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Immediate Release

Sembawang Shipyard 's Green Wave Environmental Care Competition For Schools 2007 Award Presentation Ceremony

Singapore, January 22 2008 - Sembawang Shipyard Private Limited, a subsidiary of Sembcorp Marine Ltd, is pleased to announce the winners of Green Wave Environmental Care Competition for schools 2007 at the award presentation ceremony at the Marina Mandarin Hotel, Singapore.

Our Guest-of-Honour for this award ceremony is Mr Khaw Boon Wan, Minister for Health and MP, Sembawang GRC. Sembawang Shipyard's "Green Wave" Environmental Care Project was launched in January 2003 and is an annual competition opened to all students at Primary, Secondary, Junior Colleges and Institute of Technical Education (ITE) and Tertiary Institutions. Jointly sponsored by Sembawang Shipyard's alliance partners, Shell International Trading and Shipping Company Limited (UK) and BP Shipping Limited (UK), the competition targets at our students and youths, encouraging them to develop innovative ideas and projects on environmental care and protection. This is the fifth year of the competition and we are very encouraged by the enthusiasm and passion from our students in sharing their green ideas. For the competition in 2007, a total of 278 entries were received with participation from about 1,000 students. This is indeed another year of strong participation from the schools.

During the ceremony, a total of 46 awards will be presented by Mr Khaw Boon Wan to the winning teams (See Appendix 1 and Appendix 2).

We are grateful to the panel of very dedicated judges from the schools, the Ministry of Education, Singapore Environment Council, NParks, National Environment Agency, Housing Development Board of Singapore, Public Utilities Board of Singapore, Singapore Science Centre, Singapore Polytechnics, Ngee Ann Polytechnics, National University of Singapore, National Institute of Education and Nanyang Technological University. Special appreciation goes to the Green Wave Advisory Board for their guidance and support.

Mr P K Ong, Managing Director of Sembawang Shipyard, said “We are heartened by the strong enthusiasm shown by the students in sharing their green ideas. This bodes well for our long-term objective of helping to nurture our students towards a lifelong journey of responsible involvement in environmental care and protection. We congratulate all winners and thank all participants for making this a challenging and meaningful competition”.

The Green Wave Environment Competition 2008 is now open for registration and all students and schools are invited to participate and share their ideas on environmental care and protection. Winning teams can expect the following attractive awards:

Primary Schools	1st Prize	S\$4,000
	2nd Prize	S\$2,000
	3rd Prize	S\$1,000
Secondary Schools	1st Prize	S\$6,000
	2nd Prize	S\$4,000
	3rd Prize	S\$2,000
Junior Colleges / ITEs	1st Prize	S\$8,000
	2nd Prize	S\$5,000
	3rd Prize	S\$3,000
Tertiary Institutions	1st Prize	S\$10,000
	2nd Prize	S\$6,000
	3rd Prize	S\$4,000

The 1st Prize in the Tertiary category is jointly sponsored by Shell International Trading and Shipping Company Limited and includes a one-month attachment to a Shell associate company. The 1st Prize in the Junior Colleges / ITEs category is jointly sponsored by BP Shipping and includes a one-month work attachment to BP Singapore. Winners of the top prizes at the Junior College/ITE and Tertiary levels will also be offered attachments with Sembawang Shipyard in divisions such as Engineering, IT, Human Resources, Operations and Business.

The prize money for the Primary, Secondary and Junior Colleges and ITEs should be shared on a 60%-40% basis with 60% of the prize award going to the School fund and the remaining 40% to the student/students who are in the project team. The prize money for the Tertiary Level will be shared by the student participants in the teams and the tertiary institutions on a 60% / 40% basis.

About Sembawang Shipyard

Sembawang Shipyard Pte Ltd is a wholly-owned shipyard of Sembcorp Marine, the marine engineering arm of SembCorp Industries Ltd. Sembawang Shipyard has one of the largest integrated ship repair and conversion facilities in Southeast Asia. With more than three decades of experience and proven track record in ship repair and offshore conversions, the shipyard's world-class reputation is based on the company's commitment to superior customer service, innovative solutions, quality, and strict Health, Safety, Security and Environment standards.

Besides the traditional sectors of tankers and bulkers, Sembawang Shipyard is a recognised specialist in the niche markets of FPSO/FSO conversions, offshore vessels conversions and new-buildings, complex lengthening conversions, passenger-ship conversions / refurbishment, chemical tankers, liquefied gas carriers, offshore rigs and navy ship repairs.

In July 2002, Sembawang Shipyard became the first shipyard in South East Asia to achieve ISO14001 Environmental System Certification by Det Norske Veritas Ltd. The certification is a firm endorsement of the shipyard's commitment and efforts towards environmental preservation and protection. As such, the shipyard is pleased to be the first in its industry in Singapore to promote the environmental care and protection project for all schools in Singapore. The Green Wave Environmental Care Project for schools one of the shipyard's key environmental outreach programme.

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The press release is also available at our website: www.sembship.com/greenwave

APPENDIX 1

The Winners for the Green Wave Environmental Care Competition for 2007 are:

(A) PRIMARY LEVEL

Prizes	School	Title of Project	Participants
1 st Prize S\$4,000	St. Hilda's Primary School	Newspaper curious furniture	Yorick Kwek Yu Li, Noreen Ng Xin Ying, Ashwin Vivek Vinod
2 nd Prize S\$2,000	Fuhua Primary School	Solar House	Thiam Jia Hui, Jerrold Chua Chun Hui, Tan Hui Peng
3 rd S\$1,000	Qihua Primary School	The Earth and the Greenhouse - The Link	Shara Png Si Wei, Nurfazirah Bte Johari, Low Zhen Jie, Ivy Yeo Sing Ming, Lim Teng Yee, Dillon Ang Shou Yang, Ong Cher Li, Gwendeline Lee Xin Ni, Germaine Yeo Jie Min
Merit Award S\$500	Paya Lebar Methodist Girls' School	Growing GREEN seedlings	Diana Goh Wei Ling, Samantha Tan Jie Ying, Hilary Low Wei Qi, Melissa Mak Li Ping
Merit Award S\$500	CHIJ - Our Lady of Good Counsel	The Great Beach Clean-Up	Charmaine Maria Jacob, Felicia Christabella Lim, Thet Thiri Ko
Merit Award S\$500	Hong Kah Primary School	We Care, We Save & We Waste No More	Chun Jeen, Jagdeep Kaur, Mon Cho Lei Lei, Song Yu Jung
Merit Award S\$500	St. Margaret's Primary School	'Save the Sharks'	Tee Jin Hui, Rebekah Valerie Yeo, Yue Wan Ling, Marissa Chang Hui Min
Merit Award S\$500	Queenstown Primary School	Distributed water tank system	Lim Jeck
Encouragement Award S\$200	Northland Primary School	Use of eco-friendly pesticides	Gabrielle Maegan Bong, Chen Hui Yi, Yeo Yue, Goh Mei Hui, Rachel Lim
Encouragement Award S\$200	Qihua Primary School	The accessories hanger	Ivy Yeo Sing Ming, Low Zhen Jie, Germaine Yeo Jie Min
Encouragement Award S\$200	Ghim Moh Primary School	Spaghetti - Licious Utensils	Sebastian Jon Lafour, Mana Wong Zhen Nai, Cherry Wee Li Chern, Lim Xiu Cheng

