

## contents

Milestones description of NWSP by Prof Leo Tan, Principal Chairman of Advisory Committee	3
Composition of Advisory Committee & Working Committee	7
Message from Dr Yaacob Ibrahim, Minister for the Environment and Water Resources	8
Message from Ms Ho Peng, Director of Curriculum Planning & Development, Ministry of Education	9
Message from Mr Lee Yuen Hee, Chief Executive Officer, National Environment Agency	10
Message from Mr Ng Lang, Chief Executive Officer, National Parks Board	11
Finals of National Weather Study Project Competition 2006	12
Abstract of finalists' projects	14
Participating Primary Schools and their projects	41
Participating Secondary Schools and their projects	42
Participating Junior Colleges and their projects	44
Preliminary assessment judges	47
Judges of the final competition	49
Closing Remark by Mr Roy Adair, President & CEO of Senoko Power Limited	52



Back row (left to right): Jim Tan and Roy Tan  
Front row (left to right): Jeremy Lim Guan Fong, Isabel Cheung and Noorannah Md Rizal.

## WEATHER SONG

Weather can be fun.  
Weather can be cool.  
Weather actually is unpredictable.

Come on let's learn on weather and have some fun.  
It's a small world after all.

It's a weathery world after all.  
It's a weathery world after all.  
It's a weathery world after all.  
It's a world full of weather.

When it's rainy, the humidity rises.  
When it's sunny, the temperature rises.  
When it's snowy, it's cold  
When it's cloudy, it's cool.  
It's a weathery world after all.

*Sing to the tune of "It's a small world after all".  
Weathery is NOT a word.  
Done by Noorannah Md Rizal  
Weather Song by North View Primary School*

## Herbs Rap

Herbs are good and of course useful.  
The herbs we planted were not so good.  
We didn't give up and tried again.  
Although we went through so much pain.  
We read up on conditions for herbs to grow.  
And now we'll present what we know.

*Herbs Rap by Rosyth School*



Front row (left to right) : Teacher-mentor  
Ms Shoba Jaganathan, Issac Ijong Wen Jun, Jolyn Ng,  
Dennis Lee, Andrea Lim, Dominic Goh



## Milestones description of NWSP by Prof Leo Tan, Principal Chairman of Advisory Committee

### THE NATIONAL WEATHER STUDY PROJECT

#### What is the National Weather Study Project?

The National Weather Study Project (NWSP) is a community initiative that aims to increase awareness among students in Singapore about the importance of the impacts of climate change on our daily activities and the environment we live in.



Launch of National Weather Study Project by Mr Tharman Shanmugaratnam, Minister for Education on 31 March 2005

According to the scientists from the National Aeronautics and Space Administration (NASA), 2002-2005 were among the top warmest years since 1890. Singapore is not insulated from climate change. 2005 was remembered as one of the hottest years Singapore had experienced. There were over 500 bush fires in January – February 2005 alone. Yet January 2006 was among the wettest months with days of incessant rain. The interval of weather extremes, according to most climatologists, is getting shorter everywhere in the world.

There is a general consensus among scientists that greenhouse gas emissions from human activities have contributed to climate change effects such as rising global temperatures, rising sea levels and extreme weather. Climate change has the potential to fundamentally shape the way present and future generations live their lives.

Many world leaders consider climate change to be one of the most pressing challenges affecting the world in the medium to long term. Singapore economy and trade are so integrated with the rest of the world that gradual and abrupt changes in climate that are experienced in one corner of the planet can cause a chain of reactions that will eventually affect us. Yet a survey conducted recently found that one in two Singaporeans have not heard of climate change or global warming before.



With an emphasis on project work, practical knowledge and hands-on skills, the NWSP aims to bring the students' learning process beyond the textbooks and make their learning experiences applicable to daily lives. Hopefully this will encourage the students to think globally and act locally.

The NWSP was officially launched on 31 March 2005 by Mr Tharman Shanmugaratnam, the Minister for Education. It received strong support from government agencies such as Ministry of Education (MOE), Ministry of Environment and Water Resources (MEWR), the National Environment Agency (NEA) and National Parks Board.

