



Company Registration Number: 196300098Z

## **Immediate Release**

### **Sembawang Shipyard 's Green Wave Environmental Care Competition For Schools 2008 Award Presentation Ceremony**

*Singapore, January 19 2009* - Sembawang Shipyard Private Limited, a subsidiary of Sembcorp Marine Ltd, is pleased to announce the winners of Green Wave Environmental Care Competition for schools 2008 at the award presentation ceremony at the Marina Mandarin Hotel, Singapore.

Our Guest-of-Honour for this award ceremony is RAdm (NS) Lui Tuck Yew, Senior Minister of State, Ministry of Education and Ministry of Information, Communications and the Arts. 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 and BP Shipping Limited, the competition targets at our students and youths as we believe that if we can successfully inspire and motivate young minds to think innovatively and adopt advanced technologies on environmental protection and improvement, we are on the right path towards making Singapore into a regional center for environmental development and making our planet a better place for all.

This is the sixth year of the competition and we are very encouraged by the continued support of our Alliance partners, Shell and BP Shipping, governmental and environmental bodies, environmentalists, tertiary institutions' professors and lecturers, schools principals, teachers and environmentally- minded individuals. For the competition in 2008, a total of 260 entries were received with participation from close to 1,000 students. This is indeed another year of strong participation from the schools.

During the ceremony, a total of 50 awards will be presented by RAdm (NS) Lui Tuck Yew to the winning teams (See Appendix 1 and Appendix 2).

For the first time in the competition since 2003, the Top Prize for the Junior College / ITE competition has been won by a team from Hwa Chong Institution (College) for their innovative project entitled 'Project Greenamorphosis'. This award comes with a S\$8,000 cash prize and a one-month development

attachment with BP Shipping. The Top Prize is jointly sponsored by BP Shipping and Sembawang Shipyard Pte Ltd.

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

The Green Wave Environment Competition 2009 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 1<sup>st</sup> 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 affiliate company. The 1<sup>st</sup> 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, a wholly-owned subsidiary of Sembcorp Marine has one of the largest integrated ship repair and conversion facilities in Southeast Asia. With more than four 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 newbuildings, 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. The Green Wave Environmental Care Project for schools is one of the shipyard's key environmental outreach programme. The shipyard is pleased to be the first its industry in Singapore to promote the environmental care and protection project for all schools in Singapore.

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The press release and details of the Green Wave Environment Competition is also available at our website: [www.sembship.com/greenwave](http://www.sembship.com/greenwave)

## APPENDIX 1

The Winners for the Green Wave Environmental Care Competition for 2008 are:

### (A) PRIMARY LEVEL

| Prizes                            | School                                | Title of Project   | Participants  |
|-----------------------------------|---------------------------------------|--|---|
| 1 <sup>st</sup> Prize<br>S\$4,000 | St Hilda's Primary School             | Solar-powered vending machine  | Jonathan Lim Ming En, Joshua Ng, Chan King Son, Justin Chen Zhi Yang  |
| 2 <sup>nd</sup> Prize<br>S\$2,000 | Northland Primary School              | Promoting awareness of the plants in Yishun Park and environmental awareness | Gabrielle Maegan Bong, Dayna Lyn Kalembur, Rachel Lim, Mathushah d/o Satheesan, Sourabh Prakash Mudakannavar, Ong Wen Hao |
| 3 <sup>rd</sup> Prize<br>S\$1,000 | Kuo Chuan Presbyterian Primary School | Singapore eco stories  | Maanasa Sri Ganesh, Sanggita d/o Supramaniam, Nafeesah Bte Mohamed Ibrahim  |
| 3 <sup>rd</sup> Prize<br>S\$1,000 | Kuo Chuan Presbyterian Primary School | Packaging matters!   | Toi Min Ray, Yew Wan Xin, Mencie Lim, Natalia Fernandez Hen   |
| Merit Award<br>S\$500             | Tao Nan School                        | Oil filter   | Hendrick Soh Jun Xian   |
| Merit Award<br>S\$500             | Hougang Primary School                | Eco Friendly Eco Garden  | Russell Tan Wah Jian, Rachel Tay Xi Boon, M. Vallei   |
| Merit Award<br>S\$500             | Pasir Ris Primary School              | Go green and mind your waste (To produce more Enviro-KIDS)                   | Siti Nabilah Bte Rahman, Nuraina Bte Mohammad Nasir, Jeremy Lim, Wang Zhuojing, Lee Wei Jie                               |
| Merit Award<br>S\$500             | Haig Girls' School                    | To reduce water usage and environmental pollution in caring of potted plant  | Prithipal Kaur Bhullar, Casslyn Lee Lin, Jaymie Tan   |
| Encouragement Award<br>S\$200     | Princess Elizabeth Primary School     | The Princess green wall  | Esha Agrawal, Udit Bareja, Chow Chao Dong, Karan Kishore Wagle  |
| Encouragement Award<br>S\$200     | Stamford Primary School               | New life   | Kong Ling Jun, Sin Jing Ting, Xie Ning, Chan Jia Yi, Hou Ying Yu, Syafiqah Bte Md Anuar                                   |
| Encouragement Award<br>S\$200     | Paya Lebar Methodist Girls' School    | Bottled furniture  | Yeo Zhi Yi, Kaely Hoong Kai Li, Samantha Tan Jie Ying   |
| Encouragement Award<br>S\$200     | Marsiling Primary School              | Luffa Produce  | Aidil Shah Bin Suhaimi, Justin Yang Feng Can, Sagai Mary Peng Xiao Mei, Nur Atiqah Bte Ariffin                            |

**(B) SECONDARY LEVEL**

| Prizes                            | School                             | Title of Project  | Participants   |
|-----------------------------------|------------------------------------|---|--|
| 1 <sup>st</sup> Prize<br>S\$6,000 | Raffles Institution                | A collection of short children's stories - Terrestrial Tales        | Samuel Tan Dao Ming, Manish Nair, Peh Shing Bo   |
| 2 <sup>nd</sup> Prize<br>S\$4,000 | Commonwealth Secondary School      | Can Constructed Treatment Wetland Effectively Recycle Greywater?    | Ang Kah Hwee, Kuah Kai Xiang, Pang Ning Ning, Anna Lim Li Wen, Yap Yun Han, Nitcharee Nitinavakorn, Venkatesan Harish, Bui Ngoc Linh Chi, Valerie Goh Swee Ting, Saw Yu De, Teoh Wen Qi, Shaun Au Yong Liang Wei, Quek Chee An, Nicholas Foo, Ha Ngoc Huong Lien, Toh Yu Han |
| 3 <sup>rd</sup> Prize<br>S\$2,000 | Bukit Panjang Govt. High School    | Recycling potato peels  | Kho Jie Min, Chua Kee Leng, Kong Qi Yuen, Ow Bao Yi, Cheng Heng Perng  |
| 3 <sup>rd</sup> Prize<br>S\$2,000 | Raffles Institution                | Green busTOPs   | Nigel Fong Jie Ming, Daniel Tan Wei Jie, Jeremy Sia Jia Rui, Marc Tan Jia Renn   |
| Merit Award<br>S\$1,000           | Bukit Panjang Govt. High School    | Diskless Mother Bots'   | Low Wei Lun, Lin Yuan Zhi  |
| Merit Award<br>S\$1,000           | Hwa Chong Institution              | Recycling Paper the Green Way                                       | Koh Zhe Wei, Joseph Ang Qian Bo, Ong Kai Zhi   |
| Merit Award<br>S\$1,000           | Hwa Chong Institution              | Recycling waste tea leaves  | Ernest Chen Zhengkai, Theron Ng Sir Yuan   |
| Merit Award<br>S\$1,000           | Raffles Girls' School              | Mangrove reforestation educational kit                              | Lum Shu Hui, Lew Gui Qi, Shaina Neo Hui Min, Lydia Tiong Fang Min, Koh Wei Ling, Mavis Tan Qiu Yu  |
| Merit Award<br>S\$1,000           | Raffles Institution                | The Green Book  | Joel Soon Jia Yi, Poh Chu Yong, Gan Zi Jie, Varun Vijayraghavan  |
| Merit Award<br>S\$1,000           | River Valley High School           | Where are the Herons?   | Cassandra Sim Li Ying, Lim Pan Yin, Low Gar Yim, Zoey Ang Zuo Yi   |
| Commendation Award<br>S\$500      | Anglo-Chinese School (Independent) | 12 Simple Ideas for Green Improvement in HDB Flats                  | Loh Guo-yang, Kurt Lydon Dee Tanyu, Mervyn Lim Jun Rui   |
| Commendation Award<br>S\$500      | Hwa Chong Institution              | Potato Peel as Natural Adhesive                                     | Hunter Phoon Wai Kit, Daryl Ho Ze Wei, Nicholas Ren-Jie Capel  |
| Commendation Award<br>S\$500      | Raffles Institution                | Guni-Bay  | Daniel Lim Soon Wei, Zhao Yang, Shen Tong, Malvine Phua Wei Ming   |
| Commendation Award<br>S\$500      | Raffles Institution                | The Okara Fertilizer Understudy                                     | Benjamin Lee Jun Hwee, Marcus Ng, Loke Wei Kang, Leonard Chan Wai Kin, Jon Lim Ming Liang  |
| Encouragement Award<br>S\$200     | Anglo-Chinese School (Independent) | Producing Energy from Organic Materials through Winogradsky Columns | Daryl Lo Yin Keong, Michael Sia Zhen Wei, Julian Brendan Tok Jun Feng  |

| <b>Prizes</b>                 | <b>School</b>                     | <b>Title of Project</b>                             | <b>Participants</b>  |
|-------------------------------|-----------------------------------|---|--|
| Encouragement Award<br>S\$200 | Raffles Institution               | One Voice - a poetry anthology                      | Nicholas Chee Chong Kit,<br>Huang Wenjie, Derwin<br>Seow Wen Jie, Yang Yu<br>Hsuen                                 |
| Encouragement Award<br>S\$200 | Raffles Institution               | A comic guide to endangered<br>animals in Singapore | Yan Xiao Dong, Sean Yap,<br>Lee Kai Yu, Yap Kim Wee  |
| Encouragement Award<br>S\$200 | Swiss Cottage<br>Secondary School | Hope for animals                                    | Wilson Ng Zhihan, Hnin<br>Hnin Oo, Thio Boon Kiat,<br>Nor Azura Bte Mohamad<br>Azman, Yong Hui Er, Soon<br>Pei Yee |