(B) SECONDARY

Prizes	School	Title of Project	Participants
1 st Prize S\$6,000	Hwa Chong Institution	Learning Chemistry the Green Way	Luo Kenn Siang, Ong Han Ee, Chan Pak Chuen, Janus Low Zhi Yu
2 nd Prize S\$4,000	Raffles Institution	Envirob	Gabriel Teo Kok Leong, Bryan Nah Chung Wei, Ang An Shing
3 rd Prize S\$2,000	Tanjong Katong Girls' School	Merger of Asian cooking and sugarcane waste to produce a biodegradable culinary	Siti Rasyiqah, Angelina Ling Zhi Ting, Melissa Ling Zhi Yuan, Teo Shi Hui, Amelia Yeo Hui Hsien, Zhang Xintian, Di Tongyan, Wang Ruiqin
Merit Award S\$1,000	Raffles Institution	Green Crotchets - Songs for the Environment	Jonathan Shin Zi Yang, Chu Ben Wee, Li Jinghui, Yong Zhi Yi
Merit Award S\$1,000	Bukit Panjang Government High	Recycling vegetable waste and grass by extracting nutrients from it	Pae Jun Zhi, Ng Yi Neng
Merit Award S\$1,000	Hwa Chong Institution	Bio-Ethanol: Green energy from recycling cellulosic waste	Chen Wei Jie Jeremy, Sherwin Chan Pengzhou, Timothy Tay Yi Sheng
Merit Award S\$1,000	Nanyang Girls' High School	Developing a water purification system for developing countries	Jamie Pang Ru Xue, Sun Meng Yuan, Jennifer Wu Shuang
Commendation Award S\$500	Raffles Institution	Landscaping @ RI	Jarrell Goh Ye Lone, Tan Jian Hong, Nandakumaran s/o Muthiah, Arif Borhan Said, Geeva s/o Gopalkrishnan
Commendation Award S\$500	Raffles Institution	An environmental awareness project: wEARTH	Koo Zheng Xuan, Gabriel Tan Junxian, James Tay Hock Liang, Gabriel Ng Yong Woon
Commendation Award S\$500	Bukit Panjang Government High	Recycling of tiles and glass to make concrete	Pae Jun Zhi, Ng Yi Neng, Low Wei Lun

Commendation Award S\$500	Hwa Chong Institution	Removal of toxic metals using chemically treated orange peel	Ye Xiaoyang, Nicholas Capel, Tan Yi Hang, Edmund Poh Zhi Sheng
Commendation Award S\$500	Raffles Girls' School	Proposed Model to Increase Success Rates of Reforestation Efforts through Improving Germination Rates of Avicennia Alba seeds	Rachel Phoa Huiling, Andrea Tan Yehua, Chermaine Chee
Commendation Award S\$500	Methodist Girls' School	Converting water hyacinth into paper	Hannah Tan Wenxiu, Ritika Ravichandra, Sarah Fu Jianya, R. Krishnapriya
Commendation Award S\$500	Raffles Girls' School	Raising Awareness of the Harmful Emissions Produced by Vehicles & Increasing Singaporeans' knowledge of Green Driving	Audrey Ho Jia Xin, Chen Zhiying, Lan Huihui

(C) JUNIOR COLLEGE / INSTITUTE OF TECHNICAL EDUCATION

Prizes	School	Title of Project	Participants
2 nd Prize S\$5,000	Victoria Junior College	Regulation of Lighting in Housing Estates	Donovan Chan Shi Jie, Zhang Chen, Li Yu Fei, Yam Junjie, Chen Yiliang
3 rd Prize S\$3,000	ITE College West (Balestier Campus)	Water Management System	Muhammad Nizamuddeen Bin Amar, Lee Wan Fatt, Zuraimi Bin Rahmat, Muhammad Rafiq Bin Mohd Akip
Merit Award S\$1,000	Victoria Junior College	Green Bin	Jonathan Tan Wei Teng, Dong Fang Xiao, Tam Fong Sun
Merit Award S\$1,000	ITE College West (Dover Campus)	Energy Reducer	Xu Li Li, Najima Bte Raheem
Merit Award S\$1,000	Anglo-Chinese Junior College	EcoFlats: The Planning and Design of Revolutionary Public Housing	Derek Low Ming Yuan, James Hii Ding Yong
Merit Award S\$1,000	ITE College Central (MacPherson)	Saving water, cutting bills	Zheng Wen Tao, Amos Goh Chee Sheng, Denise Tan Si Pei, Muhamad Safri B Ab Latif
Merit Award S\$1,000	ITE College West (Bukit Batok Campus)	Captain Green-bot	Low Jia Yong, Heng Wei Loon, Tan Han Pin, Chan Jian Xing, Garrett Choy Wai Ho
Commendation Award S\$500	ITE College West (Dover Campus)	Energy Monitoring Device	Lee Tian Xi, Mohamad Zuraimi Bin Rahmat, Ramachandar s/o Katnasamy, Ang Zhen Xing
Commendation Award S\$500	ITE College West (Dover Campus)	Economy WC Feed Water System	Cheong Jie Min, Manisah Bte Misnam, Chia Guo Wei, Mohammed Faizul B Md Ali
Commendation Award S\$500	ITE College West (Bukit Batok Campus)	Generating Useful Products from Waste	Rupert Sim Jun Yu, Muhd Surur bin Kamaruzaman, Fadhli b Asri
Commendation Award S\$500	ITE College West (Dover Campus)	Auto water saver	Alina Wu Yuanxin, Li Pei En

(D) TERTIARY LEVEL

Prizes	School	Title of Project	Participants
2 nd Prize S\$6,000	Singapore Polytechnic	Mosquito Dunk Dispenser	Lee Ke Wei, Gerald Teong Wei Lun, Tham Mei Wen
3 rd Prize S\$4,000	Singapore Polytechnic	Power Scavenger	Pang Toh Wee, Khairul Anwar Bin Ahmad Basha, Augustine Ashley Santhanam
Special Merit Award S\$2,000	National University of Singapore	Biofuel from Waste Grease for Use in On-campus Vehicle Transport at the National University of Singapore	Montefrio Marvin Joseph Fonacier
Merit Award S\$1,000	Singapore Polytechnic	Coolbicle - The 2-in-1 Urinal System	Yeo Jun Ning, Joanna Lim Zhengao, Justin Chan Kit Yong
Commendation Award S\$500	Nanyang Technological University	Free and Reliable Wind Energy Source from Building's Exhaust Air	Eugene Tay Tse Chuan
Commendation Award \$500	Ngee Ann Polytechnic	Haze Guard	Lam Ming Hui, Yon Ek Meng
Commendation Award S\$500	Temasek Polytechnic	Socially - Optimised Bus	Adrian Liew Wee Sen, Yuan Yuan, Feng Qian Qian
Commendation Award S\$500	Temasek Polytechnic	Generating and Optimizing Electricity from Industrial and Household Wastes	Jonathan Ang Shiong Hui, Grace Soh Ziwei, Kavan Kuah Kai Wen
Commendation Award S\$500	Singapore Polytechnic	Programmable Logic Control for Motorised Sun-shading Screens in Beach Resorts	Tan Huifen, Tan Ying Jie, Lim Ai Chia
Commendation Award S\$500	National University of Singapore	The EzCarrier	Tan Yong Chuan

APPENDIX 2

Summary of the winning projects:

(A) PRIMARY LEVEL

Prizes	School	Title of Project	Participants
1 st Prize S\$4,000	St. Hilda's Primary School	Newspaper curious furniture	Yorick Kwek Yu Li, Noreen Ng Xin Ying, Ashwin Vivek Vinod
Project Summary	<p>Pupils in our school are encouraged to throw waste papers into the school's recycling bins. However, when it comes to newspapers, they had such abundance at home that they wondered if something could be done to recycle them. The pupils had seen and used pencils made from recycled newspapers last year. If newspapers can replace the wood in pencils, can the reversed be done?? i.e. replacing the wood in furniture with newspapers? That sets our pupils thinking on how to use newspapers creatively in replacing the wood in furniture.</p> <p>The pupils brainstormed with their teachers on ways to make the newspapers furniture. First they needed to make rods of newspapers stiff like a piece of wood. After many test and trials, they hit upon the concept that the inside of the rolled up newspapers must have a thin stiff rod just like steel-frame in buildings. They scout around for a suitable thin stiff rod, cheap and easily available. Found the stiff thin plastic rod that holds up a blown balloon to be the answer. With the thin stiff plastic rod inside, pupils then rolled up sheets of newspapers tightly, with as little air spaces in between the rolled paper as possible, or else it will not be strong. After they succeeded in getting a stiff newspaper rod, the next thing was to tie them up and join them into a manageable way to withstand a heavy man's weight. Pupils learnt that an ordinary piece of newspapers when rolled up tightly can be unbelievably stiff and strong. Air spaces in-between the rolled newspapers can cause it become weak and bend easily. Pupils were truly amazed at how these rolled newspapers furniture can withstand very strong weight eg. When a teacher sat on the newspaper furniture, and its stayed intact.</p>		

