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The title of the third dissertation jointly awarded the Fred Kan & Co. Prize for 2012-2013 in the Masters of Environmental Science course, University of Hong Kong is: *Students’ Perceptions on Climate Change and Engagement in Low-Carbon Behaviours: Implication for Climate Change Education in Hong Kong*, submitted by Tse Ka Ho Alan, which we review in this edition of the UPELQ.

The Editors

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THE STATE OF HONG KONG STUDENTS’ CLIMATE CHANGE CONSCIOUSNESS

Climate and Hong Kong

Climate change represents “the most imminent challenge for humanity in the twenty-first century”, says Alan Tse at the beginning of his dissertation.

According to available science to date, there can be little doubt that anthropogenic activities are causing an escalation in the presence of global-warming (or, greenhouse) gases.

Hong Kong has one of the highest per capita emission rates in the world, estimated in 2008 to be approximately 6 tonnes of CO² per person. So, on a *per capita* basis, Hong Kong bears considerable responsibility for the global warming crisis we all face.

In terms of direct effects of climate change on Hong Kong itself, the author notes: “*there are also potential risks that climate change would affect major vulnerable areas such as biodiversity, built environment and infrastructure, business sector, energy supply, and food and water resources in Hong Kong*”.

Climate change awareness in Hong Kong

The author notes that climate change was addressed for the first time in the former Chief Executive, Donald Tsang’s Policy Address of 2006/2007. However, Mr. Tsang did not then announce firm plans to deal with climate change.

Such commitment was, though, clearly made in Mr. Tsang’s 2008-2009 Policy Address, in which he said: “*We will make early preparations to meet the challenge of climate change. In particular, we will enhance energy efficiency, use clean fuels, rely less on fossil fuel, and promote a low carbon economy – an economy based on low energy consumption and low pollution.*”

Subsequently, the government published Hong Kong’s *Climate Change Strategy and Action Agenda*, which outlined the government’s proposed principal mitigation measures.

Awareness of climate change as a serious community issue has steadily increased since then. However, most surveys in Hong Kong of climate change awareness have involved working adults. Only a few concerned students’ perceptions; and so far no comprehensive survey of primary school students’ awareness of climate change issues has been undertaken. The author says: “*Climate change is now a critical issue in Hong Kong. The support and engagement from the younger generations are particularly vital to the success of long-term policies and strategies on climate change in our society. Therefore, a thorough study on the perception of climate change which embraces both primary and secondary students is of imperative need.*”

Objectives of the dissertation study

In order to fill the gap in knowledge of the state of awareness of climate change issues among young people in Hong Kong, Mr. Tse conducted research of the following questions and issues:

- (1) What are the existing environmental attitudes of students in Hong Kong?
- (2) How do students perceive climate change? What are their expectations on the mitigation of climate change problem?
- (3) How often do students engage in LCBs? Is there any discrepancy between concern about climate change and LCBs of students? What are the significant barriers to undertaking proactive LCBs or green actions?
- (4) Are there any significant differences between primary and secondary students in aspects aforesaid (i.e., perception, attitude, knowledge and action)?
- (5) Is the existing school education on climate change sufficient and effective for students to learn about the issue and its associated concepts?
- (6) What are the views from school teachers on the introduction of formal CCE in Hong Kong? What are the main difficulties encountered in implementing relevant activities and programs?
- (7) What things should be learned from some overseas practices in the future design of CCE in Hong Kong?"

Environmental education in schools in Hong Kong

Environmental education (EE) was first included in schools' curricula in the mid-1980s. Then, in 1992, the Guidelines on *Environmental Education for Schools (Guidelines)* was first published by the Curriculum Development Council. The Guidelines were subsequently revised in 1992 to place a central focus on "sustainable development" (SD), featuring the following major characteristics.