**(C) JUNIOR COLLEGE / INSTITUTE OF TECHNICAL EDUCATION**

| Prizes                             | School                                      | Title of Project  | Participants   |
|------------------------------------|---|---|--|
| 1 <sup>st</sup> Prize<br>S\$8,000* | Hwa Chong<br>Institution (College)          | Project Greenamorphosis   | Tan Hui Ling, Ron Yeo<br>Jingyang, Darrell Tan<br>Chun Loong, Ruth Poh Xiu<br>Jing                                 |
| 2 <sup>nd</sup> Prize<br>S\$5,000  | Anglo-Chinese<br>Junior College             | Drain Water Harvesting  | Aditya Singh   |
| 3 <sup>rd</sup> Prize<br>S\$3,000  | ITE College West<br>(Bukit Batok<br>Campus) | Life-Long Universal Lit   | Ang Teck Lih, Ong Kok<br>Soon, Logaraj SO<br>Ramachandran, Rashid<br>Hanif B Rahmat, Lee Chee<br>Yang              |
| Commendat<br>ion Award<br>S\$500   | Hwa Chong<br>Institution (College)          | Applications of Carbon<br>Nanotubes   | Sainyam Gautam   |
| Commendat<br>ion Award<br>S\$500   | ITE College East                            | Filtration of water using<br>mangrove mud                                       | Daniel Poh Yuan Kai, Aidil<br>Sufian B Sohani,<br>Muhammad Ridhwan B<br>Roslan, Muhammad<br>Aminuddin B Zulkifl    |
| Commendat<br>ion Award<br>S\$500   | ITE College East                            | Green Messenger cum<br>Scoreboard System  | Tan Choon Leong, Amir<br>Bin Aman, Jegadeeswari<br>d/o Vadivelu, ,   |
| Commendat<br>ion Award<br>S\$500   | ITE College West<br>(Dover Campus)          | Waste Water No More   | Toh Leong Chin, Lin Yuan<br>Sheng, Lee Kun Lin   |
| Commendat<br>ion Award<br>S\$500   | Hwa Chong<br>Institution (College)          | Planet in Peril   | Alexander Chan Ho-<br>Young, Elson Ee, Clement<br>Law Yong Xiang, Li Xiang,<br>Wu Xiao Tian                        |
| Commendat<br>ion Award<br>S\$500   | ITE College West<br>(Balestier Campus)      | Recycled Banner-Beach Chair   | B. Maruthirayaar, Teo Jin<br>Sheng   |
| Commendat<br>ion Award<br>S\$500   | ITE College West<br>(Dover Campus)          | Underground Water Pipe Early<br>Leakage Detection and<br>Prevention through SMS | Philip Teo Gim Chew,<br>Muhammad Firdaus Bin<br>Habib Noh, Poo Ce Yu   |
| Commendat<br>ion Award<br>S\$500   | ITE College Central<br>(Tampines Campus)    | Close Line Soap Dispenser   | Muhammad Ihsan Bin<br>Amat Basir, Gerard Louis<br>S/O Petar, Chen Jiaquan,<br>Chua Chen Kuo, Jason<br>Yao Zhixiong |
| Commendat<br>ion Award<br>S\$500   | ITE College West<br>(Dover Campus)          | Conservation of Magpie Robin<br>by Mobile phone controlled<br>Food Feeder       | Muhammad Firdaus Bin<br>Habib Noh, Poo Ce Yu,<br>Philip Teo Gim Chew   |

\*Includes a one month development attachment to BP Singapore

**(D) TERTIARY LEVEL**

| <b>Prizes</b>                  | <b>School</b>                    | <b>Title of Project</b>                     | <b>Participants</b>  |
|--------------------------------|----------------------------------|---|--|
| 2 <sup>nd</sup> Prize S\$6,000 | Ngee Ann Polytechnic             | Wind Turbine Prototype Model                | Ong Sook Ping, Guo Shanshan, Luo A Yu  |
| 3 <sup>rd</sup> Prize S\$4,000 | Singapore Polytechnic            | Green Façade                                | Frederick Wee Zhi Rong   |
| 3 <sup>rd</sup> Prize S\$4,000 | Temasek Polytechnic              | Harnessing Heat Energy From Kitchen's Stove | Lee Shwu Ping, Wang Yen Chin, Sophia Chng Shu Hui  |
| Special Merit Award S\$2,000   | National University of Singapore | FIXABOTTLE                                  | Tan Bing Hui, Tan Kok Ming   |
| Merit Award S\$1,000           | Ngee Ann Polytechnic             | Stand Alone Desalination                    | Winston Hong Yuheng, Huang Hanjie, Yavin Low Yuan Rong                                   |
| Merit Award S\$1,000           | Ngee Ann Polytechnic             | Environmental Friendly Solar Fridge         | Lim Ming Wei, Goh Guan Long, Vincent Tay   |
| Merit Award S\$1,000           | Ngee Ann Polytechnic             | Hybrid Solar Lighting                       | Adam B Johan Iskandar, Thiness Kumar S/O Tamil Selvam, Suthitham Zi Rong, Nah Siang Yong |
| Commendation Award S\$500      | Ngee Ann Polytechnic             | Ozone Ice Making Machine (OZIM)             | Lim Zhi Sheng, Yoong Shu Xin, Chan Chu De, Khairul Anwar Bin Hanafi                      |

## APPENDIX 2

### Summary of the winning projects:

#### (A) PRIMARY LEVEL

| Prizes                                   | School   | Title of Project  | Participants   |
|--|--|---|--|
| <b>1<sup>st</sup> Prize<br/>S\$4,000</b> | <b>St Hilda's Primary School</b>   | <b>Solar-powered vending machine</b>  | <b>Jonathan Lim Ming En, Joshua Ng, Chan King Son, Justin Chen Zhi Yang</b>  |
| Project Summary                          | <p>Our group's focus for this year's project is on energy conservation. As we have learnt from our Science lessons, the bulk of energy produced for our electricity comes from burning fossil fuels which adds to the greenhouse gasses to the environment hence causing climate change. It will be a challenge for us to neglect our conveniences, like driving, watching the TV, working on the computer or even using the hair dryer, so just as to reduce our carbon footprint.</p> <p>Instead of just sitting down in an 'air-con' room thinking of ways to reduce the effects of climate change, we decided to walk around the school to look for inspiration. As we were walking around the school compound we stopped by the canteen to get drinks for ourselves from the vending machines. Then it hit us that the vending machines are switched on 24 hours a day, 7 days a week and throughout the entire year. Imagine the amount of energy consumed by the machines. We decided to propose to build a stand-alone vending machine run on solar power. Using solar panels to charge the batteries in the vending machine, this machine can dispense drinks like the conventional vending machine. It will also be retrofitted with lights and a cooling system.</p>  |   |  |
| <b>2<sup>nd</sup> Prize<br/>S\$2,000</b> | <b>Northland Primary School</b>  | <b>Promoting awareness of the plants in Yishun Park and environmental awareness</b> | <b>Gabrielle Maegan Bong, Dayna Lyn Kalember, Rachel Lim, Mathushah d/o Satheesan, Sourabh Prakash Mudakannavar, Ong Wen Hao</b> |
| Project Summary                          | <p>Plants play many important roles. Besides helping to provide oxygen to living things, they also help to beautify the surroundings. Some plants also can be used to make useful products and medicines. However, many plant species are going extinct or under threat due to deforestation. The heavy demand for wood, paper and land has caused many forests to be cleared, resulting in the loss of trees and other plants. Many people are however still not aware of the causes and impact of deforestation as well as the importance of plants.</p> <p>To raise awareness of the plants in our neighbourhood, we decided to study the plants in Yishun Park and decided to make postcards and bookmarks that feature some of the plants in Yishun Park, the postcards and bookmarks would help to highlight some of the plants and the facts on deforestation and importance of trees and forests.</p> <p>We went to Yishun Park to study the plants. We identified a few interesting plants and took photographs of them and we did our research and shortlisted some facts from the list which are applicable and easier to be understood by the residents and students from primary schools. We presented the postcards to NParks to seek advice and permission to print.</p> <p>We plan to conduct nature trails at Yishun Park to the residents and students from schools in the neighbourhood and in the North area in the near future.</p> |   |  |