2 nd Prize S\$2,000	Fuhua Primary School	Solar House	Thiam Jia Hui, Jerrold Chua Chun Hui, Tan Hui Peng
Project Summary	<p>Our focus of this project is to think as developers to build a solar HDB flat that uses solar energy to operate for some of the electrical equipments. Currently, our electrical appliances at home basically use electricity provided by the power station. The power station in turn generates electricity by obtaining energy provided by the petroleum.</p> <p>Our project is the beginning of investigating how our electrical appliances can use solar energy as a replacement of fossil fuel. We need to act fast as the fossil fuel supply will probably be finished by the 2050. We found that our project provide an avenue for Singapore to invest money and time into Solar technologies that can provide reliable and permanent energy resource to the country.</p> <p>In our project, we decided to focus on one of the renewable energy resources, solar energy. Our group came up with the idea of using solar energy for the HDB flats to provide electricity to the household appliances. In 2006, our solar project was able to show the public that we can use solar energy for lightings and fans. We managed to prove it by designing small models and it was a success. This year, we decided to be more innovative by investing our time on bigger machines. For example, the washing machines and lifts. We decided to work on these two machines because they are the ones that require a huge portion of energy resource in a typical HDB flat.</p> <p><u>How the lift works</u> The actual lift we used in the HDB flat requires pulley, metal chains and motors to work. We designed a model lift using only styrofoam to show how solar energy can provide energy to the lift. (you can find out how the lift works by placing the Solar house under the Sun)</p>		

3rd Prize S\$1,000	Qihua Primary School	The Earth and the Greenhouse - The Link	Shara Png Si Wei, Nurfazirah Bte Johari, Low Zhen Jie, Ivy Yeo Sing Ming, Lim Teng Yee, Dillon Ang Shou Yang, Ong Cher Li, Gwendeline Lee Xin Ni, Germaine Yeo Jie Min
Project Summary	<p>We did an exhibition in our school to raise awareness of the Greenhouse effect. The exhibition focused on the activities that led to Global warming as well as what we can do to help reduce the effects of Global Warming. We built a greenhouse from recycled bottles for the frame as it is free and after the exhibition, we can recycle the bottles. To allow our fellow schoolmates to experience the Greenhouse effect on the day of the exhibition, we put two green houses together one had some plants in it and the other was empty then we put a thermometer in each of the green houses and another out in the open. We explained that it would be hotter in the green house than out in the open because the plastic traps heat. We link the analogy to the greenhouse gases and the set-up with plants was cooler as the plants produces water vapour which helps to cool the surrounding. From the results, we could conclude that we had achieved our objective to get people to know about Global Warming and the actions we could take against it.</p>		
Merit Award \$500	Paya Lebar Methodist Girls' School	Growing GREEN seedlings	Diana Goh Wei Ling, Samantha Tan Jie Ying, Hilary Low Wei Qi, Melissa Mak Li Ping
Project Summary	<p>As the younger generation has been reported to have the least green consciousness and awareness, it is important to sow seeds in each of the young minds what they can do for environment.</p> <p>Our school dedicates the 2nd week of April as our Green Week. All students will be asked to write in their journals what they have done or will do to conserve the environment based on different themes mirroring the MOE's Science syllabi. For example, Primary 5 pupils will focus saving electricity. Selected journals will then be published in our School's Messaging System and our school's webpage.</p> <p>We seek to create environment awareness and reflect upon our behaviour and actions to protect our environment.</p>		
Merit Award S\$500	CHIJ - Our Lady of Good Counsel	The Great Beach Clean-Up	Charmaine Maria Jacob, Felicia Christabella Lim, Thet Thiri Ko
Project Summary	<p>Our project is a video clip that teaches our classmates the importance of keeping the beach clean. We wanted a video clip which is light-hearted and informative. We chose to film this at East Coast Beach because one of our classmates went on a family outing to the East Coast Beach and told us about it the numerous pieces of rubbish on the beach. We hope that the video comes in handy to spread the message of keeping the beach clean and everybody can do their part to help Mother Nature.</p>		

Merit Award S\$500	Hong Kah Primary School	We Care, We Save & We Waste No More	Chun Jeen, Jagdeep Kaur, Mon Cho Lei Lei, Song Yu Jung
Project Summary	<p>We have proposed and created our personalized recycle bin for papers within each level and class before the collection are sent down to the big recycle bin. Games and activities books and certificate are created to educate the pupils in schools on the importance of recycling through and exciting and fun atmosphere.</p> <p>Our projects aims to educate the whole school on the need to stop the wastage of papers. However, being students ourselves, we were aware that talking or advising them to recycle and reuse would never be impactful. Thus, we tried to brainstorm ideas and came up the invention of the innovative idea of a game board that emphasizes on the theme of recycling.</p> <p>We also created an activity book which pupils could complete and achieve certificate which will be endorsed by teacher. In our school, we have the most model pupil's award for each month. Based on this idea, we created our very own congratulation certificate to be awarded to a child observed recycling to the maximum. We also created a recycling ambassador badge for those who joined us in the campaign.</p>		
Merit Award S\$500	St. Margaret's Primary School	'Save the Sharks'	Tee Jin Hui, Rebekah Valerie Yeo, Yue Wan Ling, Marissa Chang Hui Min
Project Summary	<p>We got the creative idea of getting our school mates to pen down their opinions on 'Why Sharks shouldn't be killed' when a picture of a messy office sticky board came to our minds.</p> <p>In that way, we worked on our project based on the information that we collected and we came up with a poster and a toothpick holder to remind restaurant diners that sharks are extremely valuable to our ecosystem and their population is diminishing fast.</p> <p>Our product is a toothpick holder which is made of a shark's mouth and a container of toothpicks sitting snugly in the mouth. Above the toothpick holder is a little prominent sign which states 'Save The Sharks'. It is a public reminder that sharks are in grave danger and we are required to stop fishing them in great quantities. Shark's fins are in demand due to the fact that it is a delicacy in Asian cultures, with most Chinese restaurants having it on their menu.</p> <p>So the aim of our project is to remind the public that each time they take out a toothpick, a shark can be saved by not ordering shark's fin soup and if we join our efforts, we will eventually rescue the sharks out from the pit of possible endangerment.</p>		