### Objectives

Through this initiative, a platform for a closer working relationship between government agencies, such as MEWR and NEA, and schools could be created to enhance the learning experiences of students in Singapore. The NWSP also complements existing community-based environmental initiatives implemented by such organisations as the Singapore Environment Council and the Singapore Nature Society to broaden and deepen the students' understanding of the environment.



Students & teacher from North View Primary School examining the weather monitoring equipment

Participating students are encouraged to find out more about climate change and global warming by engaging in meaningful hands-on work. While teachers act as facilitators for the teams, students have to perform research, acquire useful data and speak to the right persons in the community in order to produce quality project work.

To stimulate the learning process of the students further, the NWSP does not restrict the project scope to the subject of Geography per se. Participating students are free to explore the impact of climate and weather changes using their knowledge in subjects such as Physical Sciences, Economics, Mathematics and Social Sciences.

By participating in the NWSP Competition, the students will acquire and refine a wide variety of key skills that will serve them well in their future scholastic, career and life pursuits.





### Advisory Committee

A 15-member Advisory Committee comprising industry experts, academics and representatives from people and public agencies, as well as Senoko Power, was formed to formulate the guidelines of the NWSP, provide direction on the areas of the study,



*Opening address by Mr Hawazi Daipi, Snr Parliamentary Secretary of MOE and MOM at the inaugural meeting of the Advisory Committee in July 2005*

decide on the rules and regulations for the competition and establish the judging criteria for the competition.

The Advisory Committee is co-chaired by Professor Lim Hock, Director of Temasek Laboratories of the National University of Singapore (NUS). The Advisory Committee is supported by a working Committee which gives technical and implementation advice to the participating teams.

### Competition 2006

The inaugural competition commenced from January 2006 with the deadline for the submission of projects set on 31 March 2006.

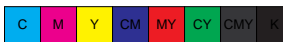
Senoko Power pledged a sum of \$1 million to support the NWSP. The sponsorship went towards the procurement and installation of a mini-weather station for each participating school. The funding permits each participating school to install instruments measuring, inter alia, the following features:

- Temperature maxima & minima
- Relative humidity
- Rainfall
- Wind speed & wind direction
- Solar intensity



*Mr Tharman Shanmugaratnam with Mr John Lim, Chairman, Senoko Power Ltd*

In its first year of implementation, 178 schools and over 250 teams took part in their respective eligible categories – primary schools, secondary schools or junior colleges. This tremendous response far exceeded the initial target of attracting a quarter of the 360 schools in Singapore.



Mr Roy Adair briefing the teacher mentors in May 2005

Preliminary assessment involving over 100 judges from both the public and private organisations was undertaken at the participating schools in April 2006. The open forum final judging of the students' projects was held on 18 May 2006 by a panel of industry experts, academics and representatives from government agencies. The winners will receive a trophy, cash prizes and certificates. In addition, some of the first prize winners will embark on sponsored trips and will showcase their projects to like-minded students overseas. A feedback session with the participants will be organised in the latter part of 2006 to prepare for the competition in 2007.

### Project roadmap of the National Weather Study Project Competition 2006

DATE	EVENT
Mar 2005	Official launch by the Minister for Education
May 2005	Briefing to the school teachers
Jul 2005	Procurement of mini-weather station
Nov 2005	Registration of project from the participating schools
Dec 2005	Installation of mini-weather station in school
Jan 2006	Commencement of project proper
	Progress update to the teacher-mentor
Mar 2006	End of project study & submission of final report
Apr 2006	Preliminary assessment of projects undertaken in school
May 2006	Competition by finalists
	Prize presentation by Minister

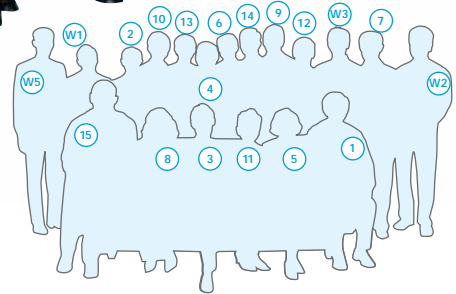
More information about the National Weather Study Project can be obtained at the website <http://www.senokopower.com.sg/environment/national.htm>.