|  |  |                              |   |
|--|--|------------------------------|---|
| <b>3<sup>rd</sup> Prize<br/>S\$1,000</b> | <b>Kuo Chuan<br/>Presbyterian<br/>Primary School</b>   | <b>Singapore eco stories</b> | <b>Maanasa Sri Ganesh, Sanggita<br/>d/o Supramaniam, Nafeesah<br/>Bte Mohamed Ibrahim</b> |
| Project<br>Summary                       | <p>Singapore Eco Stories is a collection of story books that aims to educate the young children about the environment and the need to care for it through interesting stories. As the stories progress, details about Singapore's efforts towards a better world and global environment hazards will be highlighted in snippet forms.</p> <p>Target Readers : Nursery, Kindergarden and lower Primary pupils.</p> <p>Goals Achieved : Foster family bonding as parents read these stories to their children and, more importantly, educates the family as a whole on how to care for the environment.</p>  |                              |   |
| <b>3<sup>rd</sup> Prize<br/>S\$1,000</b> | <b>Kuo Chuan<br/>Presbyterian<br/>Primary School</b>   | <b>Packaging matters!</b>    | <b>Toi Min Ray, Yew Wan Xin,<br/>Mancie Lim, Natalia Fernandez<br/>Hen</b>                |
| Project<br>Summary                       | <p>Products on the market usually come in lovely packaging to attract customers to buy them. The packaging of these products may account for a fair portion of the cost of the products. Furthermore, most of the packaging is thrown away after the products are opened or consumed. Excess and non-recyclable packaging adds to our energy and waste problems.</p> <p>Repackaging products with excessive packaging using less and recyclable materials will help in protecting our environment and conserving resources and energy. We propose to look at ways to cut down on the amount of packaging of selected products, yet making them attractive to potential customers at the same time.</p> <p>Our group went to supermarkets to look for products that use a lot of packaging. We shortlisted these products :</p> <p>i) Strawberry Marshmallows<br/>ii) Hong Da Coconut Biscuits</p> <p>We brainstormed ways to re-package them. One of the main materials we decided to use is plastic bags with grip seals as they are not only resealable, but are also reusable.</p> <p>After we had repackaged the products, we conducted a survey among our schoolmates and good responses e.g. Nice packaging, impressive, attractive and etc.</p> |                              |   |
| <b>Merit<br/>Award<br/>S\$500</b>        | <b>Tao Nan School</b>  | <b>Oil filter</b>            | <b>Hendrick Soh Jun Xian</b>  |
| Project<br>Summary                       | <p>Since oil pollution is one of the major pollution problems and my project consists of an oil filtering system which is able to eliminate or prevent the oil spillage into the sea. I chose to use a maze for this project called "Oil Filtering Maze".</p> <p>The prototype is design as an anti-oil pollution filtering system in order to eliminate the oil spill and to prevent the oil pollution problem of Marine Environment.</p> <p>The 'Oil Filtering Maze' consists of three plastic compartments, the first compartment consisting of felts called the 'Felt Filter'. The second compartment consisting of sand and the third compartment consisting of small pebbles and bigger stones. Finally, the water flowing out from the oil filtering maze will be freed from diesel oil.</p> <p>Each of the compartment is connected to each other using PVC pipes. Two intersection points or otherwise known as valves are connecting the pipes together.</p> <p>Lastly, these valves are installed to open, close or control the flow of oily water.</p>   |                              |   |

|                           |  |   |  |
|---------------------------|--|---|--|
| <b>Merit Award S\$500</b> | <b>Hougang Primary School</b>  | <b>Eco Friendly Eco Garden</b>                                    | <b>Russell Tan Wah Jian, Rachel Tay Xi Boon, M. Vallei</b>   |
| Project Summary           | <p>As Life Science ambassadors we are constantly trying to improve our facilities at or Eco-garden which is our Centre for Life Sciences. We look after the plants and animals there and sometimes we meet to brainstorm for ideas. It was during these sessions that we thought of the eco friendly eco-garden.</p> <p>We have a massive eco garden. It includes a rainforest themed area that consists of a eco-pond and a fernery, a vegetable plot area a butterfly graden and plant nursery. We have over 450 species of plants growing in these areas and watering the plants is not humanly possible because of this large area.</p> <p>The plants are watered by a sprinkler system and it is runs on batteries and the supply of water comes from PUB. We plan to create a water recycling plant so that water required for the sprinkler system will come from this facility. We also plan to create a solar panel so that the sprinkler system will run on solar energy.</p> <p>Furthermore, with the solar panels working in sync with the water recycling plant, it would nake the garden completely green and environmentally friendly making it easy for students to learn and understand environment issues and its applications under one roof.</p>   |   |  |
| <b>Merit Award S\$500</b> | <b>Pasir Ris Primary School</b>  | <b>Go green and mind your waste (To produce more Enviro-KIDS)</b> | <b>Siti Nabilah Bte Rahman, Nuraina Bte Mohammad Nasir, Jeremy Lim, Wang Zhuojing, Lee Wei Jie</b> |
| Project Summary           | <p>It is about biomass. Biomass is organic material made from plants and animals. Biomass contains stored energy from the sun. Biomass is a renewable energy source because we can always grow more trees and crops, and waste will always exist. Some examples of biomass fuels are wood, crops, manure, and some garbage. This project is about using cow dung to burn as fuel. People in India, Africa, use cow dung for their cooking.</p> <p>The biomass is introduced to students to expose them to rural life outside Singapore that nothing is wasted and these are Renewal Fuels. Non Renewal Fuels will be depleted so everyone should mind their waste and use energy mindfully.</p> <p>The objective is to create more enviro-kids through our 'Mind our Waste Kit' package :</p> <ul style="list-style-type: none"> <li>• Jigsaw puzzles</li> <li>• Scrambling of words</li> <li>• Boardgames</li> <li>• Colouring of pictures</li> <li>• Bio-mass project</li> <li>• Videos</li> </ul> <p>Though the package students will have a better understanding of the need to be an Enviro-Kid. The Environment Cards will further instill in students to act and do their part. They will become the self-appointed Environmental Project Officers at home. It is a fun filled package created by the students for the students. The activities are all twine together to form a fun filled package on an Educational Waste Management Project.</p> <p>The success of the project will be seen in results of the pre and post survey that will be administered to the students. This is an on going project that will instill life long skills in our students.</p> |   |  |

|                                   |   |  |  |
|-----------------------------------|---|--|--|
| <b>Merit Award S\$500</b>         | <b>Haig Girls' School</b>   | <b>To reduce water usage and environmental pollution in caring of potted plant</b> | <b>Prithipal Kaur Bhullar, Casslyn Lee Lin, Jaymie Tan</b>             |
| Project Summary                   | <p>Long term water availability in both global and local context will be current and future challenge to the survival of mankind. One can maximize water resource usage by reducing pollution of with nitrates runoff is one of them.</p> <p>The project serves to investigate into a novel means of housing potted plant in a holding device that allows for “recycling or reused” of the water and its dissolved nutrients so as to maximize water usage and to reduce environmental pollution. Water runoff rate and nitrate leaching rate from vermiculite containing self construct pots were carried out. The average water runoff rate is around 71.3 ml for every 100 ml of water added per watering per day. Nitrates leaching rate is constant at 40 ppm for a succession of 5 runoffs in the same day. Impact of nitrates and recycling on plant growth were also carried out on Balsam plant for 4 weeks. Plants growth without fertilizers were possess yellowish leaves while plant grow with fertilizer and subsequently maintained by recycling the nitrate-rich runoff water develop green leaves with a height of 5.5 cm compared to that of the control at 4.8 cm.</p> <p>The experiment illustrate that by using the novel pot for housing potted plant is able to reduce water usage and maximize nitrates hence resulting in reduction of environmental pollution by fertilizer's leaching.</p> |  |  |
| <b>Encouragement Award S\$200</b> | <b>Princess Elizabeth Primary School</b>  | <b>The Princess green wall</b>   | <b>Esha Agrawal, Uditi Bareja, Chow Chao Dong, Karan Kishore Wagle</b> |
| Project Summary                   | <p>Instead of using electrical energy or electricity to cool down a place by using an electric fan or air conditioner, we are using nature to do the work. The principle of this project is plants give out water to cool themselves by a process called transpiration. During transpiration, plants give off minute water vapour. When we stand under a tree on a hot day, we can feel the coolness under it.</p> <p>Based on this concept we intend to build some structures whereby plants can be planted and placed on the wall. We call it the “Princess Green Wall” our objectives are :</p> <p>i) to reduce the temperature of a room<br/> ii) to conserve electricity<br/> iii) to save on utility bill</p> <p>Green Walls increase the aesthetic appeal of a building and can foster community interaction. They provide opportunities for pupils to manage their own garden, teamwork and co-operation.</p> <p>We build the structures using framed wire mesh for support whereby plants can be planted in recycled plastic water bottles as planting pots.</p>   |  |  |

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| <b>Encouragement Award S\$200</b> | <b>Stamford Primary School</b>  | <b>New life</b>          | <b>Kong Ling Jun, Sin Jing Ting, Xie Ning, Chan Jia Yi, Hou Ying Yu, Syafiqah Bte Md Anuar</b> |
| Project Summary                   | <p>Singapore's water shortage problem is becoming more and more critical. We cannot ignore it any longer. Singapore has been buying water from Malaysia. However, this is only a short-term solution to the problem.</p> <p>In 2007, our Principal, Mr Yong Cheng Huat, had a brainwave to help solve the problem when he came up with the brilliant and innovative idea of collecting rainwater in the school and reusing it. It is a modification of Singapore's method of collecting water in reservoirs. Rainwater is collected from the school rooftops for recycling by channeling it into twelve 1000-litre tanks made from recycled materials.</p> <p>In 2008, Stamfordians were tasked to find different ways to use the rainwater collected, to calculate the amount of water used and the amount of money the school can save each month through the recycling process.</p> <p>The alternatives for using the rainwater that the New Life team explored were threefold</p> <ul style="list-style-type: none"> <li>• Generation of hydro-electricity by channeling rainwater into a school pond</li> <li>• Watering of plants using mobile tanks</li> <li>• Flushing of toilets</li> </ul> <p>The school adopted the idea of watering plants using rainwater but not the idea of using mobile tanks. It also implemented the idea of channeling rainwater into two toilet complexes.</p> <p>Results showed that more than eleven thousand litres of water can be saved each month. In monetary terms, the school may not have saved much, but if other schools also adopt this idea, Singapore can really save a lot of water nationwide. Stamford Primary shares its vision with the nation.</p> |                          |  |
| <b>Encouragement Award S\$200</b> | <b>Paya Lebar Methodist Girls' School</b>   | <b>Bottled furniture</b> | <b>Yeo Zhi Yi, Kaely Hoong Kai Li, Samantha Tan Jie Ying</b>                                   |
| Project Summary                   | <p>Our team is working on the project entitled "Bottle Furniture". We collected a hundred of "Ice Cool" bottles and used them for making a chair.</p> <p>We tested three types of bottles – mineral water bottles, "Pop" drink bottles and "Ice Cool" bottles. After a few attempts, "Ice Cool" bottles emerged to be the most hardy to withstand our weights and could form straight structures. Fortunately, these colourful bottles add colour to our chair.</p> <p>The materials needed are "Ice Cool" bottles, a penknife, Silicone glue, Plumbing glue, metal straps, acrylic board and copper wire. We cut the top part of the bottles and combined it with other uncut bottles. We then used the plumbing glue to stick the bottles together. Using the bottles, we started constructing different parts of the chair and we joined all the parts using silicon glue. Metal straps are used to provide better support for our chair's leaning board.</p> <p>We are very encouraged by the success of constructing the chair. We hope that we are able to share our experience with more people and construct more chairs and even a table for our school.</p> <p>We hope that through this chair that we have made, we would inspire others to think twice before they throw away their trash. Hopefully in the future, everybody will make the effort to be more environmental-friendly.</p>   |                          |  |