Merit Award S\$500	Queenstown Primary School	Distributed water tank system	Lim Jeck
Project Summary	<p>Singapore has many high rise buildings and it was observed that every building was installed with a water tank on its roof. That means water has to be pumped to the roof and to be distributed down to the individual households via pipes. Within the households, thimbles are used to slow down water flow because at the lower floors, the water pressure will be too great and that can cause much water to be wasted.</p> <p>Instead of pumping water to a single roof top water tank, we propose pumping water to a series of water tanks at every floor. The provision of water for a particular floor can come from a tank about 2 or 3 floors higher. That way, the water pressure will be just adequate and no unnecessary energy is wasted in pumping the water any higher.</p> <p><u>Advantages of Distributed Water Tank System</u></p> <ul style="list-style-type: none"> • Reduced Energy • Stronger Building Structure Unnecessary • Higher Capacity Pump Unnecessary • Warming Up The Water • Cooling The Room <p>The proposed system has all the advantages. The only added cost may be the construction of extra piping and many more extra tanks. Such cost can easily be offset by savings in building structure and energy. It also results in a cooler room. The uniqueness of this invention is to have an array of water tanks distributed on many floors rather than on the roof top.</p>		
Encouragement Award S\$200	Northland Primary School	Use of eco-friendly pesticides	Gabrielle Maegan Bong, Chen Hui Yi, Yeo Yue, Goh Mei Hui, Rachel Lim
Project Summary	<p>Many insecticides are harmful to the environment and have the potential to alter ecosystems and some could be toxic to humans. Moreover, harmful insecticides and pesticides destroy wildlife either directly by killing them or indirectly by introducing harmful chemical agents that affect the ecological chain.</p> <p>To minimize on the use of harmful insecticides, the team members have decided to make natural insecticidal sprays using plants and herbs such as mint, basil, garlic, orange peel, lime, pepper and basil mixed with pure soap. This would help to keep away pests and at the same time cut down on the use of harmful pesticides and insecticides.</p> <p>Results shows that it is effective in keeping away aphids and other pests. These insecticides are easy to prepare and are a better choice than to use harmful pesticides that could be harmful to the environment, humans and wildlife.</p>		

Encouragement Award S\$200	Qihua Primary School	The accessories hanger	Ivy Yeo Sing Ming, Low Zhen Jie, Germaine Yeo Jie Min
Project Summary	<p>We have to do our part in saving the environment. More people are catching on with the idea of reducing, reusing and recycling because of the increasing weather havoc and global warming. We want to take a more pro-active way of saving the environment in our school by inculcating good habits in pupils, especially in Art lessons.</p> <p>During Art lessons, most of the pupils will buy materials which are needed for their art and craft. We want the pupils to get used to the idea of reducing, reusing and recycling as a first line of obtaining their art and craft materials. Hence, we decided to make The Multi-purpose Hanger to show that by using only recycled materials, the craft that is produced is presentable and useful.</p> <p>We started collecting old stuff like old hangers, old scarves and tablecloths to be used as the main material for our Multi-purpose Hanger. We wanted more variety and colour in our collection so we decided to be bold and approached our neighbourhood tailor shops and asked for their scrap or leftover materials. We learnt how to sew simple stitches to put our project together. The sewing has to be done carefully as the hanger will be put to daily use and need to be hardy.</p> <p>We are happy with our final product especially with the fact that it is practical and attractive. We hope that we are able to convince both pupils and teachers that by changing our mindset, we are able to produce something totally out of recycled materials.</p>		
Encouragement Award S\$200	Ghim Moh Primary School	Spaghetti - Licious Utensils	Sebastian Jon Lafour, Mana Wong Zhen Nai, Cherry Wee Li Chern, Lim Xiu Cheng
Project Summary	<p>In this project, utensils are made using food – spaghetti. Unlike traditional utensils that are often made of plastics or wood, these spaghetti-made utensils are environmental friendly since they are biodegradable and fewer natural resources like wood are needed. Besides, the ability to consume these utensils after the meal adds nutrition to the diet and reduces waste. Since the utensils are edible, washing up is not necessary. Thus, the use of water is greatly minimized. This product can also be applied to a large population since utensils are widely used in eateries and gathering events like picnics and parties.</p> <p>The “spaghetti-licious” utensils were tested when we used them to eat like popiah, salad, and been hoon. At the end of the ‘makan’ session, the utensils were still in good conditions. The utensils were also delicious when we consumed them. We recommend anyone who tries the utensils to hold them by the knots to provide more strength. Also, it can be toasted for 1 minute just before use (kill germs and to make the utensils harder). Overall, we felt that the “spaghetti-licious” utensil can be a good replacement for the current plastic utensils available in the market.</p>		

(B) SECONDARY LEVEL

1 st Prize S\$6,000	Hwa Chong Institution	Learning Chemistry the Green Way	Luo Kenn Siang, Ong Han Ee, Chan Pak Chuen, Janus Low Zhi Yu
Project Summary	<p>Over the years, there have been rapid advances in green technology that promises to reduce damage to the environment, however, with the great milestones in Science and Technology, people are beginning to overlook the most simple forms of environmental conservation, the three R's : Reduce, Reuse, and Recycle . Furthermore most of the revolutionary technologies developed are normally not relevant to the lives of students. Our group henceforth hopes to apply these principles in our chemistry laboratory, to provide a more environmentally friendly set of experiments for students to conduct, as well as allow students to be exposed directly to methods of conservation. By integrating the concepts of microscale chemistry and recycling into our current chemistry practicals, we came out with a green approach which reduces breakage, cost and usage of chemicals drastically. Our group has also devised a new set of chemistry practicals which can be carried out using our green approach. Over the years, this will not only save chemicals and resources but also nurture students who are conscious about the environment.</p> <p><u>Materials and Methods</u> Among the apparatus, the centrifuge tube and the Petri dish were recycled from biology research laboratories. The W-tube is a new apparatus we devised to test for gases. The miniature test tubes were purchased. The current secondary 3 practical worksheets were obtained from chemistry teacher. We modified and also devised some new worksheets so that our approach could be implemented successful, without compromising the chemical content to be covered.</p> <p><u>Methodology</u></p> <ol style="list-style-type: none">1) Recycled apparatus2) Construction of W-tube3) Trying out our approach<ul style="list-style-type: none">• Tests for cations, anions and unknowns• Experiments that require heating<ul style="list-style-type: none">- Heating of liquids/solutions- Heating of solids• Test for gases<ul style="list-style-type: none">- Hydrogen, oxygen and ammonia- Chlorine <p>Test for carbon dioxide and sulphur dioxide</p> <p>In this project, we successfully came out with a GREEN approach integrating recycling and microscale chemistry into secondary 3 chemistry practicals in our school. The use of recycled items such as centrifuge tubes and Petri dishes reduce breakage of test tubes, reduce cost and conserve resources. Microscale chemistry which we use to test for gases reduces the amount of chemicals used significantly and provides a safe environment for students to carry out practicals. Results show that our approach is environmentally friendly without compromising scientific rigour as results obtained were comparable to those obtained using current practice.</p> <p>We will be implementing this green approach to sec 3 chemistry practicals next year. If it proves to be feasible, we will make further modifications and extend it to secondary 4 chemistry practicals and lower secondary science practicals.</p>		

2 nd Prize S\$4,000	Raffles Institution	Envirob	Gabriel Teo Kok Leong, Bryan Nah Chung Wei, Ang An Shing
Project Summary	<p>As leaders of the future, youths are of utmost importance to any nation. Thus it is crucial that they be educated on the drastic effects of environmental degradation stemmed from our daily actions. Indeed it is no mean feat to interest an average youth on such global and pressing issues, and even harder for her to take action to rectify such a problem. Thus the aim of our project is to educate youths on the various causes of this issues, leading on to the drastic consequences that we can already see today.</p> <p>We feel that we are in the best position to create a card game as we feel that we know what the teenagers want as we can relate very well to them. Environmental awareness can be transmitted in a fun and jovial manner, and not merely just by teaching. We hope to make use of a card games as a medium for education, as we belief that card games are very appealing and attractive to teenagers.</p> <p>We are creating a trading card game, primarily centered on geographical concepts. There are three different types elements of the game, earth air and water. It is aimed at promoting understanding of our environment and the precautionary measures we can adopt. Players build or adopt defences against natural hazards, whilst at the same time try to attract the opponent with natural hazards. Each player has an environment, and one loses when his environment is crushed. However, throughout the game there are lots of surprising coming on the way, deemed as the fun elements of the game.</p>		