### Competition 2007

Riding on the resounding success of the competition in 2006, the Advisory Committee looks forward to an even more successful competition in 2007 with more teams participating and with the support of the schools that had not signed up in 2006.



## Composition of Advisory Committee & Working Committee



### The Advisory Committee

S/N	Committee	Name	Designation
1	Principal Chairman	Prof Leo Tan Wee Hin	Director of NIE & Chairman of NParks
2	Co-Chairman	Prof Lim Hock	Director, Temasek Laboratories, NUS
3	Member	Dr Geh Min	Nominated Member of Parliament & President of Nature Society Singapore
4	Member	Mrs Yu Sing Tong	Dy Director/Schools North, MOE
5	Member	Mdm Ang Siew Hong	Asst Director, Curriculum Planning & Development Division, MOE
6	Member	Mr Lim Kew Leong	Head, Meteorological Services Division, NEA
7	Member	Mr Terence Siew	Director, MEWR
8	Member	Ms Radha Basu	Correspondent, The Straits Times, SPH
9	Member	Mr Howard Shaw	Executive Director, Singapore Environment Council
10	Member	Dr Goh Kee Tai	Sr Consultant, MOH
11	Member	A/Prof Irene Lye Lin Heng	Dy Director Asia-Pacific Centre for Environmental Law, NUS
12	Member	Prof Tay Joo Hwa	Division of Environmental and Water Resources Engineering, NTU
13	Member	Mr Tony Chng Siang Soon	North West CDC, Peoples' Association
14	Member	Mr Gan Chin Huat	Dy Director/School East, MOE and North East CDC, Peoples' Association
15	Member	Mr Roy Adair	President & CEO, Senoko Power

### The Working Committee

W1	Member	Mr Kwong Kok Chan	GM, Senoko Power
W2	Member	Mr Ng Cheow Kheng	Asst Director Streetscape - Projects, NParks
W3	Member	Mr Kho Chin Hu	Curriculum Planning Officer, MOE
W4	Member	Mr Puah Poo Boon	Meteoroloical Officer, NEA ( <i>Absent</i> )
W5	Member	Mr Izzuddin Taherally	Community Relation Officer, Senoko Power



## Message from **Dr Yaacob Ibrahim, Minister for the Environment and Water Resources**

The National Weather Study Project initiated by Senoko Power is indeed a milestone project and a fine example of corporate social responsibility. This initiative has encouraged and enabled school children and youths from all over Singapore to engage in projects to study the effects of weather patterns, climate change and the environment. Such activities are especially timely in view of the growing concern with climate change and global warming.

I am pleased to learn that students from 178 schools, from primary school to junior college levels, have participated in this initiative, and 279 creative ideas have emerged from these young minds. I was told that some of the ideas have potential to be adapted for wider application.

I commend Senoko Power for successfully engaging our young in this meaningful manner. I would also like to thank the other partners, namely Ministry of Education, National Environment Agency and National Parks Board, for their whole-hearted support.

To all the winners who will be receiving their awards at today's ceremony, I offer my heartiest congratulations. I would also like to congratulate the rest of the participants as "Champions" in their own right, as they too have taken a major and significant step in taking ownership of the environment, and in doing so, help to spread the message of caring for our environment to all Singaporeans.



**Ministry of the Environment  
and Water Resources**





## Message from **Ms Ho Peng, Director of Curriculum Planning & Development, Ministry of Education**

The National Weather Study Project (NWSP), officially launched by Mr Tharman Shanmugaratnam, Minister for Education on 31 March 2005, is a relevant and timely educational and community initiative. The project focuses on climate change which is of immediate concern to everyone as increasing world temperatures have brought about a host of environmental and social economic problems.