Major features	Pedagogical approaches
<ul style="list-style-type: none">• Based on the principles and values that underlie sustainable developments;• Deal with the well-being of all four dimensions of sustainability – environment, society, culture and economy;• Lifelong learning;• Locally relevant and culturally appropriate;• Based on local needs, perceptions and conditions but also acknowledge the implications of fulfilling local needs (i.e. international effects and consequences);• Accommodate the evolving nature of the concept of sustainability;• Address content, taking into account context, global issues and local priorities;• Build civil capacity for community-based decision-making, social tolerance, environmental stewardship, an adaptable workforce, and a good quality of life	<ul style="list-style-type: none">• Use a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills;• Engage formal, non-formal and informal education;• Interdisciplinary in nature. All disciplines can contribute to ESD

Climate change education (CCE) in schools

The dissertation then reviews the evolution of CCE in Hong Kong's schools, and includes this summary:

"At present, a formal CCE, per se, does not exist in the school curriculum in Hong Kong. Both the 1992 and 1999 Guidelines do not explicitly address CCE. Elements about climate change are penetrated into different subjects like Science, Geography, Liberal Studies (LS) of secondary education; and General Studies (GS) of primary education. After the implementation of 1999 Guidelines, the concept of 'sustainable development' (SD) appears in more school subjects. Students can obtain knowledge about climate change through two main pathways: formal education (e.g., formal curriculum in school lessons) and informal education (e.g., learning from extra-curricular activities)."

The author's review revealed a number of problems with CCE in both primary and secondary schools, such as the following:

- (a) "Adaption" and "mitigation" are not properly addressed. Most syllabuses implicitly stress the importance of "mitigation" without pointing out that "adaption" is complementary to "mitigation".
- (b) Most CCE materials relate to the senior secondary curriculum. CCE "seems to play a major role in the school curriculum for junior secondary graders".
- (c) The *Energy Technology and Environment* module focuses too much on "negative effects brought by the use of energy technology, like global warming", whereas the various causes of climate change should be explained.
- (d) The terms "climate change" and "global warming" are not used consistently. Conceptual differences between the terms are not explicitly addressed.
- (e) Climate change is seldom taught as a main module, but rather as a topic subsumed into other areas of EE.

The author concludes that overall "contents about climate change are fragmentary and scattered throughout a number of school subjects".

Students' surveys

For his dissertation, Mr. Tse conducted surveys of students and distributed questionnaires from which he gathered detailed responses from more than 700 school students concerning their attitude to the challenge of climate change.

Detailed tables of the responses are set out in the dissertation. A sample of a number of the author's conclusions from the responses is as follows:

- (a) *On the whole, students held moderate pro-environment worldview,*
- (b) *They showed manifest consciousness about ecological crisis and strongly agreed with the statements of 'eco-crisis' sub-scale, such as "if people don't change their current ways of living, the Earth will suffer from severe environmental disasters".*
- (c) *Furthermore, half (51%) of the respondents concurred with the existence of overpopulation problem in our planet.*
- (d) *Evidently, students were well aware of contemporary environmental problems as well as the anthropogenic impact on the environment.*
- (e) *In contrast, students scored fairly low in the sub-scale of 'human exemptionalism'. Opinions were divided on the statement whether "people will know enough about how nature works to be able to control it" with similar proportion of supporters and opponents. It is discouraging to unveil that students clearly overrated humans' capability of preventing environmental problems.*

Perception of climate change

More than 80% of the surveyed students agreed "that the effects of climate change were becoming severe". As well, approximately 70% of respondents agreed that human activities are the primary cause of climate change. Overall, students "were highly concerned about climate change".

The survey also revealed, perhaps unsurprisingly, that primary students were less convinced than secondary students that anthropogenic causes play a major part in climate change.

Perceptions of climate change effects in Hong Kong

Students believe that climate change has triggered “acute effects in Hong Kong”. Specific impacts noted included adverse health effects and detrimental consequence for our ecological systems and wildlife. Again, perceptions differed between primary and secondary students; the former considered impacts to be less severe than did the secondary students.

Students “held a modestly positive hope on the mitigation of climate change”, and more than 50% of respondents considered climate change awareness has remarkably increased in Hong Kong”.

Perceived responsibility for climate change

Industry and the business sector are seen to be most responsible for climate change in Hong Kong, followed by the government. However, student accepted they, and adult citizens, are part of the problem.

Primary and secondary students held different perceptions of “climate change responsibility”: Primary students accept a greater responsibility than their secondary colleagues.