3 rd Prize S\$2,000	Tanjong Katong Girls' School	Merger of Asian cooking and sugarcane waste to produce a biodegradable culinary	Siti Rasyiqah, Angelina Ling Zhi Ting, Melissa Ling Zhi Yuan, Teo Shi Hui, Amelia Yeo Hui Hsien, Zhang Xintian, Di Tongyan, Wang Ruiqin
Project Summary	<p>Due to urbanisation, voluminous amount of non-biodegradable plastic utensils are being used and thrown away, ending up at landfills. All these will eventually cause pollutions, soil and water contamination to occur. In addition, there will be adverse effects on human health and global warming too. Instead of burning off bagasse (sugarcane fibres), we realized that we can actually make use of it as a basic ingredient in the synthesis of biodegradable culinary products. Plain flour mixed with oil and water was used as the basic materials for creating of dough. Different thickness and layering were created using the dough. The items are then dried under three conditions, namely sun dry, oven at 50°C and microwave heating. The dried products are examined for crack or line of weakness. A 500g weight test was carried out for the plate created. All plates made from dough alone were able to withstand the 500g weight test while 80% of those made with sugar fibre did not crack under the weight placed on top. It was observed that natural drying is the best although slow drying using the oven set at 50°C can also achieved the same result. Usage of microwave although is fast, result in creation of 'boils' due to the rapid cooking of the dough or rising of gas in the process. It was also observed that creation of multi-layers of thin sheet of dough is better than one layer of similar overall thick dough. When water proof by application of lacquer, it was observed that the bowl created as able to retain its shape after placing cooked instant noodles in it overnight. Based on the finding, we have produced a set of culinary incorporating fork, spoon, plates, bowl and chopsticks using traditional cooking method, in this instance, usage of dough that is prepared akin to the preparation of Roti prata (or Indian pancake). When the dough is reinforced with sugarcane, it's strength and durability increases from a general observation perspective. Thus, we concluded that we have found an alternative way to replace plastic plates. That is plain flour reinforced with sugar cane fibres. As this is biodegradable, we are confident that this will help to prevent more plastic plates to be produced and therefore conserve the environment we are hoping to save.</p>		

Merit Award S\$1,000	Raffles Institution	Green Crotchets - Songs for the Environment	Jonathan Shin Zi Yang, Chu Ben Wee, Li Jinghui, Yong Zhi Yi
Project Summary	<p>This project is about raising awareness of our environmental problems through music, more specifically a CD album that consists of songs that have an environmental theme. Each song is centered on a specific environmental problem, namely – deforestation, global warming, water pollution, and also about the consequences of our irresponsible actions and music is a universal language and has a big outreach, we used it as a medium to bring our thoughts and hopes for our environment to the people. (Remember Live Earth?).</p> <p>This album contains 5 songs, each focusing on different problems of our environment. They are fully self-composed songs with self-written lyrics and compiled into a self-made album. From writing the lyrics to composing the music to recording the CD, we have enhanced our knowledge and understanding of our environment and dying planet.</p> <p>Track 1 – The World is Dying. This is a piece which highlights the severity of Global warming and its impact on the environment. It shows how humans are destroying the environment around us (for example cutting trees) and also highlighted some solutions to reduce the amount of greenhouse gases emitted such as taking public transport.</p> <p>Track 2 – Save the Trees. It emphasizes the importance of us taking initiative and actually saving the trees and keeping our ecology.</p> <p>Track 3 – The Great Web of Lift. It is the issue of The Species Extinction / Loss of Biodiversity, General, this song emphasises that life is all interconnected, and the delicate balance that connects the great web of life is hanging precariously now. Hence, we must not upset the delicate balance by our destructive actions, as firstly, it would bring about great devastation to the ecology of the earth, and then, we would suffer as we too, are connected to this food chain.</p> <p>Track 4 – Pollution! The song focusing more on the sea. Water pollution is a drastic problem that we are facing at the moment and this pollution such as oil leakage has affected the marine creatures and has also turned the waters from blue in colour, to brown and maybe black.</p> <p>Track 5 – In A Hundred Years. This last song brings the environmental problems that we are creating closer to listeners’ hearts, by emphasising that we are killing our own descendants. Rhetorical questions are used to great effect in both verses and chorus, hopefully leaving listeners’ with a final lasting impression and inspiring them to act quickly.</p> <p>We hope that those who have listened to the album will be able to understand how important the environment is to us, and how we can solve these problems. Throughout the course of the project, even we have learnt a lot about our Earth.</p>		

Merit Award S\$1,000	Bukit Panjang Government High	Recycling vegetable waste and grass by extracting nutrients from it	Pae Jun Zhi, Ng Yi Neng
Project Summary	<p>Everyday tons of unwanted vegetables parts like the roots and tough stems are thrown away by people from all walks of life. Vegetables roots and stems are packed with natural minerals and nutrients which are valuable resources. We intend to extract nutrients from these vegetables waste and use them to make fertilizers and nutrient solution in hydroponics to grow vegetables. We can convert the vegetable waste into organic fertilizers that can be used to grow vegetables at home and in school without the application of chemical fertilizers. Most importantly, reducing the discharge of vegetable waste and thus reduces the use of landfills. This is because vegetable wastes are usually discarded in large plastic bags preventing it from being biodegraded.</p> <p>Extracting the vegetable juice and planting vegetable is not expensive, these are the items needed:</p> <ol style="list-style-type: none"> 1. Blender \$40 or below 2. Seeds \$10 3. Container for germinating seeds used styrofoam or plastic containers from hawkers 4. Cloth for filter use old tee shirts 5. Containers for store juices used box such as ice creams etc... <p>We have also designed a simple flyer to educate people of reusing unwanted vegetable. We hope to make it a Community Involvement Project for our school and our neighbourhood to educate them on reusing vegetable waste and thus reducing vegetable waste.</p>		
Commendation Award S\$500	Hwa Chong Institution	Removal of toxic metals using chemically treated orange peel	Ye Xiaoyang, Nicholas Capel, Tan Yi Hang, Edmund Poh Zhi Sheng
Project Summary	<p>Trace amounts of some heavy metals is essential to living organisms. However, excessive levels or accumulation over time of heavy metals in the bodies of mammals is detrimental to their health. Hence through this study, orange peels were chemically modified to yield different bioadsorbents and their biosorption of three metal ions investigated. The effect of pH on biosorption and the efficiency of a prototype made from the bioadsorbents in removing heavy metals were also investigated. Biosorption was found to be pH dependent. With pH adjusted to 6, most of the chemically modified orange peels showed better ability to remove the three metal ions than the untreated orange peels. The prototype made was also effective in removing all the three metal ions. The bioadsorbents made from orange peels showed great promise in removing heavy metal ions from waste water.</p>		

(C) JUNIOR COLLEGE / INSTITUTE OF TECHNICAL EDUCATION

2nd Prize S\$5,000	Victoria Junior College	Regulation of Lighting in Housing Estates	Donovan Chan Shi Jie, Zhang Chen, Li Yu Fei, Yam Junjie, Chen Yiliang
Project Summary	<p>The aim of our project is to conserve electrical energy consumption in Singapore, with the focus on reducing the amount of electricity consumed by the ceiling lights of HDB apartment blocks island wide. We have observed that in HDB flats, the lighting located in the stairwells and along the corridors are being left lit throughout the night. This consumes large amounts of energy, which in turn requires more fossil fuels to undergo complete combustion industrially. We have also identified this as a main concern for the high levels of energy consumption in Singapore. Therefore, we have thought up a system which not only reduces the amount of energy being used, and it also does not compromise on the residents' safety and convenience. We then decided to use motion sensors that are strategically placed in common areas (e.g. corridors) to only light up that level's lightings only when there is activity within that vicinity while at the other floors; the lights are not in function. We have also calculated that by implementing this system in HDB blocks, we would conserve a lot of energy in the long run and hence this system is also economically viable for Singapore. Our system works on the basis of the use of ultrasonic sensors to control lighting within a HDB block. Its primary aim is to conserve electricity and in the process, save money. Conventionally, HDB corridor lights will always be switched on from 6.45pm till the next morning at roughly around 7.00am. In this case, energy is wasted as even though there is no use for such lighting, it is being switched on throughout the night. In our system, instead of the usual switching on of lights at the corridors from 6.45pm till the next morning, the corridor lighting would always be switched off. By using sensors to sense the presence of activity within the range of the sensors, the lighting for that particular corridor would be switched on. This would then allow the HDB block to save money and still not compromise on the resident's inconvenience to be 'walking in the dark'.</p>		