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| <b>Encouragement Award S\$200</b> | <b>Marsiling Primary School</b>   | <b>Luffa Produce</b> | <b>Aidil Shah Bin Suhaimi, Justin Yang Feng Can, Sagai Mary Peng Xiao Mei, Nur Atiqah Bte Ariffin</b> |
| <b>Project Summary</b>            | <p>Luffa is the only known plant that may be used to produce natural sponges which have been found to have a positive impact on cleansing human skin. It may also be used to produce an organic soap and it is commonly used in the production of kitchen.</p> <p>In this project, we are going to explore other products that can be made from luffa. For instance, the products that we come up with may be based on the non-slip characteristic of the luffa sponge; to be used to hang objects or act as an alternative notice board; products made based on its poor conductivity of heat; or simply a tool that can be used in an art class or a texture-creating devise in the paint industry.</p> |                      |   |

**(B) SECONDARY LEVEL**

| Prizes                                   | School   | Title of Project  | Participants  |
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| <b>1<sup>st</sup> Prize<br/>S\$6,000</b> | <b>Raffles Institution</b>   | <b>A collection of short children's stories - Terrestrial Tales</b>     | <b>Samuel Tan Dao Ming, Manish Nair, Peh Shing Bo</b>   |
| <b>Project Summary</b>                   | <p>The aim of our project is to create an educational book for children (aged 6 – 8) about wildlife, with illustrations and text. We chose children as our target audience because they are more impressionable and thus open to changing their daily habits and become more environmentally friendly. Altering the mindset of a younger target audience is also more significant as its effects will last for years to come.</p> <p>Research will be conducted on endangered wildlife in Singapore. Following this, the information will be simplified appropriately to suit the target audience. Finally, the product will be created, incorporating an angle promoting positive sentiments about wildlife conservation.</p> <p>Our compilation included five original stories encompassing the areas of overconsumption and wastage of non bio-degradable materials. These stories were modeled in part after long 'ballads' by Tim Burton and Roald Dahl, the latter who concentrated more on social problems through his numerous children's stories.</p> <p>Thereafter, our educational book will be tested out among children of the stated age group, and an analysis of its effectiveness would take place. The submission would consist of our research material, the educational book, as well as our effectiveness analysis.</p> |   |   |
| <b>2<sup>nd</sup> Prize<br/>S\$4,000</b> | <b>Commonwealth Secondary School</b>   | <b>Can Constructed Treatment Wetland Effectively Recycle Greywater?</b> | <b>Ang Kah Hwee, Kuah Kai Xiang, Pang Ning Ning, Anna Lim Li Wen, Yap Yun Han, Nitcharee Nitinavakorn, Venkatesan Harish, Bui Ngoc Linh Chi, Valerie Goh Swee Ting, Saw Yu De, Teoh Wen Qi, Shaun Au Yong Liang Wei, Quek Chee An, Nicholas Foo, Ha Ngoc Huong Lien, Toh Yu Han</b> |
| <b>Project Summary</b>                   | <p>Our project explores the effectiveness of constructed treatment wetland in treating greywater collected from toilet sinks. Our school has already set up a constructed treatment wetland, and we have had conducted tests and took readings to determine the effectiveness of the constructed treatment wetland in removing chemicals such as nitrates and phosphates, and also its effectiveness in removing pathogens such as coliforms. Other parameters such as turbidity, biochemical oxygen demand (BOD), total dissolved solids (TDS) and pH are also being considered for the analysis of the final water output. We want to show that the treated water from the Constructed Treatment Wetland (CTW) is clean and safe enough to be used for gardening (watering plants), for our fish ponds and for many other uses.</p>  |   |   |
| <b>3<sup>rd</sup> Prize<br/>S\$2,000</b> | <b>Bukit Panjang Govt. High School</b>   | <b>Recycling potato peels</b>   | <b>Kho Jie Min, Chua Kee Leng, Kong Qi Yuen, Ow Bao Yi, Cheng Heng Perng</b>  |
| <b>Project Summary</b>                   | <p>Everyday, tons of potatoes are peeled and their skins are thrown away as they are deemed as useless and treated as rubbish. We wanted to recycle the potato peels into useful products. Potato peels, just like the flesh, contain high level of carbohydrates, minerals and other nutrients. This is perfect for ethanol production. By recycling the potato peels, we will fully utilise the potato peels as a whole without</p>  |   |   |

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|  | <p>creating waste.</p> <p>Our project consists of five semi-projects. Firstly, we fermented potato peel, which was blended with distilled water, into ethanol. The ethanol was used as pesticide. Secondly, we dried fibres that was sieved from the blended suspension and used them as plant fertiliser. Thirdly, the potato peels were left to dry naturally under the sun after washing. They were then grinded into flour which can be used to bake cookies or cake. Fourthly, we add ethanol to the sticky substances obtained when boiling the flour obtained in water, to make glue. Finally, after boiling and blending the potato peels, they were divided into two portions. One portion was left to dry under the sun and the other portion was grined together with fresh grass and dried in the sun. Two different types of animal feed, one for pigs and the other for cows and other grass-eating animals were thus made.</p> <p>We have successfully used potato peels to develop five valuable products, namely ethanol, fertiliser, flour, glue and animal ffeed. Besides reducing food waste, we have also reused and recycled potato peels.</p>  |                              |   |
| <b>3<sup>rd</sup> Prize<br/>S\$2,000</b> | <b>Raffles Institution</b>  | <b>Green busTOPs</b>         | <b>Nigel Fong Jie Ming,<br/>Daniel Tan Wei Jie,<br/>Jeremy Sia Jia Rui, Marc<br/>Tan Jia Renn</b> |
| <b>Project<br/>Summary</b>               | <p>This project raises the novel proposal of growing plants on top of bus stops in three possible configurations:</p> <ol style="list-style-type: none"> <li>(1) growing creepers on a mesh</li> <li>(2) growing plants in a soil layer, and</li> <li>(3) growing plants in a bed of coconut husks as an environmentally-friendly substitute for soil</li> </ol> <p>We then elucidate the detailed structure, suggest possible plants, and propose the maintenace requirements of each configuration.</p> <p>The conversion of Singapore's existing busTOPs into green busTOPs, together with related measures like public education and corporate adoption of busTOPs, so as to generate direct environmental benefits, and more importantly promote environmental awareness and action, and contribute towards urban beauty and identity. Initial cost, technical feasibility, and ease of maintenace may pose several problems to the wide-scale implementation, but we have shown that these issues can be easily mitigated, such that on the whole, they are insignificant juxtaposed against the benefits of green busTOPs.</p> <p>We would strongly advocate the wide-scale implementation of green busTOPs. In today's urgency of acting to promote environmental sustainability, green busTOPs will most importantly demonstrate fervent political will for this cause, and demonstrate how small actions can go a long way to overcome the tragedy of the commons, while at the same time generating a myriad of other benefits that in themselves justify the costs. We are optimistic that the message of enviornmental consciousness embodied by green busTOPs, if implemented, would start a ripple effect and eventually provide individuals and corporations with the moral and practical impetus to walk towards environmental sustainability.</p> |                              |   |
| <b>Merit<br/>Award<br/>S\$1,000</b>      | <b>Bukit Panjang<br/>Govt. High School</b>  | <b>Diskless Mother Bots'</b> | <b>Low Wei Lun, Lin Yuan<br/>Zhi</b>  |
| <b>Project<br/>Summary</b>               | <p>Recycling of computer MOTHERBOARDS – When a computer reaches it shelf life, it is condemned by throwing it away or selling it to karang-guni man who will still thrown them away if there is no demand for it. By reusing the motherboards it will saves money and conserve resources. With this we hope we could spread the message of conserving resources and preserving the environment.</p> <p>We felt that we could do something to renew the life of the motherboard especially</p>   |                              |   |

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|                             | <p>most of the time the computer does not work is because of the hard-disk and the monitor. The motherboard and its power supply is quite a hardy piece of equipment. We can salvage the motherboard and try to reuse it. We know that from the internet, using a USB device, we could boot the computer and use it. There is no need for hard-disk with the newer technology. Using free software like Linux and openSource software we can try to reuse the old motherboard instead of discarding it away. We intend to make a wooden housing to house the old motherboards and relocate it in the Science Lab for students to use.</p>  |   |  |
| <b>Merit Award S\$1,000</b> | <b>Hwa Chong Institution</b>   | <b>Recycling Paper the Green Way</b>          | <b>Koh Zhe Wei, Joseph Ang Qian Bo, Ong Kai Zhi</b>  |
| Project Summary             | <p>Presently, harmful and toxic chemicals such as chlorine and hydrogen peroxide are being used in the paper-industry for the deinking-process of waste paper. Such chemicals often pose as an environmental hazard as they contribute to water pollution, resulting in the deaths of aquatic life forms. Therefore, to counteract this pollution problem, our project focused on the study of a more efficient and quicker alternative to the use of harmful chemicals by replacing them with a more efficient method of enzymatic deinking.</p> <p>Our project seeks to meet two objectives, namely to study the effectiveness of combinations of enzymes in deinking different grades of inkjet-printed paper as well as to work out a suitable combination of different enzymes for the deinking of different grades of inkjet-printed paper and determine the optimum conditions for the process. Our results show that there was a considerable decrease in brightness index of the reconstituted paper that had undergone treatment. Deinking was most effective when a combination of enzymes was used. Hence in our study, we have illustrated that enzymatic deinking is an environmentally friendly and effective way to recycle paper.</p> |   |  |
| <b>Merit Award S\$1,000</b> | <b>Hwa Chong Institution</b>   | <b>Recycling waste tea leaves</b>             | <b>Ernest Chen Zhengkai, Theron Ng Sir Yuan</b>  |
| Project Summary             | <p>Tea is a popular beverage. Large amount of tea leaves are discarded, leading to the loss of precious substances such as caffeine, catechin and melanin which are still present in the waste tea leaves. Our project aims to recover these useful chemicals from waste tea leaves.</p> <p>Results showed that all the 3 chemicals could be extracted from waste tea leaves. Yield of melanin was greatest while waste green tea leaves gave the greatest yield of all the 3 chemicals. Waste tea leaves were also successfully converted into black ink which can be used for painting or writing. Other ways of recycling waste tea leaves were also explored.</p> <p>Our aim is to promote the awareness of 3Rs (Reduce, Reuse and Recycle), we came out with proposals suitable for recycling waste tea leaves at homes, schools and industries.</p>  |   |  |
| <b>Merit Award S\$1,000</b> | <b>Raffles Girls' School</b>   | <b>Mangrove reforestation educational kit</b> | <b>Lum Shu Hui, Lew Gui Qi, Shaina Neo Hui Min, Lydia Tiong Fang Min, Koh Wei Ling, Mavis Tan Qiu Yu</b> |
| Project Summary             | <p>Our project aims to generate awareness of mangroves and the means to obtain reliable experimental data through outdoor experimentation. We purpose to do so by producing a portable and easy-to-use educational kit and related material to facilitate the acquiring of this information. We intend to target young children between the ages of 10-12 years of age. Through this project, we hope to foster these children's interest in the conservation of the environment so that they may play a more active role in protecting it, as well as equip them with the necessary knowledge to become active stewards of our environment.</p>   |   |  |