Responding to climate change

The students’ responses to the question of their individual responsibility to change their everyday behaviour to combat climate change were not particularly encouraging. The author notes: “... the approaches that students adopted to combat the adverse effects of climate change were substantially divided. About half (51%) of the respondents adopted proactive approaches whereas approximately the same proportion (49%) opted for passive approaches. It is discouraging to unveil that a quarter (24%) of respondents did not take any action responding to climate change. In the survey, only slightly more than one-third (35%) of respondents reported that they adopted both adaptation and mitigation approaches to cope with the climate change effects. Overall, the findings reflected that many students were still not keen to take proactive action to contribute to the mitigation of climate change effects.”

Primary students are more proactive than secondary students in dealing with climate change.

The dissertation examines various forms of “low-carbon (green) behaviour” (LCBs) available to be adopted by students. These include: using public transport; conscious reduction in use of plastic bags; reduction in food and energy consumption; recycling waste; and buying organic food.

Detailed tables are produced to illustrate the various rates of participation in such LCBs. The general, net result is “that only 36% of respondents affirmed that they were interested in low-carbon living”. Primary students are more likely to adopt LCBs than are secondary students.

Students’ knowledge about climate change

The author gives detailed examples of “climate change questions” (e.g. did you know the U.S. did not ratify the Kyoto Protocol?) put to students in the survey, and a breakdown of their responses. In short, the author observes: “On the whole, students’ knowledge about climate change was certainly at a fairly low level. The overall mean of correct answers was merely 4.17 out of 10 questions asked in the survey. It was quite disappointing that even senior secondary graders only got an average number of correct answers at 5.40. As expected, the performance of senior secondary graders was significantly better than junior secondary graders (Mean=4.55) ($p<0.01$) and primary students (Mean=3.51) ($p<0.001$).”

Teacher survey

The author also conducted interviews with three secondary and two primary school teachers with diverse teaching backgrounds. He records their varying views on different aspect of CCE, such as their teaching strategies concerning climate change and their respective perceptions of the need (or otherwise) to formalise and expand CCE. We shall not review the teachers’ responses. The author’s summary of these included these comments:

Secondary schools

“All secondary teachers are typically contented with the existing school curriculum about climate change. They neither agreed further adjustment of the school curriculum nor the introduction of formal CCE.”

Primary schools

“Teacher D denied the necessity of formal CCE and held the view that it was more important to promote students’ environmental awareness, to nurture their interests in environmental issues, and to encourage green practices at this stage, rather than knowledge. Oppositely, Teacher E thought that contents about climate change or global warming should also be enhanced in formal curriculum through appropriate methods to boost students’ understanding of this critical issue; and she also believed that CCE should be implemented at an earlier stage (primary schooling).”

Common views

“Although there was no general consensus on enhancement or introduction of CCE in school, the findings unveiled some consistent problems encountered by schools when launching EE and CCE:

- (1) The complexity of administrative procedure in applying environmental funds from the government, e.g., quotation, auditing, and certification and evaluation from authorised bodies;
- (2) Lengthy time requirement for approval of environmental funds from the government; and
- (3) Insufficient funding support.

Another constraint raised by Teacher D was also noteworthy, which was about the inconsequentially stringent requirement that mandated approval was needed when installing any facilities in the building regardless of its size and significance. Actually, almost all reported barriers involved with the application of environmental funds from the government.”

Recommendations

After reviewing EE and CCE programmes in schools in other countries, such as Canada and India, the author makes certain recommendations as a result of his conclusions of the evidence revealed in his research. These are:

- “(1) The fundamentals of CCE should be: (a) education for sustainable development – taking science beyond climate change; (b) education for mitigation – changing behavior for good; (c) education for adaptation – learning to deal with climate changes; and (d) education for disaster risk reduction –

preparing for the worst. ESD can provide the best framework to address the issues about climate change. Moreover, science education about climate change should be strengthened.

- (2) In align with the enhancement of CCE in schools, it is recommended that the existing outmoded "Guidelines for Environmental Education in schools" should be reviewed and updated. The existing Guidelines barely touch upon climate change issues.
- (3) Cross-curricular approach in CCE in both primary and secondary education should be deepened and broadened in more subjects. More attention should be given to the social, ethics and development of skills that prepare for change. It is also utter important that teachers need to emphasise the linkages between climate change and its associated issues through formal and informal education.
- (4) The government should also extend the magnitude of financial support on EE/CCE in schools. Maintenance cost of environmental facilities should also be covered in the funding projects to assure sustainable education and prevent projects from 'petering out'. It is also of imperative need to rectify the deficiencies of the inconsequential application procedures of environmental funds by simplifying and speeding up the administrative process."