3 rd Prize S\$3,000	ITE College West (Balestier Campus)	Water Management System	Muhammad Nizamuddeen Bin Amar, Lee Wan Fatt, Zuraimi Bin Rahmat, Muhhamad Rafiq Bin Mohd Akip
Project Summary	<p>Water nowadays is becoming lesser and more precious as people use a large amount of water in our daily life. Water is also used in many activities such as in car wash, laundry, food industry, manufacturing and more. We have an innovation of saving water rather than wasting water. Our design can make a difference so that relatively “clean” waste water can be recycled for other uses. In future, this design can help to reduce high water bills, keep the environment clean and reduce misunderstanding between countries where we are dependent upon to supply water. Water is our future. We need to save as much as we can so as to conserve the little resource that we have. The benefits of using this water management system is to reduce the amount of water used in a household as the system will separate very dirty used water from relatively clean water, the little saving of this precious water can be put to other use as in the watering the plants, washing cars and other uses. It will help to reduce the water bill of a household.</p>		
Merit Award S\$1,000	Victoria Junior College	Green Bin	Jonathan Tan Wei Teng, Dong Fang Xiao, Tam Fong Sun
Project Summary	<p>Public garbage bins can be dirty and produce an unpleasant smell, especially when they have not been emptied for several days and there are perishables, such as food waste in them. Liquid waste that is thrown into the bins, such as unfinished drink cartons and unwanted raw food, can also produce leachate within the bin and stain the bottom of bins especially when they have dried up. In addition, garbage bins can pose hygiene and health problem when flies, rats, maggots, stray cats and other pests are attracted to them. In fact, this is an environmental problem that still persisted in various neighbourhoods and areas. This project aims to improve on the current structure of garbage bins so that waste disposal is more hygienic and environmentally friendly. The proposed bin will reduce the smell produced using a lining of chemical substances and layers of recyclable materials at the bottom of the bin will also separate liquid from solid waste when plastic bags tear due to the heavy weight of fluids. These layers are disposable and can be recycled.</p>		

Merit Award S\$1,000	ITE College West (Dover Campus)	Energy Reducer	Xu Li Li, Najima Bte Raheem
Project Summary	<p>Our idea is to design and develop a low cost motorised mechanism for the mounting of solar panel so that it can track the sun as it moves. Eventually, the panel would achieve maximum solar energy conversion throughout the day, hence to achieve the objective of reduction other energy used. Our objectives are to provide a low cost power source to campers, hence reduce energy usage from other sources, to design a simple tracking mechanism and easy to set up, machine is intelligent and able to do auto tracking and resetting and can be adapted for permanent installation. We have developed a simple a single axis mechanism to track the sun. At the same time, in order to reduce initial cost of set up, we designed a simple sun tracking sensor. To instill intelligence into the machine, a micro-controller will be programmed to provide continuous tracking of sun movement and reset the panel back to the East in the night. Sensors together with micro-controller will provide light sensing and movement of photo voltaic panel. Based on the principles that light travels in straight line, the micro-controller will continuously orientate the panel towards the strongest sun light direction.</p>		
Merit Award S\$1,000	Anglo-Chinese Junior College	EcoFlats: The Planning and Design of Revolutionary Public Housing	Derek Low Ming Yuan, James Hii Ding Yong
Project Summary	<p>Our proposed plan is to study and identify the wastage of energy and resources in the common household. Thereafter, we plan to solve these problems by designing an "EcoFlat". Preliminary ideas include the adoption of innovative features such as utilising polarised windows to block out the heat. In this way, the EcoFlat will be environmentally friendly in all aspects, conserving the environment in multiple ways. Other physical factors are also considered, such as windows built facing the North and South to avoid direct sunlight. The EcoFlats, if adapted by the HDB, could prove vital for a sustainable future. This unique design for future HDB housing projects would allow an all-rounded environmental conservation effort through innovating features and specifications in their architecture.</p>		

Merit Award S\$1,000	ITE College Central (MacPherson)	Saving water, cutting bills	Zheng Wen Tao, Amos Goh Chee Sheng, Denise Tan Si Pei, Muhamad Safri B Ab Latif
Project Summary	<p>In water scarce Singapore, conservation of water is very important and awareness is the first step in water conservation. A breakdown of indoor water use shows that 50% of water is used for toilet flushing and laundry. With this study results in mind the team decided to do a project to “Re-use water from washing machine discharge for toilet flushing and recycle to washing machine for first round washing.” The project is estimated to cost \$4,000 to develop. It includes both the necessary hardware and developmental software costs. This project, if implemented, will go a long way in helping every Singaporean to save the country’s treasured water. Water is essential to our health and the health of our economy. The team believed that their innovative “Recycle Water Project” will be the pioneer system that can effectively save water for the nation and save money for every household that implement this system. The prospect of commercialisation is excellent.</p>		
Merit Award S\$1,000	ITE College West (Bukit Batok Campus)	Captain Green-bot	Low Jia Yong, Heng Wei Loon, Tan Han Pin, Chan Jian Xing, Garrett Choy Wai Ho
Project Summary	<p>This is a revolutionary idea – beyond its active action of floating litter collection on water surface, it serve as a dynamic icon to promote and develop a culture of active caring for our environment – remove littering & “make it a better place”. Captain Green was a character in National Education Program to promote care for our environment in a fun way since 2000. It went online with poems and songs. It went further with a “Captain Green Column” and “Chat Forum” on ENV’s website for students and the public to share their ideas, contributes suggestions, poems and songs on the environment, as well as involved Fellow Singaporeans in discussions on environment issues. Here, we take a big step – makes Captain Green comes alive as an intelligence Robot – Captain Green-Bot. This can be a national scale project – with a few teams of Captain Green-Bot (solar powered mobile robot with GPS guidance and remove vision) at a few reservoirs. Beyond its basic function of litter collection on water surface, it promotes and develops the culture of Green environment. It will attract and make friend with people around, educate and encourage people (through SMS conversation) to follow its example of “make is a better place”. Hence, it develops a long-term “Total Solution” – to improve and clean our environment for both land and water surface. This project also opens up the endless possibility of applications and support Singapore Green Plan 2012. More fun can be added with animation and web pages with life video on life of Captain Green-Bots and even the video viewed from the Captain Green-Bots. Further extension may be added with underwater sensor for object or even human body searching.</p>		