Climate change is a broad topic spanning subjects such as Geography, Social Studies, Economics, Mathematics, Physics, Chemistry and Biology. Our students need to have adequate knowledge and understanding of climate change. The interdisciplinary nature of the project and its emphasis on the applicability of project findings provide ample room for our students to be engaged in authentic learning. Through learning and doing, our students are better able to relate the impact of climate change to their daily activities.

Senoko Power Limited has graciously equipped each participating school with a solar-powered digital mini-weather station and a data logger for the purpose of data collection. Through the NWSP, our students are encouraged to use information technology to take their learning experience outside the classrooms. Students have to apply what they learnt in their classroom and interpret the real life data collected. When faced with limited data, they have to exercise their initiative to seek out additional sources of data. To this end, it is heartening to see teams coming up with innovative methods to supplement the weather data. These include the tracking of household utilities bills, monitoring of blood pressure at different times of the day and modifying existing equipment to analyse soil samples collected. Learning activities have become personal and meaningful.

The inaugural NWSP competition has attracted a healthy participation, with 279 projects coming in from 178 schools. The projects are of high quality, with a broad range of topics. These testify to the success of the NWSP, driven by Senoko Power Limited with very strong support from its partners - the Ministry of the Environment and Water Resources (MEWR), the National Environment Agency (NEA), the National Parks Board (NParks) and the Ministry of Education.

I extend my warmest congratulations to all the winning teams.





## Message from Mr Lee Yuen Hee, Chief Executive Officer, National Environment Agency

Singaporeans typically pay attention to the weatherman only when our skies appear hazy, when torrential rain causes massive floods and traffic jams, or when we experience a prolonged dry spell. Even so, they just want to know when the weather will improve and seldom question the root causes of abnormal weather phenomena, or how human activities can affect the climate.

The world is getting warmer and the impact of climate change is being manifested in extreme weather conditions. For example in 2003, Europe experienced its hottest summer in 500 years, killing more than 26,000 people. The summer flood in April 2006 was the worst in a century, destroying large farm lands, killing scores of inhabitants and inflicting massive property losses. Many of us view such events as distant incidents that have minimal impact on our daily lives. Unfortunately, as inhabitants of Planet Earth we are neither insulated nor exempt from Nature's fury.

NEA is tasked to ensure a quality environment not just for the present but also for the future generations of Singapore. However, we cannot do our work without the support of our partners in the community, industries and, most importantly, the general public. Everyone is a stakeholder in our environment, and thus each of us has a responsibility to play a part in creating and sustaining a clean and healthy environment.

The National Weather Study Project (NWSP), organised and funded by Senoko Power, is a step in the right direction, helping to raise the awareness among our students about climate change and even encouraging them to suggest solutions and steps that Singaporeans can take to help mitigate the impact of climate change. I would like to thank and congratulate Senoko Power for its exemplary corporate citizenship in spearheading the National Weather Study Project.





## Message from Mr Ng Lang, Chief Executive Officer, National Parks Board

I wish to congratulate Senoko Power for the success of the National Weather Study Project (NWSP) and the inaugural NWSP Competition 2006.

As the lead agency for managing Singapore's greenery, NParks has always had a keen interest in understanding how our weather conditions affect the health and aesthetics of our trees and plants. In this, NParks and the NWSP share the same goal - which is primarily to use science and its methods to understand and manage the often unpredictable nature of the weather.

For instance, we have learnt over the years, through horticultural experiments and observations, to select and grow plants which can thrive in our weather conditions. We have also been growing our knowledge and investing in technology to help minimise tree breakages in severe weather conditions that disrupt economic activities and damage properties. With more research and data to understand our weather, we can certainly do better in these and other areas.

We are therefore very pleased to participate in the judging panel of the inaugural NWSP Competition 2006. Even more so to learn that several of these projects pursue themes that are very relevant to NParks. The Victoria School team experimented with houseplants and found that they can help to lower classroom temperatures. South View Primary School grew lady's fingers in their school garden and discovered that the produce is strongly influenced by weather patterns.

Another initiative we found significant from the NWSP is the potential for a centralised depository for weather-related information. The data would be a valuable resource to help us determine the correlations between weather conditions and tree failures. It is a good example of how the People, Private and Public sectors can work together to solve problems in our community.