Conclusion

The dissertation is well researched and written, and addresses a fundamentally important issue for Hong Kong society, namely: increasing students' awareness of the critical dangers climate change represents, and simple behavioural changes they (and all individuals) can make to at least partially address the problem.

[Note : for the sake of brevity, the author's source attributions have been deleted from quoted text.]

TOWN PLANNING

Railway Development Strategy 2014

On 17 September 2014, the Transport and Housing Bureau released an update of the Railway Development Strategy ("RDS 2014"). RDS 2014 provides the framework for planning the future expansions of Hong Kong's railway network up to year 2031. Seven new railway lines, extensions and stations were outlined in the report. It is expected that in year 2031, 45% to 50% of the total public transport patronage will be accounted for by railways.

Clean Air Network ("CAN") generally welcomes the proposal as it sees railway being a relatively environmental friendly mode of transportation.

The Chief Executive Officer of CAN, however, is concerned with the potential increase in numbers of private vehicles when the railway proposal is adopted, as in the past decade the relief to road congestion is often offset by the increase of private vehicle ownership.. She said the government must adopt effective measures to discourage private vehicle use, so that the environmental benefits can truly be seen. As a result, she urged adoption of a comprehensive transport blueprint to spell out the strategies of different public transportations and to avoid duplication of roles.

CAN also encouraged the government to incorporate in its planning cycling as an effective mode of transportation as it has proven itself to be a popular and sustainable mode of transport worldwide and can increase the connectivity for the public to switch to railway (e.g. by riding a bicycle to the railway station, parking it there then taking the railway to work).

[CAN Newsletter, 17/09/2014]

Draft Tai O Fringe Outline Zoning Plan approved

The Chief Executive in Council has approved the draft Tai O Fringe Outline Zoning Plan (OZP).

A Town Planning Board spokesman had said that the approved OZP provides a statutory land use planning framework to guide the development and redevelopment within the Tai O Fringe area.

The Planning Scheme Area is bounded by the Lantau North Country Park ("the Country Park") in the east and south, and natural coastline in the north and west, covering an area of about 186.62 hectares, including a major part of Tai O Island which is separated by Tai O River from Lantau Island.

The general planning intention is to protect the natural environment and to provide for the area's existing villages. A vast part of the zoning plan is conserved as areas of high ecological significance, to protect the rural and natural characters and to maintain the unique landscape character and cultural heritage of the area. Approximately 6.57 hectares of land are zoned "Village Type Development" specially reserved for Small House development for indigenous villagers.

About 3.8 hectares of land are zoned "Government, Institution or Community" to provide the government, institution or community facilities serving the needs of locals and/or a wider district, region or the territory. It is also intended to provide land for uses directly related to or in support of the work of the government, organisations providing social services to meet community needs and other institutional establishments.

Apart from catering for the importance of indoor facilities, the zoning plan has also provided for 0.75 hectares of land to be zoned as "Open Space" to provide outdoor open-air space for active and/or passive recreational uses serving the needs of the locals as well as the general public.

About 3.25 hectares of land are zoned "Other Specified Uses" for specific annotated uses, including military use, cemetery and sewage treatment works.

About 1.16 hectares, being part of an area to the east of Sun Ki Street, is zoned "Undetermined" pending finalisation of the Study on Restoration of Disused Salt Pans in Tai O. The planning intention for this portion of the zoning plan is to be a "Salt Panning Demonstration Area" to promote heritage education and visitor attractions.

To set the limit of development areas by natural features and to preserve the existing topography and natural vegetation, as well as to provide passive recreational outlets, a vast majority of the zoning plan, approximately 124.47 hectares of land are zoned "Green Belt", including areas covered with fallow agricultural land, hill-slopes, natural vegetation and small streams. This area also encompasses the areas adjoining Leung Uk Tsuen and traditional burial grounds on the hill-slopes of Fu Shan, Wang Hang and Nam Chung.