Commendation Award S\$500	ITE College West (Dover Campus)	Energy Monitoring Device	Lee Tian Xi, Mohamad Zuraimi Bin Rahmat, Ramachandar s/o Katnasamy, Ang Zhen Xing
Project Summary	<p>Most of Singaporeans enjoy showering and spent long hours in it. Not only that, many like to have hot showers despite the hot weather, thus leading to the rise of their utility bills. This “2-in-1” monitoring device provides real time monitoring on the water consumption as well as the energy consumption at home. This device will measure the amount of water and energy consumption simultaneously and converts it into cost of usage respectively. The display panel will display the cost of water usage & energy usage according to the flow rate & energy transfer rate. The display is on per usage, it means it will auto reset after certain time delay. This will keep track of individual user’s usage each time they take shower. It also displays accumulative cost on daily and weekly basis. Most importantly, this device provides an alarm feature when consumers had exceeded certain amount of water or energy usage. These information empowers consumers to make education decision on energy conservation. It also helps to develop a culture of conservation.</p>		
Commendation Award S\$500	ITE College West (Dover Campus)	Economy WC Feed Water System	Cheong Jie Min, Manisah Bte Misnam, Chia Guo Wei, Mohammed Faizul B Md Ali
Project Summary	<p>The objective of the project is to have two forms of water supply into the WC storage tank of a standard sanitary toilet system. This idea came about when we discuss on the drainage of waste water of cloth washing from a washing machine pumped out into the drainage. Out of the discussion, some felt that the waste water can be reused again e.g. it can be kept in a container to wash corridor floors, school shoes, toilet floors and even toilet sanitary. Why not we target on toilet sanitary? This is where we can actually save water from using the dual water system. The project requires two tanks, sanitary storage and a reservoir. The reservoir tank stores the waste water whenever the washing machine discharges water for a complete washing process. Any overflow of the reservoir tank will be managed by a vent; therefore the reservoir size depends on the capacity. For a standard WC storage tank, there should be a floater tap switch to control the flow of water supply from the Public Utilities Board (PUB) and a WC flushing system. So the flushing of the sanitary depends solely on using the water from PUB.</p>		

Commendation Award S\$500	ITE College West (Bukit Batok Campus)	Generating Useful Products from Waste	Rupert Sim Jun Yu, Muhd Surur bin Kamaruzaman, Fadhli b Asri
Project Summary	<p>Waste acetic acid (CH_3COOH) produced during our practical training is usually contaminated with other by-products, and is sent for disposal. The project is to produce carbon dioxide gas from this waste stream by applying acid carbonate chemistry and chemical processing principles using a modified pilot process rig. The gas is then recovered and stored for training use. The process also converts the acidic waste to a more environmental-friendly form that is suitable for environmental studies. Students from our institute have the opportunities to use the carbon dioxide gas and treated process liquid that are generated for their course training. Our project explores the possibility of reprocessing and recycling waste meant for disposal by generating useful products that meet training needs. This will improve the waste management system of the institute, provide an additional source of training materials that benefits students' learning and reduce training cost in the long term.</p>		
Commendation Award S\$500	ITE College West (Dover Campus)	Auto water saver	Alina Wu Yuanxin, Li Pei En
Project Summary	<p>Many a times, whenever we want to fill up say a pail of water, we would tend to wait for it. Thus, as a result, if we are the impatient type, we would tend to multi-task with other things, which if not manage properly, would lead to the precious water being overflow. Thus, the project looks into auto-monitoring the water's level which when an appropriate level is reached, it would auto turn off the tap, thus, saving the water from being overflow. The Auto Water Saver is an integrated controller system that combines logic controller and mechanism technology into a intelligence system consisting of the sense module and the Mechanism module. The Auto Water Saver offers solution auto monitoring the level and thus activating the stepper motor to turn off the tap, which in turn saving precious water from being overflow.</p>		

(D) TERTIARY LEVEL

2nd Prize S\$6,000	Singapore Polytechnic	Mosquito Dunk Dispenser	Lee Ke Wei, Gerald Teong Wei Lun, Tham Mei Wen
Project Summary	<p>Combating dengue fever has been a national priority for years, though the problem has been identified and tackled since years ago, it has never been fully resolved. This year, its destructive influence once again surfaced in Singapore as well as in the rest of the region. Eliminating the breeding grounds of mosquitoes is crucial to the fight against dengue fever. Many products and innovations have since addressed this issue, and many of these have had successes in their own right, but the battle against the Aedes mosquito wages on. In recent months, it seems like the blood sucking vectors are winning. We propose to invent a mosquito dunk holder cum dispenser to cut down on the need of frequent replenishment of this chemical in the risky roof gutters. It works by having a weather proof plastic dispenser housing multiple pieces of BTI dunks in a vertical column, simple yet effective design allowing a solid dunk of BTI to slide down to the bottom of the dispenser by gravity whenever the resident piece of the dunk in the interactive zone with the stagnated water is completely dissolved. Our design allows only the resident BTI dunk inside the dispenser to be in contact with the stagnant water, and the rest would be kept dry, being stored in the holder waiting to be dispensed. Instead of the current practice and its associated inconvenience of having to tie a dunk to the gutter which could get displaced or accidentally flushed out of the gutter through the rain water down pipe. Our new dispenser would prolong the duration for more for more of these dunks to be placed in the roof gutter in a protected holder; the dispenser could hold between 4-12 pieces of BTI dunks (i.e. it could last between 4-12 months before it is depleted). Our product is safe and simple to install and use. The chores of placing in the roof gutter can now be done less frequent or it could be given completely to your regular pests and victor control contractor to fix it during their routine inspection to your building, maintenance and replacements of BTI dunks in the gutters are no longer a frequent inconvenience to the building owners. With our proposed Mosquito Dunk Dispenser, roof gutters will never be comfortable mosquito grounds again.</p>		

3 rd Prize S\$4,000	Singapore Polytechnic	Power Scavenger	Pang Toh Wee, Khairul Anwar Bin Ahmad Basha, Augustine Ashley Santhanam
Project Summary	<p>The objective of this project is to find ways to complement renewable energy – solar and wind energy – through scavenging energy which would otherwise go wasted. We designed and built a device – Power Scavenger that scavenges frictional energy from moving vehicles on roads. This energy is then converted into electrical energy which charges up a battery to supply power to light up driveway where it is very costly or impractical to lay new electrical cables to supply power. The Power Scavenger comprises of a stepper motor and a battery attached to a circuitry and a wheel. With a transmission ratio of 10, when a car moves over the wheel, it moves the stepper motor which converts motion to electrical energy. The generated electrical energy can reach 20 Volts and 0.2 Ampere. In an average traffic flow of 1000 vehicles per lane per hour, it takes about 4 hours to fully charge the 6V battery. The device had been installed and tested on a road. The harvested power is enough to power a 6V super-bright LED lamp for a night use. We believe the low production cost, maintenance free and versatility in applications of the Power Scavenger lends itself to high degree of commercialisation. The application area does not limit to powering lights along expressways (such as those in Malaysia, Thailand and Europe) where it is too costly or impractical to lay power cables. The Power Scavenger can be adapted to act as a micro wind turbine to trap low velocity wind in suburban areas. In addition, it can be used to transform energy due to theft breaking in through doors and windows into energy to power security camera to take snap shot of burglars in case the power supply is cut off.</p>		

Special Merit Award S\$2,000	National University of Singapore	Biofuel from Waste Grease for Use in On-campus Vehicle Transport at the National University of Singapore	Montefrio Marvin Joseph Fonacier
Project Summary	<p>This project will establish a novel model that exploits the use of an urban waste – fats, oil and grease as feedstock for liquid fuel production to be used in road transportation. The model will be pilot tested at the National University of Singapore (NUS) to demonstrate how an institution can adopt waste-to-energy principles and reduce its carbon emissions to atmosphere, improve air quality and save on fuel costs. NUS is estimated to generate 13,500 litres of yellow and brown waste grease from its food centres and grease interceptors per month. This volume can be converted to biodiesel with an estimated monthly yield of 12,150 litres of biodiesel. Biodiesel can be blended with regular mineral diesel without expensive modification of the internal combustion engine, and results in cleaner vehicle emissions. The waste grease recovered has a high free fatty acid (FFA) content as given by the high acid number of 5.2g KOH/L. This value is significantly more than the limit of 2.0g KOH/L prescribed for the conventional alkali-catalysed process for biodiesel production. However, a two-step catalysed process has been developed whereby a pre-treatment step esterification process is used to convert all FFAs to fatty acid methyl esters (FAMES) prior to the conventional transesterification process. The result is a high-grade biodiesel suitable for use in university campus vehicles. The collection of waste grease will be carried out by existing waste contractors, and the raw waste grease will then be transferred, filtered and stored in a waste grease filtering and storage facility on campus. Waste grease will be periodically extracted from the grease interceptors and receptacles of food centres. A two-step catalysed biodiesel reactor, with a capacity of around 15,000 litres of waste grease, will be built to accommodate the quality and volume of waste grease generated in NUS. A fuelling facility is proposed on-campus to store the biodiesel product and mineral diesel for fuel blending. A special fuel delivery system will be installed to facilitate blending of biodiesel with mineral diesel at a 20% (B20) blend. All NUS diesel vehicles and Internal Shuttle Buses will run on the B20 blend of biodiesel without the need for any engine modification. This will result in an environmental-friendly, sustainable campus-transportation system with significant reductions in carbon and tailpipe exhaust emissions, and the positive use of an existing waste stream. Overall, the project has successfully demonstrated that a waste product generated in large volumes on campus can be effectively converted to biodiesel for use in NUS vehicles. This will result in a significant offset in the volume of fossil fuels use, with a substantial reduction in the university's carbon footprint and other associated environmental benefits. Moreover, there is excellent potential to translate the project into a nationwide program, where waste grease from food establishments across the country can be captured and converted to biodiesel for use in public utility vehicles.</p>		