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|                             | <p>Thus, we can make quiz cards, which may include riddles, crossword puzzles, mangrove-related frequently questions and fun facts!</p> <p>Also, we can create pictorial storybooks containing various short stories which are interesting for school children to read. This would appeal to booklovers and also to Primary 1 to 3 children who prefer reading pictorial to wordy books.</p> <p>We understand that Sungei Buloh Wetland Reserve has been very dedicated in increasing the exposure of mangrove ecosystem to young school-goers. Thus, we would like to work with them in such a way that students would be able to possess a greater understanding and knowledge about mangroves and how to go about protecting them. Captivating and educational trips to places such as this can be organized in conjunction with Primary Schools.</p>   |                              |   |
| <b>Merit Award S\$1,000</b> | <b>Raffles Institution</b>   | <b>The Green Book</b>        | <b>Joel Soon Jia Yi, Poh Chu Yong, Gan Zi Jie, Varun Vijayraghavan</b>  |
| <b>Project Summary</b>      | <p>Environmental problems such as global warming, desertification etc. are rampant in our society today and are one of the greatest threats that our planet faces today. These problems arise mainly from ignorance regarding good green practices and environment conservation. We plan to educate children in primary schools about these issues in a fun an interactive way that is suitable for their age group.</p> <p>The aim of our project is to :</p> <ul style="list-style-type: none"> <li>- raise awareness about environmental damage to children through stories and an ABC charge</li> <li>- educate children regarding green practices</li> <li>- ensure that the product is attractive for children and parents will be willing to spend</li> </ul> <p>Thus we brainstormed for possible methods to convey green messages to the target audience. Some of the medium which we could convey these messages were through visuals, aurally or through activity. We decided on using short stories and adaptations of fables as these are the best in captivating children's attention. Even at adulthood, many still remember childhood fables and folktales they heard or read when they were young, thus thse types of stories can be remembered most easily by children. We also decided to use a lot of pictures and illustrations in our books as pictures can be recalled very easily and make the book more attractive.</p> <p>This will be in the form of "environmental Fables" that will contain stores that bring about the importance or saving our earth. There will also be an alphabetical chart that touches on global warming and environmental conservation.</p> |                              |   |
| <b>Merit Award S\$1,000</b> | <b>River Valley High School</b>  | <b>Where are the Herons?</b> | <b>Cassandra Sim Li Ying, Lim Pan Yin, Low Gar Yim, Zoey Ang Zuo Yi</b> |
| <b>Project Summary</b>      | <p>Through this project, we wish to find out the status of herons in Singapore whether the number has been decreasing over the years and whether it has become a rare species in recent years. Our main purpose is to promote the conservation of herons in Sungei Buloh Wetland Reserve and also in Singapore among secondary students by creating educational materials like brochures.</p> <p>We had a heron survey to find out the awareness of people on herons. We decided on a sample size of 236 participants, which targets people of all ages and occupations. The proportion of males and females are made equal. The survey lasted for two months. We distributed the surveys in school and randomly selected a few students from each level.</p> <p>In addition, we also conducted the survey with visitors in Sungei Buloh Wetland Reserve when we went there for the heron census. This allows us to have a wider</p>   |                              |   |

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|                                  | <p>sample size of audience and also helps to ensure that biasness were not introduced into the data, which will undermine the validity of the findings.</p> <p>This survey is done for two purposes. Firstly, it is to find out if people have the awareness for herons, so as to enable us to come up with brochures later to increase the awareness and conservation ideas about herons. Secondly, is that we want to know whether anyone has seen any herons in any areas of Singapore. Our group is more interested in the survey results from mainly students. This is due to the fact that our target audience for our products are students.</p>  |   |  |
| <b>Commendation Award S\$500</b> | <b>Anglo-Chinese School (Independent)</b>  | <b>12 Simple Ideas for Green Improvement in HDB Flats</b> | <b>Loh Guo-yang, Kurt Lydon Dee Tanyu, Mervyn Lim Jun Rui</b>        |
| <b>Project Summary</b>           | <p>In this modern society where resources are scarce, conservation of the environment takes first priority. We believe that the general population plays a pivotal role in helping the protection of the environment. Hence our project recommends changes in the HDB estate; this will not only save a large amount of energy but also raise awareness within residents on the importance of having an eco-friendly lifestyle. Through this, we hope to raise awareness within the entire general population.</p> <p>Our 12 ideas we are trying to introduce are often SIMPLE in nature, in fact, some are also cheap to implement, yet all these ideas bring about large savings in energy. The ideas presented are also often unobtrusive, that is, the residents are allowed to continue with their normal lifestyle. By integrating residents with an eco-friendly lifestyle, we believe that this would encourage residents to further the cause of green protection.</p> <p>Below is a succinct summary of our 12 ideas:</p> <ol style="list-style-type: none"> <li>1. Louver Gates – To increase ventilation and decrease overall temperature.</li> <li>2. Rooftop hydroponics garden – To decrease the temperature of building, and to act as a decorative area and lastly to foster bonds within the community.</li> <li>3. Colour of HDB – To decrease the overall temperature of the building</li> <li>4. Aluminium Foil lights – Prevents energy from being wasted and increases the intensity of indoor lighting.</li> <li>5. Larger tiles – Reduces the time taken to wash bathroom tiles and reduces water wastage and pollution</li> <li>6. Artificial intelligence lifts – Prevents wastage of energy through an algorithm system and prevents the wastage of energy on putting the lift to standby mode during 'non peak' periods.</li> <li>7. Dual Waste Chute system – Allows residents to recycle at the convenience of their home, encouraging residents to recycle and reduce the wastage of resources.</li> <li>8. Two-way Sink system – To save the residue water through a simple motor mechanism for other future use such as watering plants, this conserves water.</li> <li>9. Reflective curtains – These curtains scatter and reflect heat away yet maintain the interior façade of the house, reducing the overall temperature.</li> <li>10. Green lobbies – Increases air quality and becomes an area for rest and recreations.</li> <li>11. Aluminum Fins with plants – Reflects heat and disperse rain hence window can be continued to be opened even during a rainy season.</li> <li>12. Pay-per use Electricity meter – Reduces the amount of carbon emissions as residents are more conscious about that energy bill and reduce the need for paper bills.</li> </ol> |   |  |
| <b>Commendation Award S\$500</b> | <b>Hwa Chong Institution</b>   | <b>Potato Peel as Natural Adhesive</b>                    | <b>Hunter Phoon Wai Kit, Daryl Ho Ze Wei, Nicholas Ren-Jie Capel</b> |
| <b>Project Summary</b>           | <p>Potatoes have always been an essential part of our diet, be it mashed, cooked or deep fried and are a very popular food item on the menu of many restaurants today. Due to high consumption of potatoes, large amount of potato peel is generated by restaurants, fast food outlets and industries. However, a large amount of waste is</p>   |   |  |

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|                                  | <p>generated as the potato skins are not used. These waste potato peels contain a heterogeneous mixture of water, protein, fiber, and starch which can be recycled and reused.</p> <p>Starch has been widely used as adhesives. Adhesives are materials that are capable of fastening two other materials together by means of surface attachment. A well-known class of adhesives is based on starch and dextrin. They play an important part in industries, especially the packaging industry. This is due to their ability to adhere two substrates together to form materials that have greater mechanical strength. By bonding with starch based adhesives, most of the corrugated cardboards and packaging material we see today are made.</p> <p>Starch and dextrin adhesives are commonly used because they are readily available, low in costs and easy to use upon water dispersion. This makes them the cheapest form of paper packaging adhesive that we can use in large-scale operations in the factory. Starch-based adhesive is highly versatile as well, as it can be customized to be used when it is hot or cold, and have a very slow curing rate which allows ample assembly time.</p>   |  |  |
| <b>Commendation Award S\$500</b> | <b>Raffles Institution</b>  | <b>Guni-Bay</b>                        | <b>Daniel Lim Soon Wei, Zhao Yang, Shen Tong, Malvine Phua Wei Ming</b>                          |
| <b>Project Summary</b>           | <p>Our product is a website, Guni-Bay, that serves to bridge the connection between rag-and-bone men, and the general public, in order to facilitate the proper disposal of waste, including e-waste.</p> <p>Furthermore, the website has the additional benefit that users or even the non-participating web surfer would be able to gain much information regarding recycling, electronic wastes, and related items. This would be catalyzed through the information library that the website hosts. Through this awareness-raising concept, we hope to be able to impact more people, thus promoting environmental awareness and contributions.</p> <p>In this project, we seek to facilitate the communication between residential consumers and Karang Guni men so as to compensate the lack of convenience and motivation which recycling companies has. We seek to make transaction of items on Guni-Bay fast, easy and low-risk through efficient website layout, publicity and security features and precautions. We also seek to raise awareness of electronic waste and its disposal. Overall, this project aims to reduce the inconsiderate disposal of electronic waste by encouraging residential consumers to sell their electronic wastes to Karang Guni men.</p> |  |  |
| <b>Commendation Award S\$500</b> | <b>Raffles Institution</b>  | <b>The Okara Understudy Fertilizer</b> | <b>Benjamin Lee Jun Hwee, Marcus Ng, Loke Wei Kang, Leonard Chan Wai Kin, Jon Lim Ming Liang</b> |
| <b>Project Summary</b>           | <p>We chose this title not only due to the pun of TOFU in the four initials of our title, but also to highlight how important Okara is in production of tofu as well as how it can be used even to a higher extent than what it is used now.</p> <p>Through this projec, our objective is to convert Okara as a waste product into a main supplement of fertilizers that can be sidely used, so as to decrease the reliance on conventional fertilizers that are used presently as well decrease the run-off of Okara due to its wastage after the production of Tofu. To fulfill our objective, we wmbarked on our projects in the form of a survey, experiment. Through this, we formulated our product that would fulfill the objectives of our project, as well as bring a close to our project.</p> <p>We embarked on the survey to find out the views of the common population of the use of fertilizer, and also tried to find out the various preferences on fertilizer of the Singaporean populace. The survey was conducted on 30 people of varying age groups. Finally, we basically found out that Singaporeans would prefer having a</p>   |  |  |