A further 36.58 hectares of land are zoned "Conservation Area" to protect and retain the existing natural landscape, ecological and topographical features of the area for conservation, educational and research purposes and to separate sensitive natural environment, such as the Country Park, from the adverse effects of development. Patches of woodland in Po Chue Tam, an extensive area to the east of Sun Ki Street, an area to the east of Lung Tin Estate, an area at Leung Uk Tsuen, the area along Tai O River next to Hang Mei and the Tai O Mangrove Replanting Area to the west of the Tai O Reed Bed are within this zone.

The plan is finally complete with measures for protection of the coastline. About 6.71 hectares of land are zoned "Coastal Protection Area" to conserve, protect and retain the natural coastlines and the sensitive coastal flora and fauna. This area is the long strip of coastline to the north of Tai O Island and a coastal strip to the east of Po Chue Tam. Within this area there may only be a minimum of built development.

[Town Planning Board Press Release, 03/10/2014]

Northeast New Territories planner's proposal faces heavy attack

The proposal to build twin new towns in the northeast New Territories has faced with stern attacks by community groups and conservationists, alleging that the proposal is 'fundamentally flawed' as it fails to address major traffic problems to be generated by the future population in the areas.

Community groups questioned the Town Planning Board in the first of 38 meetings scheduled by the Board as to why there is no rail station in Fan Ling North to meet the expected population growth. A district planning officer said that such plans without rail lines and stations would actually allow for greater flexibility.

Opponents alleged that there will be a sharp increase in the population of the newly developed Fan Ling North and Kwu Tung North and that the East Rail Line running nearby is already running at its maximum capacity. The Board's vice-chairman is in unison with the opposing voice; he opined that the transportation system in the area is already overloaded as he often encounters traffic jams at Sha Tau Kok Road.

A resident of the area said that the current transport plans could not cope with the additional population, and so he asked the Board to reject the Fan Ling North draft outline zoning plans.

Conservationists are concerned about the depth of measures to protect biological diversity at Fan Ling North and Kwu Tung North.

The Board received more than 3,000 applications from those wanting to attend the meetings. Some of the earlier received statements demanded that the government relax restrictions on development intensity in the two new towns. The district planning officer explained that the government had already listened to people's views on increasing the development intensity.

[The Standard, 09/10/2014]

Harbourfront Authority should create exemplary public spaces

The government is consulting the public on the setting up of a Harbourfront Authority, but both the digest and response form fail to address key concerns. These include: a lack of oversight over the harbor as a whole; the lack of advisory powers over government departments; a lack of legitimacy in land allocation; bias towards commercial operations; and a loss of the public voice on the board.

Since 2004, we have called for an authority to create a world-class waterfronts. Now the shortcomings need to be resolved before the community and legislators support the proposal. The government wants the authority to be endowed with large waterfront sites. Yet the vesting of land should be the last, not the first, tool in enhancing the sites.

To start, we need a strategic plan for Victoria Harbour and its 75km of waterfronts to justify the location of water-dependent Land uses – especially the ones nobody wants: pumping stations; sewage plants; waste transfer stations; concrete plants; fish and wholesale markets; container and oil terminals; cargo areas; passenger piers; water sports centres; fuel stations; and police, customs, marine department and fire stations.

Next, the authority must develop waterfront plans for each district along Victoria Harbour, identifying land and water-based activities and facilities which local communities want. Such district planning processes are not new: the District Urban Renewal Forum successfully brought together professionals, the government, district councilors and the community to envisage what was required to improve the livability of Kowloon City.

To intervene, the authority must have advisory powers to guide the government to invest in new projects, and steer works at existing sites. These should include road and pavement design, pedestrian connectivity, and cycling and dog walking routes irrespective of who manages the land. It should steer the Food and Environmental Hygiene Department so we can eat cooked food outdoors at restaurants and kiosks along the waterfront.

The authority must advise on the funding of such projects, irrespective of which government department has responsibility.

Where a local community has decided that neither the government nor developers can deliver the desired outcomes, sites can be proposed for vesting to the authority. With well-argued reasons and community support for proposed activities, land uses, urban design and business plans, project proposals identifying funding gaps could be readily approved by the Legislative Council.