I hope the NWSP will continue to grow in strength to nurture interests in our school children in science and research, and in the work that NParks and other scientific agencies are doing. I wish NWSP every success in the years ahead.





## Finals of National Weather Study Project Competition 2006

Thirteen teams from schools across Singapore gathered at Singapore Power Auditorium on 18 May 2006 to prove that they are the best among the best.



*Presentation by Fuhua Secondary School*

The competition was divided into three categories – Primary School, Secondary School and Junior College. 178 schools comprising 279 project teams participated. After a grueling round of preliminary judging in April 2006, only 13 out of 279 project teams were selected. Primary School teams had 15 minutes to present while teams from Secondary Schools and Junior Colleges had 25 minutes. A 5-minute question and answer session with the judges followed after the presentation. Teams were judged on various criteria such as originality and creativity, depth of project topic covered, analytical processes, problem solving skills, relevance of the project to the community, teamwork and enthusiasm.



*Project Team from Yishun Junior College*



*Project Team from South View Primary School*

The teams were competing for prizes worth about \$50,000. The judges were given the discretion to vary the quantum of the award. The decision of the judges was final.

The final competition kicked off at 8.30 am with North Spring Primary School presenting their project. The 9 judges comprised heavyweights from both civil and private sectors who took time off from their busy schedule to grace the occasion. It was definitely a fun session as the presentations were interesting and had some light-hearted moments during the question and answer session. The judges were won over by the students' articulation, self-confidence and high quality project works.

After all five teams had presented, the Panel Chairman of the Primary School Category, Professor Chong Chee Leong, Dean, School of Science and Technology, SIM University delivered his closing comments. Professor Chong commented that the judges were very impressed by the students' works. He commended the teams for their effort and high standards. In conclusion, he hoped that the students' would share their findings with the larger communities like peers in school and neighbourhood to bring home the message about climate change and global warming. Their pioneering projects should be continued by their respective schools to create greater environmental awareness and enhance learning.



*Project team from Geylang Methodist Secondary School*



*Student supporters from Yishun Junior College*



*Supporters of Tanjong Katong Girls' School*

Competition was extremely tense for the Junior College teams that followed. This category had a different panel of judges. Topics presented by the teams cover a diverse scope of study ranging from Economics to Science/Medical to Community. The presentations were informative, creative and educational. Due to the judges' high expectations from the older students, the students were subjected to tough grilling during the question and answer sessions. All teams did well and stood their ground.

Three teams presented in this category. A closing summary was made by the Panel Chairperson, Dr Geh Min, NMP and President, Nature Society after all teams had presented. Dr Geh Min commented that the judges were impressed by the presentations they had seen. The judges placed high emphasis on innovative approach, risk taking, global content and interaction with stakeholders. It had been a fruitful exercise and good teamwork was evident. She mentioned that the judges found judging difficult due to the diversity of the project topics presented.



*Professor Lim Hock giving his assessment of the participating teams*

Mr. Roy Adair, President and CEO, Senoko Power Ltd, a member of the judging panel also congratulated the finalists on the high standards of work put up within such a short time. He was delighted by the level of response and thanked the teams for their effort. To conclude, he pointed out that, "In this competition, there are no losers. Everybody wins".

After lunch, the battle continued with the top five teams from the Secondary School Category vying for top honours. Presentations were interesting, informative and thought provoking.

In his closing address after all the secondary school teams had presented, the Panel Chairman, Professor Lim Hock, Director of Temasek Laboratories, NUS, remarked that projects were interesting and showed students' awareness of how society should respond to problems. Students should carry on and not stop at this level as the topics presented had great potential for further development which would be useful to the community.



*Team from Woodgrove Secondary School*

Results for the finals will be announced on 30 May 2006 at the Rock Auditorium. The Guest-Of-Honour, Mr Yaacob Ibrahim, Minister for the Environment and Water Resources will present prizes and certificates to the winners.



*Primary school students supporting their school teams*