Merit Award S\$1,000	Singapore Polytechnic	Coolbicle - The 2-in-1 Urinal System	Yeo Jun Ning, Joanna Lim Zhengao, Justin Chan Kit Yong
Project Summary	<p>This project focuses on the development of a 2-in-1 urinal flushing system known as COOLBICLE. It is a combination of the usual urinal system with an integrated hand washing facility. The rrelease of water for washing is further triggered by the auto sensor which is found commonly in the toilet these days. COOLBICLE is made of professional water saving urinal designs for clients, which manage, maintain and plan for commercial and industrial type buildings. This series of urinals uses the technology of used water in the process of used water in the process of washing our hands and gravity to flush the urinal. It is also far kinder to the environment, as it uses less water. Furthermore, it is simple to fit and much safer for maintenance as it eliminates the need to handle dangerous chemicals. This innovative design means that it is quick and easy to fit which makes it ideal for whole range of commercial and industrial applications including offices, hotels, hospitals, motorway service stations, pub, airports, shopping centers and other public toilets. In addition to the substantial savings on water of up to approximately 50% can be achieved and a reduced maintenance bills, the COOLBICLE system also offers a uniquely effective and environmentally sound means of dealing with the dual problems of smell and blockages in bowl urinals without the need for environmentally harmful chemicals or constant flushing. The benefits of the system include the following :</p> <ul style="list-style-type: none"> • Eco-friendly, reducing environment impact • Lower water bills • Lower maintenance costs • No urinal smells • Fewer blockages • Better washroom hygiene • Safer to employees and the environment – no harmful chemicals 		

Commendation Award S\$500	Nanyang Technological University	Free and Reliable Wind Energy Source from Building's Exhaust Air	Eugene Tay Tse Chuan
Project Summary	<p>The objective of this project is to show that it is possible to generate wind energy from a building's exhaust air. The project was conducted at two exhaust air outlets located at the School of Civil and Environmental Engineering (Location 1), and the School of Chemical and Biomedical Engineering (Location 2) in NTU. A simple wind turbine was constructed using an old car radiator fan and motor. The wind turbine was placed at the exhaust air outlets to generate electricity. As the wind turbine is self-made and the motor is not suitably sized, the energy generation is neither efficient nor optimised. The energy generated annually is 0.88kWh and 0.06 kWh for Locations 1 and 2 respectively. If commercially built wind turbines are placed at 8 exhaust air outlets similar to Location 1, the potential annual energy generation is 7488 kWh. This amount of energy is sufficient to light up 416 exit signs for a year. The project results showed that there is potential to generate sufficient energy for specific purposes if an efficient and optimised wind turbine is used.</p>		
Commendation Award \$500	Ngee Ann Polytechnic	Haze Guard	Lam Ming Hui, Yon Ek Meng
Project Summary	<p>Haze Guard treats the air that people breathe, making it cleaner and safer, substantially reducing the concentrations of airborne particles (molds, viruses, bacteria, pollens, etc) in one's breathing zone, thereby significantly decreasing the probability that these particles will be inhaled and as a result will reduce the risk of adverse health effects. No matter where you are, having fresh air can mean the difference between enjoying yourself and being uncomfortable. Whether you're travelling on an airplane or standing in line at the bank, you'll almost always find yourself assaulted by dust, smoke, odours or perfume. Then of course, there's always the things you don't know about; germs, mildew, pollen and a host of other allergens. And even though not everyone else understands the need for having quality air, you don't have to be concerned. With Haze Guard along, you'll feel confident that when you leave home, the air you breathe will be safer and enjoyable. Haze Guard is an easy-to-use, maintenance-free and personal air purifier and it can improve the quality of the air you breathe, no matter where you go.</p>		
Commendation Award S\$500	Temasek Polytechnic	Socially - Optimised Bus	Adrian Liew Wee Sen, Yuan Yuan, Feng Qian Qian
Project Summary	<p>In a congested bus, commuters normally want to occupy a whole seat by themselves. Hence they would sit on the outer seat, leaving the inner seat empty. The gadget invented makes the bus seatings to be optimised by enforcing commuters to sit automatically onto the inner seat first. So, with this product, we hope to get the passengers to occupy the inner seat so the passengers would have an easier time finding a space to sit. It will also reduce the congested condition on the bus aisle.</p>		

Commendation Award S\$500	Temasek Polytechnic	Generating and Optimizing Electricity from Industrial and Household Wastes	Jonathan Ang Shiong Hui, Grace Soh Ziwei, Kavan Kuah Kai Wen
Project Summary	Used waste materials from industries (Cu^{2+} waste solution, waste acid, etc) and household (paper bowls, used batteries, etc) to generate electricity. The electricity generated can then be used to power small electrical appliances. Research on factors to maximise the current output (parallel cells, pH, agitation, temperature, concentration, etc). Build a working prototype to demonstrate the viability of the project. Share the project and its message with the public. This will help spread the environmental conservation / recycling messages.		
Commendation Award S\$500	Singapore Polytechnic	Programmable Logic Control for Motorised Sun-shading Screens in Beach Resorts	Tan Huifen, Tan Ying Jie, Lim Ai Chia
Project Summary	The most effective control of excessive solar heat and light transmission into buildings like beach resorts is obtained by applying external shading elements (usually made of reinforced concrete), and not to provide shading measures when the heat reaches their external walls, doors or windows. Most sun-shading devices for buildings in Singapore are usually designed with permanent and rigid built-in features made from reinforced concrete or metal. The project aims to explore suitable sun-shading features that can be designed with improved mobility and performances to suit the resort's occupants, to reduce energy and conservation costs, as well as to ward off the escalating costs of concrete arising from the recent ban by Indonesia on the import of sand and granite. The idea is to develop a motorised sun-shading system that can respond not only to a manually controlled switch, but also automatically to changing heat intensities through detection by a sun-sensor. The input will be monitored and controlled by a programmable logic controller.		
Commendation Award S\$500	National University of Singapore	The EzCarrier	Tan Yong Chuan
Project Summary	The proposed project aims to reduce the excessive use of plastic bags to help save resources by encouraging the continued use of reusable alternatives to plastic bags. Although reusable bags is nothing new but the adoption rate could have been better. Through careful observation and designing, we intend to come out with an effective solution to assist in the adoption of reusable alternatives and reduce the extra plastic bags that would otherwise become litter. The EzCarrier is a trendy yet compact accessory which can be conveniently carried around in handbags. It is just like one of the accessories in the handbag. Moreover, the size of the EzCarrier is comparable to that of a long ladies wallet and some of the ladies accessories. This gives a feel of how compact the EzCarrier is.		