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|                                   | cheaper and more abundant source of fertilizer that would be easier to use and buy.   |  |  |
| <b>Encouragement Award S\$200</b> | <b>Anglo-Chinese School (Independent)</b>   | <b>Producing Energy from Organic Materials through Winogradsky Columns</b> | <b>Daryl Lo Yin Keong, Michael Sia Zhen Wei, Julian Brendan Tok Jun Feng</b>     |
| Project Summary                   | A windogradsky Column is a mixture of mud, water and a nutrient source, forming an ecosystem in which bacteria thrive. The bacteria in the column are interdependent on each other, in a process by which electrons are transferred, thus, it is possible to generate electricity. For our research, we intend to test organic material such as fruit peels and others which are commonly discarded, as a substitute for the nutrient sources of the column. This project thus will examine a new form of clean energy generation, while also contributing to and possibly helping to expand the recycling effort. The columns would also help to reduce use of dry cell batteries as they have the same functionalities, and thus, this also reduce the problems of electronic waste.  |  |  |
| <b>Encouragement Award S\$200</b> | <b>Raffles Institution</b>  | <b>One Voice - a poetry anthology</b>                                      | <b>Nicholas Chee Chong Kit, Huang Wenjie, Derwin Seow Wen Jie, Yang Yu Hsuen</b> |
| Project Summary                   | Through this project our group aims to promote awareness about the destruction that mankind has wrought upon the earth and Mother Nature, through this poetry anthology. We also hope that the profits from sale of our poetry anthology can be used in the future to aid in mankind's effort against environmental change. The poetry anthology consists of a wide variety of poems about our hopes, our concerns and our fears – with regard to environmental change. Although this poetry anthology is targeted mainly at teenagers and adults and how these groups of people can actually be agents of positive change, we hope that the greater message of environmental change will still be passed on to children and elderly alike. More broadly speaking, to fight environmental destruction, we need all – regardless of age, gender, nationality, race, religion etc. – to stand up, and to articulate in one voice, their wish for a sustainable future.  |  |  |
| <b>Encouragement Award S\$200</b> | <b>Raffles Institution</b>  | <b>A comic guide to endangered animals in Singapore</b>                    | <b>Yan Xiao Dong, Sean Yap, Lee Kai Yu, Yap Kim Wee</b>                          |
| Project Summary                   | <p>The project mainly revolves the making of a children/teenager's fun guide to endangered animals in Singapore focusing on five species of animals in Singapore. They will be done in comic style, each with a profile page with an illustration of the said character along with interesting facts about the animal. Following the profile pages will be a short comic strip illustrating who they are and why their existence on the island is threatened. The stories will be based on problems faced by these animals in real life, in order to bring a sense of authenticity and "reality" to the fictional stories, and to emphasize how real the situation is.</p> <p>The aim of this project is to spread awareness, mainly about the reasons why some animals are being driven to extinction in Singapore, and the measures needed to prevent the situation from worsening through the use of cute and colourful characters, all this in order to raise awareness, and hopefully instigate more youths to take a stand and advocate this cause.</p> |  |  |

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| <b>Encouragement Award S\$200</b> | <b>Swiss Cottage Secondary School</b>  | <b>Hope for animals</b> | <b>Wilson Ng Zhihan, Hnin Hnin Oo, Thio Boon Kiat, Nor Azura Bte Mohamad Azman, Yong Hui Er, Soon Pei Yee</b> |
| <b>Project Summary</b>            | <p>The main aim of our project is to tackle the problem of pollution (mainly land and water) and deforestation as well as some animals became endangered as a result of the above.</p> <p>We focused on 2 major areas. Firstly, on increasing the population of some of these endangered animals - We have designed a nature reserve that would suit and provide natural living conditions for the survival of different species of endangered animal and allow them to produce offspring to ensure the survival of their species.</p> <p>Secondly, on promoting the awareness of these issues to the public so as to get them involve in contributing to the prevention of deforestation and pollution – We have 3 solutions.</p> <ol style="list-style-type: none"> <li>1) A website that will provide information about the endangered animals.</li> <li>2) Through organising events, such as, Eco Festival and Eco Olympics, these will provide a wide range of different activities to cater to the different group ages.</li> <li>3) Draw up lesson plans on poster to show various types of fun activities that can be used to educate children on the seriousness of environmental issues.</li> </ol> |                         |   |

**(C) JUNIOR COLLEGE / INSTITUTE OF TECHNICAL EDUCATION**

| Prizes                                   | School   | Title of Project               | Participants   |
|--|--|--------------------------------|--|
| <b>1<sup>st</sup> Prize<br/>S\$8,000</b> | <b>Hwa Chong Institution<br/>(College)</b>   | <b>Project Greenamorphosis</b> | <b>Tan Hui Ling, Ron Yeo<br/>Jingyang, Darrell Tan<br/>Chun Loong, Ruth Poh<br/>Xiu Jing</b> |
| <b>Project<br/>Summary</b>               | <p>Our team has been heavily involved in Environmental Outreach in Singapore for the past 1 year since the launch of Project Greenamorphosis. From the initial group of five people, our team is currently a well establish youth committee that has more than 20 committee members and more than 1000 youth volunteers. We aim to create awareness in the environment across Singapore.</p> <p>Project Greenamorphosis has drawn more than 1000 participants from more than 60 secondary schools in Singapore and reaching out to 42,000 members of the public.</p> <p>Partnering closely with National Environmental Agency (NEA) and North East Regional Office of NEA, we have created more innovative and creative projects, engaging more youths from schools and Youth Environment Envoys, from NEA.</p> <p>One prominent example is the National Youth EnvirOlympics held in 2009. This large-scale event combined environmental messages with the concept of the popular reality show “The Amazing Race”. This proved to be very popular with teenagers, and will thus be held yearly.</p> <p>We are also in-charge of the Green Station situated near the Community Centre. On a regular basis, residents can trade recyclables for coupons to buy necessities. This is aimed to promote the 3Rs – Resuse, Reduce and Recycle amongst residents, by making recycling more convenient and offering incentives to recycle. We were integrating both the current popular recycling methhods, which included selling old belongings to the rag and bone man (where money was given as an incentive) or to put them in the recycling bin. (In this case, they bring their recyclables to the Green Station, and coupons are given as an incentive).</p> <p>The ongoing Aljunied-Hougang Environmental Outreach Program is another initiative by the team. Field trips are held monthly for residents and students to various environmental-related places of interest. This is part of educating the community on sustainable waste management system and to understand our environment better, thus encouraging them to develop eco-friendly habits.</p> <p>Besides creating environmental awareness, our project also works out programs to combat the problem of Dengue in North East region. To ensure every household do know the methods to prevent the breeding of Aedes mosquitoes, we have recruited trained volunteers that to go house to house, teaching residents about the “Ten minute mozzie wipeout” (How to prevent Aedes mosquitoes from breeding in one’s home in just 10 minutes). This was done in collaboration with Ci Yuan YEC.</p> <p>Through the initiating of such projects, we have helped the community to kick start environmentally-friendly schemes, which can then be continued within the community. This will be continually monitored by the heading committee.</p> |                                |  |
| <b>2<sup>nd</sup> Prize<br/>S\$5,000</b> | <b>Anglo-Chinese<br/>Junior College</b>  | <b>Drain Water Harvesting</b>  | <b>Aditya Singh</b>  |
| <b>Project<br/>Summary</b>               | <p>This project introduces the concept of Drain-Water Harvesting (DWH) devices which tap hydroelectric energy from water drains. Statistics show that it rains approximately half the number of days annually in Singapore. With an efficient and extensive drainage system laid throughout the country, it is possible that the water flowing in these drains could be harnessed for electricity.</p> <p>Our project involves the tapping of hydroelectric energy from water drains in</p>  |                                |  |

