned off when leaving the house
my roof changes to a light colour in summer to reflect light heat and a dark colour in the winter to absorb heat and keep my house warm
You can unlock you house with the same remote you unlock you car with
We can set our lights on a timer so that when going on Holidays our lights will come on and turn off just as they would when we are at home
that I have a device that can check whether the lights or stove are still on when I leave the house and are turned on when I arrive
I don t have to fumble with my keys to get in the house Give me remote central locking for my home
every household has a device that take in carbon dioxide produced in the home filters it and releases the oxygen back into the atmosphere
everyone even the homeless can have a roof over their heads through a far cheaper version of housing
An industrial scale simple process for community based methane fuel production from household organic waste for least developed countries