In this way, the authority becomes a benign solution provider rather than a commercial developer. It becomes a partner of the community rather than an aloof institution. We avoid the pitfalls facing the West Kowloon Cultural District Authority. If not, government departments will soon turn their back on the new authority, adopting an attitude of: "It's not my site, not my responsibility".

Importantly, we need to drop the requirement of "financial sustainability" and a "balanced portfolio of projects". It appears that the government's finance branch is once again meddling with what was supposed to be a good idea. The bean counters consider the setting up of the authority an opportunity to reduce spending on public spaces and increase development along the waterfronts. Currently, public space is managed by the Leisure and Cultural Services Department, supported with ample annual funding of operations and ad hoc funding of projects.

The requirement to balance projects would force the authority to not just focus the social objectives but also pick waterfront sites based on commercial viability rather than community aspirations. The focus on financial sustainability would create conflicts of interest, making it impossible for the authority to act as an adviser on harbourfront planning.

Finally, in the current organisation, members of the Harbourfront Commission nominate their own representatives. This has ensured a diversity of views, creativity and transparency. The authority must similarly pursue community appointments.

With such changes, the authority can create waterfronts which become exemplary public spaces with an abundant choice of activities for all people. Without these changes, why risk unintended consequences of yet another authority? Why not simply create a well-funded works office to implement projects identified by the Harbourfront Commission and District Councils?

Either way, it's time for the government to start spending money on the world-class design and management of our waterfronts. And not just Victoria Harbour; surely residents of Aberdeen, Ap Lei Chau, Tseung Kwan O and Sha Tin have the same aspirations for their waterfronts, too.

[Written by Paul Zimmerman, convener of *Designing Hong Kong Harbour District* and a member of the Harbourfront Commission]

[SCMP, 03/11/2014]

Draft Chuen Lung and Ha Fa Shan Development Permission Area Plan approved

The Chief Executive in Council has approved the draft Chuen Lung and Ha Fa Shan Development Permission Area (DPA) Plan.

A Town Planning Board spokesman said, on 3 October 2014, that the approved DPA Plan will provide planning guidance and facilitates development control within the Chuen Lung and Ha Fa Shan area during the period required for detailed analysis of the land use pattern, study of infrastructural provisions and examination of development options for the formulation of an outline zoning plan (“OZP”).

The DPA is located at the north-western fringe of the Tsuen Wan New Town, mainly comprises the stream valleys surrounding Chuen Lung and the upper foothills around Ha Fa Shan to the south of Tai Lam Country Park and covers about 209.95 hectares.

The general planning intention for the DPA is to protect the natural environment and the rural landscapes surrounding Tai Lam Country Park and Tai Mo Shan Country Park, as well as to prevent haphazard developments in the DPA.

Apart from the protection of the natural environment and rural landscapes, it is also the intention of the zoning plan to protect the heritage of the existing villages. About 2.79 hectares of the DPA is zoned “Village Type Development” to cater for existing recognised villages and to provide land considered suitable for village expansion.

The remaining 207.16 hectares of the DPA is designated for “Unspecified Use”, pending detailed analysis and studies to establish the appropriate land uses in the course of preparing an OZP.

[Town Planning Board Press Release, 03/12/2014]

Recovering ancient Hong Kong relics at MTR station

Earlier in the year, some ancient relics were located at To Kwa Wan’s new MTR site. Two specialists, Professor Tang Chung, director of the Chinese University’s Centre for Chinese Archaeology and Art, and William Meacham, former chairman of the Hong Kong Archaeological Society, were brave enough to advise that the plan to preserve the relics in place could be a waste of public money.

Their expert opinion is based on the fact that the ‘ancient relics’ are in fact not at all that rare, as many similar relics from the Song period (960 – 1279) have already been discovered in Hong Kong.

Due to the need to retrieve the relics, construction has so far been delayed by almost a year, costing HK\$3 billion, just so the project could be built around the relics. If the preservation project is to continue according to plan it is expected to cost MTR another HK\$1 billion in added construction costs. The government, having considered the experts’ opinion, finally decided on 9 December 2014 that it would adopt the cheapest option to relocate the ancient well, which will still cost HK\$10 million.