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|   | <p>Singapore. Mini DC-generators, with certain kinds of turbines and circuits attached, were installed in drains, and connected to (a) rechargeable batteries; and (b) low-power electronic devices (like iPods). During rainy days, as the water flowing in the drains ran the generators, a direct current was produced which was used to recharge iPods and Handphones. Alternatively, this electricity can be stored as charge in capacitors, or chemical energy in rechargeable batteries. Our experiments show that a three centimeter long, 1.5 V electric motor can generate upto 1.9 V of potential difference on a moderate rainy day. Due to its characteristic rainy weather, a large-scale implementation of this innovative drain-water harvesting system in the near future could help Singapore meet its growing energy demands effectively.</p>  |   |  |
| <b>3<sup>rd</sup> Prize<br/>S\$3,000</b>  | <b>ITE College West<br/>(Bukit Batok<br/>Campus)</b>  | <b>Life-Long Universal Lit</b>                    | <b>Ang Teck Lih, Ong Kok<br/>Soon, Logaraj SO<br/>Ramachandran, Rashid<br/>Hanif B Rahmat, Lee<br/>Chee Yang</b>           |
| Project<br>Summary                        | <p>Since the invention of florescent lamp, it has become part of our life. The florescent lamp uses electricity to excite mercury vapor in the argon gas, resulting in a plasma that produces shortwave ultra-violet ray. This hazard ray then causes the phosphor to fluoresce to produce light. Mercury is not good for health. It can contaminate the environment once it is leak out. It was reported in 1987 that a toddle was hospitalized due to mercury poisoning caused by a broken lamp. The disposal of the lamp is also an environmental problem. It will cause health hazard if it is not properly disposed.</p> <p>We have developed a new light tube using Light Emitting Diodes (LED). With the technology advancement in LED, it has replaced conventional bulb in many areas like, traffic light, torchlight. We felt that it can further expand its application to replace the florescent tube. We put altogether a series of LEDs in a tube of the size of a 1.5 feet florescent lamp. We tested the lamp and found that it is as bright as the 1.5 feet florescent light tube. It also consumes less power and has a much longer life span. It is definitely environmental friendly.</p>   |   |  |
| <b>Commenda<br/>tion Award<br/>S\$500</b> | <b>Hwa Chong<br/>Institution<br/>(College)</b>  | <b>Applications of Carbon<br/>Nanotubes</b>       | <b>Sainyam Gautam</b>  |
| Project<br>Summary                        | <p>The project focuses on the deadly dual combo of environmental problems that face us today, namely Air and Water Pollution. One of the most exciting topics of research in the world today is that of carbon nanotubes and their potential applications in various fields. Some researchers want to develop electronic circuits based on carbon nanotubes while others are considering their remarkable structural properties to be used in construction as well as space shuttles. I have concentrated on nanotube filters and developed some concept products and techniques that have the potential to solve the aforementioned long-standing environmental problems.</p> <p>Nanotubes have been recently discovered and pose exciting prospects with applications in various fields. For my project, I have limited their use to filters for air and water. Freestanding monolithic uniform macroscopic hollow cylinders having radially aligned carbon nanotube walls, with lengths up to several centimetres are appropriate for nanotube filters. These filters can be cleaned for repeated filtration through ultrasonication and autoclaving. The exceptional thermal and mechanical stability of nanotubes, and the high surface area, ease and cost-effective fabrication of the nanotube membranes make them the most feasible and viable option.</p> |   |  |
| <b>Commenda<br/>tion Award<br/>S\$500</b> | <b>ITE College East</b>   | <b>Filtration of water using<br/>mangrove mud</b> | <b>Daniel Poh Yuan Kai,<br/>Aidil Sufian B Sohani,<br/>Muhammad Ridhwan B<br/>Roslan, Muhammad<br/>Aminuddin B Zulkifl</b> |
| Project<br>Summary                        | <p>The Mangrove ecosystem traps and cycles various organic materials, chemical elements, and important nutrients. Dissolved substances are used by plankton,</p>  |   |  |

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|                                  | <p>bacteria, and fungi. This material, in nature, is deposited over the seabed. Here bacteria densities are almost as high as those in the mangrove mud and they do much the same job, breaking down the litter to be consumed by bottom-living fauna.</p> <p>This project involved the usage of mangrove mud collected from Singapore Sungei Mandai and Sungei Buloh to make an internal filtration water system to filter off the water collected from Singapore and Kallang River. Instead of using chemical methods to clean and filter Singapore waters, an alternative suggestion of using environmental friendly mangrove mud is possible.</p>   |  |  |
| <b>Commendation Award S\$500</b> | <b>ITE College East</b>   | <b>Green Messenger cum Scoreboard System</b> | <b>Tan Choon Leong, Amir Bin Aman, Jegadeeswari d/o Vadivelu, ,</b>                      |
| <b>Project Summary</b>           | <p>Most of the scoreboard system available in the market is meant for a specific game usage and the design are rather bulky to support the weight, and usually powered by electricity where it required long cable and socket. When come to storage, it tends to occupy space.</p> <p>The objective of this project is to develop a portable green energy messenger cum scoreboard system powered by renewable energy (solar) that saves the earth.</p> <p>In this project, the team had design and developed a system that foldable by mean of hinges mechanism to make it compact and for easy storage.</p> <p>The source of supply is powered by renewable energy which environmental friendly, reduce the dependent of fossil fuel. A solar panel is used to charge up the battery for the consumption of load comprises messenger and scoreboard.</p> <p>The design is also unique whereby it incorporates both the messenger application and a scoreboard usage.</p> <p>The system can be used either for indoor or outdoor games, versatile enough to perform as messenger display, scoreboard in games, or even as a testimonial of renewable energy product that minimise the rely on fossil fuel.</p> |  |  |
| <b>Commendation Award S\$500</b> | <b>ITE College West (Dover Campus)</b>  | <b>Waste Water No More</b>                   | <b>Toh Leong Chin, Lin Yuan Sheng, Lee Kun Lin</b>                                       |
| <b>Project Summary</b>           | <p>The objective of our project "Waste Water No More" is to save precious water during showering by installing a water saving device automatically redirects cold water to a temporary storage tank when water is cold and to the showering hose when water is warm enough for showering. The device must be low cost, simple to use and no maintenance is required. It must be an DIY device.</p> <p>According to our survey, almost 100% of the participants surveyed indicated that they are having warm water heating system in their homes. An estimated amount of water wasted during each showering in HDB household is 1.5 litre of water.</p> <p>With the installation of our project, all cold water when first turns on before showering would be channel to a temporary storage tank, and water is warm enough, the device will switch back to showering hose for showering. Water stored in the temporary storage tank could be used for toilet flushing, or cloth washing.</p> <p>Hence, with our add-on device, much precious water would be saved.</p>  |  |  |
| <b>Commendation Award S\$500</b> | <b>Hwa Chong Institution (College)</b>  | <b>Planet in Peril</b>                       | <b>Alexander Chan Ho-Young, Elson Ee, Clement Law Yong Xiang, Li Xiang, Wu Xiao Tian</b> |
| <b>Project Summary</b>           | <p>Youths today might be aware of the whole debacle on climate change. Yet, few take action of any kind, if at all. Indeed, the fundamental problem at hand is that</p>   |  |  |

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|                                  | <p>people do not delve deeper beyond the vague and often times confusing expanse of information on this pertinent issue. The public is aware of things at a very basic surface level, but have never had the opportunity and time to go deeper beyond the shallow and general context of the emerging global crisis.</p> <p>Built around this concept, our project entitled Planet In Peril seeks to raise awareness of this issue through a campaign consisting of an outreach programme and a virtual component. These aim to educate our youths of today as well as our various events to raise awareness of the issue.</p>  |  |   |
| <b>Commendation Award S\$500</b> | <b>ITE College West (Balestier Campus)</b>  | <b>Recycled Banner-Beach Chair</b>   | <b>B. Maruthirayaar, Teo Jin Sheng</b>  |
| Project Summary                  | <p>Many Banners are ordered, custom made and hung up for display for a period of time. They are then taken down and thrown into the rubbish bins. This banners are expensive to make and because of their PVC material they are not easy to decompose and when they are burnt, they will produce toxic fumes that will pollute our atmosphere. Therefore, PVC Banners is a waste that is difficult to dispose off. So if we recycle all the discarded Banners, measure and cut them to size, sew them up and turn them into a sliding back rest for their clining beach chair. These colourful reclining beach chairs will look unique and brighten up the beach and add some colours to our coast lines when families gather there for picnics, swimming and sea-sports or just laze around for the weekend.</p>   |  |   |
| <b>Commendation Award S\$500</b> | <b>ITE College West (Dover Campus)</b>  | <b>Underground Water Pipe Early Leakage Detection and Prevention through SMS</b> | <b>Philip Teo Gim Chew, Muhammad Firdaus Bin Habib Noh, Poo Ce Yu</b>   |
| Project Summary                  | <p>The present level of detecting water pipe leakage technology could come as a surprise that there are just a few conventionally available means. In particular, no specialised leakage detection in the market can meet the needs of various types of pipes under different environment. Our project seeks to add another quicker way of early water leakage detection by providing alternative to industries and individuals needs.</p> <p>Our project is low cost device to detect slow water leakage rate resulted from underground pipes. A thin copper wire (1mm diameter) is tied close to the surface along the underside of the metal pipes. Initially, any early surface leakage or damage along the pipe if lay horizontally will cause significant volume water to accumulate at its lower belly. Over the days, the accumulated water becomes acidic and starts to corrode the copper wire and finally breaks the wire. The wire carries a low voltage and one physically broken, it will trigger and send a SMS message to the mobile phone.</p> |  |   |
| <b>Commendation Award S\$500</b> | <b>ITE College Central (Tampines Campus)</b>  | <b>Close Line Soap Dispenser</b>   | <b>Muhammad Ihsan Bin Amat Basir, Gerard Louis S/O Petar, Chen Jiaquan, Chua Chen Kuo, Jason Yao Zhixiong</b> |
| Project Summary                  | <p>We have observe that when we wash our hand in public toilet, we often turn the water tap to wet our hand and then get some soap, during this time the water is still running and water wasted during this period. Thus, it inspired us in design this project to save water.</p> <p>Our project allow the user have the choice to select detergent mixed with water to clean their hands or flush main water to clean the soap away. The "check valve" in user to control the detergent flow to mixed ith water and prevent water went into the detergent container, and the "gate vlave" is user to control the main water flow through and mixed with detergent.</p> <p>When user turn the water tap to flush away the soap, the water will bypass the mixing path and flow out through the water tap to clean the hand and soap.</p>  |  |   |

| <b>Commendation Award S\$500</b> | <b>ITE College West (Dover Campus)</b>   | <b>Conservation of Magpie Robin by Mobile phone controlled Food Feeder</b> | <b>Muhammad Firdaus Bin Habib Noh, Poo Ce Yu, Philip Teo Gim Chew</b> |
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| Project Summary                  | <p>Many birds especially Magpie Robins are near extinction in Singapore over the years due to rapid urbaization and reclamation of land for industries. Magpie Robin was once among top three garden birds in 1920's. They extinct in 1970's due to bird trade, competition with other birds and loss of habitats and rural areas. To date, Sungei Buloh Nature Park and Pulau Ubin remain the strongholds for some of these birds.</p> <p>The project acts as food supplements to conserve the birds and migrate them to public parks/gardens in the Island. A wooden box structure can be designed and suspended on-site, incorporating the following features:</p> <ol style="list-style-type: none"> <li>1) A speaker producing a simulated Magpie Robin call;</li> <li>2) A food feeder to dispense their favourite foods by remote controls; and</li> <li>3) A hidden web camera to view the birds.</li> </ol> |  |   |

**(D) TERTIARY LEVEL**

| <b>Prizes</b>                            | <b>School</b>  | <b>Title of Project</b>                            | <b>Participants</b>                                      |
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| <b>2<sup>nd</sup> Prize<br/>S\$6,000</b> | <b>Ngee Ann Polytechnic</b>  | <b>Wind Turbine Prototype Model</b>                | <b>Ong Sook Ping, Guo Shanshan, Luo A Yu</b>             |
| <b>Project Summary</b>                   | <p>The Wind Turbine Prototype Model is a system designed to test for Singapore's weather condition. It is a prototype to be installed on the rooftop of the HDB flats to tap wind energy from surrounding air.</p> <p>It requires no fossil fuel which makes it a pollution free and environmentally friendly equipment to harness wind energy day and night.</p> <p>The objective is to design and build a system which comprises a wind speed stimulator, a wind turbine whereby when the wind turns the blades, it spins a shaft which drives a permanent magnet alternator and generates electricity. The generated AC electricity is then rectified into 12V direct current and passing through a 6A charge controller to charge on a 12V battery. To charge up the battery fully, it must at least contain 8V minimum. When the battery is charged, the inverter will then convert the electricity from DC to AC to drive electrical appliances.</p> <p>The system consists of three main components. The centrifugal air blower, a vertical axis wind turbine and a display output unit. The centrifugal air blower is able to generate wind speed varying from 2-8 m/s. The control panel on the display unit board provides voltage and current readings. All materials used for fabrication are of the least cost, ease of manufacturing and quality of the surface finish.</p> <p>The aim of this project is to harness wind energy and generate electricity at a minimum wind speed of 2m/s.</p> |  |  |
| <b>3<sup>rd</sup> Prize<br/>S\$4,000</b> | <b>Singapore Polytechnic</b>   | <b>Green Façade</b>                                | <b>Frederick Wee Zhi Rong</b>                            |
| <b>Project Summary</b>                   | <p>A green façade that allows personalized customization upon which presents versatility to the user as well as the urban space that it will marry to. It is the injection of one's insight into environmental awareness, it allows users to make an active decision in saving the environment by using this facade is able to be fitted with almost any materials, including scrap or recycled materials. Moreover, various injection of one's personalized facade would make a vibrant urban fabric for the young and the elderly.</p>   |  |  |
| <b>3<sup>rd</sup> Prize<br/>S\$4,000</b> | <b>Temasek Polytechnic</b>   | <b>Harnessing Heat Energy From Kitchen's Stove</b> | <b>Lee Shwu Ping, Wang Yen Chin, Sophia Chng Shu Hui</b> |
| <b>Project Summary</b>                   | <p>Our energy saving proto-type is aptly named ECO-ILS (for Ecology-friendly copper coils) to reflect its' ability to harness waste energy for re-use. In a stove, only the heat energy at the top is used for cooking. Much heat is also lost from the sides. In this current time, when energy price is going up by leaps and bounce, this is quite a waste of energy. In places such as hawker centers, where there are many stove in use at any one time, all this heat lost can add up significantly. This project navigates how the waste heat energy can be "captured" and re-used. This ultimately resulted in the construction of a prototype called ECO-ILS.</p> <p>This project also investigates the many factors that aid in the "capturing" of such waste energy and then incorporating these factors into the design of the prototype. The potential benefit of ECO-ILS helps to reduce bill utilities and living cost at this current time of high inflation. This is achieved by reducing our usage of water heater.</p>  |  |  |
| <b>Special Merit Award<br/>S\$2,000</b>  | <b>National University of Singapore</b>  | <b>FIXABOTTLE</b>                                  | <b>Tan Bing Hui, Tan Kok Ming</b>                        |

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| Project Summary             | <p>This project is an implementation of a 'Joint Grid System' onto existing bottles as to introduce a new and exciting way of packaging, managing and playing with plastic bottles. Generated from the idea of jigsaw puzzle, by introducing an interlocking system we are able to create objects such as furniture, walls, shelves and many others. By introducing protruded and recessed joints to the bottles, our concept is made possible and allow corporations and manufacturers to take on other forms which suit their branding, style, qualities, characteristics and many more be it curved, funky, the normal "coke-bottle-look-alike", the "square-ish" Voda Voda bottles, all forms and sizes are feasible as long as they are conformed to the "Joint Grid System". Furthermore, not only can we reuse bottles to put together other items, we can also reduce; by omitting unnecessary packaging materials such as plastic wrappers or cardboard trays. Plastic products, which sums up to an estimated 11% of Singapore's total waste output reported at World Cities Summit Issue, June 2008, had only 1.2% of it recycled. Since plastic product is rarely recycled and is impossible to decompose, our team tapped on the qualities of interlocking, applying it onto plastic bottle and hence resulting in a whole new manner of packaging (reduce), and an exciting after life for this synthetic object (Reuse).</p> |  |   |
| <b>Merit Award S\$1,000</b> | <b>Ngee Ann Polytechnic</b>   | <b>Stand Alone Desalination</b>            | <b>Winston Hong Yuheng, Huang Hanjie, Yavin Low Yuan Rong</b>                                   |
| Project Summary             | <p>This project attempts to demonstrate the feasibility of using renewable energy (solar) to provide electricity needed for the desalination of sea water to portable water. This concept is especially useful in regions where there is a shortage of drinkable water as a result of a crisis i.e. the aftermath of a tsunami and earthquake just to name a few. Its portability feature provides an added advantage.</p> <p>This prototype is unique as it is a stand alone desalination unit designed to run solely on solar power. It is portable and can be transported quickly and easily to inaccessible regions.</p>  |  |   |
| <b>Merit Award S\$1,000</b> | <b>Ngee Ann Polytechnic</b>   | <b>Environmental Friendly Solar Fridge</b> | <b>Lim Ming Wei, Goh Guan Long, Vincent Tay</b>   |
|                             | <p>This project illustrates that use renewable solar energy and an environmental friendly CFC-free fridge to save the Earth. Fisheries port and frozen food suppliers used heavy duty compressor fridges which use alternating current as the source of energy. Many of the older fridges are not CFC-free. These fridges release greenhouse gases which contribute to ozone layer depletion and climate changes. This project tapped on solar energy which is free, clean and abundant in supply. There is no reason to rely on fossil fuels and bear the cost of energy due to accelerating oil prices. This project used four PV panels to power one fridge and two batteries on sunny days. In the evening and on rainy days, the fridge is powered by the energy stored in the batteries. The batteries are of the deep-charge types and are rechargeable. The project resembles an ice-cream cart. The solar panels also shaded ice-cream seller from the sun. There are wheels and brake where the carts are parked.</p>   |  |   |
| <b>Merit Award S\$1,000</b> | <b>Ngee Ann Polytechnic</b>   | <b>Hybrid Solar Lighting</b>               | <b>Adam B Johan Iskandar, Thiness Kumar S/O Tamil Selvam, Suthitham Zi Rong, Nah Siang Yong</b> |
| Project Summary             | <p>The purpose of our product is to capture sunlight when it is readily available in the day and distribute it using optical fibers into the interior of a building. This way, it saves electricity. Sunlight has been proven to be good for health and plants can grow indoors. Although sunlight has undesirable UV and IR wavelength (if exposed on a constant basis); therefore, hot mirrors were implemented to avoid it. During the process of making our product work to meet our objective, we encountered difficulties e.g. tracking the sunlight. However, after thorough research and experiments, we manage to make it work and fulfill our aims for the project. Our objective in this project was to save electricity by bringing sunlight into darkened</p>  |  |   |

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|   | rooms of corridors by means of fiber optics. Earth's natural resources are fast running out, so why not tap the sunlight directly during the day, and transmit them straight into our homes? Sunlight is in abundance. Furthermore, sunlight as proven has been good for health. It helps our body product Vitamin D and plants can now grow indoors. It proved to be more difficult that we had expected; many unseen factors involving tapping and trapping the sunlight surfaced as we worked towards our goal. We hope that as technology improves, capturing and transmitting sunlight would be less costly and tedious with the development of more advanced equipment.  |  |  |
| <b>Commenda<br/>tion Award<br/>S\$500</b> | <b>Ngee Ann<br/>Polytechnic</b>  | <b>Ozone Ice Making Machine<br/>(OZIM)</b> | <b>Lim Zhi Sheng, Yoong<br/>Shu Xin, Chan Chu De,<br/>Khairul Anwar Bin<br/>Hanafi</b> |
| <b>Project<br/>Summary</b>                | The Ozone Ice Making Machine is a portable system which is meant mainly for use in the food industry for the preservation of food. This is achieved by using the characteristic of the Ozone atom which interferes with the metabolism of bacterium cells by inhibiting and blocking the operation of the enzymatic control system. This project involves the integration of an ozonated air generator and ice making machine for the purpose of trapping the ozone atom in ice. The ozone enriched ice is safe and an environment- friendly product as its potentially harmful molecules are broken into less toxic byproduct. The objective of this project is to design and modify the previous batch of ozone ice making machine, which ozone is generated from water by an ozone generator into ozone air generator that generates ozone from air. This machine is capable of producing significant amounts of zone enriched ice that can be used for the preservation of fish or meat without the use of chemicals. This project also aims to ascertain the extent of reducing pathogens and bacteria by using ozone. This machine is capable of producing 4.8kg of ozone ice per hour and will be equipped with all necessary controls. |  |  |