[SCMP, 10/12/2014]

WEST KOWLOON CULTURAL DISTRICT

Freespace Fest 2014 a great success

The two-day outdoor arts festival, *Freespace Fest 2014*, organised by the West Kowloon Cultural District Authority (“WKCD”), was held on 22 and 23 November 2014. The event attracted more than 43,000 visitors. Visitors were well indulged in a unique and innovative mix of performances and interactive arts and cultural activities.

Now in its third edition, *Freespace Fest 2014* has become an event not only for arts lovers but also for the general public. On the days of the event, we saw youths, families and children participating and enjoying an array of multidisciplinary performances by 200 international and local performers across dance, music, physical theatre and literary arts, on the site of the future park in the West Kowloon Cultural District (“WKCD”).

This year’s *Freespace Fest* is unique in the sense that it encouraged direct audience participation in many of its programmes. A total number of about 2,000 attended M.U.R.S., an ‘immersive interactive outdoor smart show’ presented by the well known theatre company “*La Fura dels Baus*” from Spain. The audience became performers and enjoyed the interactions in a mysterious wall by using their smartphone devices.

In another event “s.l.o.a.p” (“Space Left Over After Planning”), the latest international production by “Brach Nebula” from Australia, hundreds of audience members showed their courage and calmness when acting as ‘human obstacles’ in their participation along with a group of dancers and a motorcyclist from Hong Kong who performed side by side with the audience.

And in the programme of “Tangle” by the “Polyglot Theatre”, children and their families could be seen to be creating a massive interactive installation work against the magnificent backdrop of Victoria Harbour.

The Chief Executive Officer of the WKCD called this event a great success and is optimistic as to the endless possibilities the future park will create once it is opened to the public in a few years’ time.

[WKCD Press Release, 24/11/2014]

The landscape of art in China and East Asia by M+

Expanding the 1980s: The Landscape of Art in China and East Asia, is the ninth of the M+ MATTERS series, which is scheduled to be presented to the public on 13 January 2015.

M+ MATTERS is a series of public talks organised by the M+, the new museum established in the WKCD. This symposium aims to explore relevant, timely and critical issues with leading scholars and curators in the fields of design and architecture, moving image, and visual art.

Following the finale for the 2014-2015 series which focused on themes of globalisation of contemporary art, “*Expanding the 1980s: The Landscape of Art in China and East Asia*”, by contrast, will focus on examining the development of contemporary Chinese art in relation to its surrounding countries during the

1980's, the crucial transitional period. This symposium is the 'next chapter' and builds on the recent symposium "*Post-war Abstraction in Japan, South Korea, and Taiwan*" which addressed mainly the earlier decades, 1950s to 1970s.

A senior curator of M+ explains that, "beginning with a look at the political and cultural changes during the decade in Mainland China, Hong Kong, and Taiwan, the symposium aims to examine the subtle ties between contemporary Chinese art and the modernist movements from the pre-war period, and explore the different individual art practices in terms of how they were influenced by political transitions in history."

The symposium will also observe the cultural and political landscapes and movements in Japan and Korea the era pre-globalisation, as a part of M+'s sustained comparative studies of differences as well as parallels and similarities between artistic practices in these neighbouring countries in the region.

[WKCD Press Release, 08/12/2014]

HONG KONG BRIEFING

Old trees are chopped

The alarming rate at which ailing heritage trees are felled is due to the government's lack of preventive steps to boost the health of the trees, tree specialists believe. Frontline inspectors argue, however, that they face an acute manpower shortage and cannot possibly check every single tree.

The question is how to protect the 400-odd Old and Valuable Trees (OVTs) left on a government register, after the *South China Morning Post* found the city had been losing 10 such trees a year on average since a Tree Management Office was set up in 2010, against six trees a year before its formation.

One of the office's ten advisers, Professor Jim Chi-yung, said the office tended to seek advice on removing a heritage tree rather than on improving its health. Fellow tree adviser Ken So Kwok-yin echoed Professor Jim's view. "The office seldom takes the lead to identify health problems ... for example, by analysing the conditions of the soil surrounding the tree. It tends to take action only when the tree becomes very sick or threaten public safety" he said.

The department, one of several that manage trees, makes assessments twice a year. Ninety per cent of the heritage trees that died in the past four years were under its charge.

The office said the tree deaths were part of the natural life cycle. It said the removals were based on thorough arboricultural assessment and expert advice. The office and its experts had checked 76 heritage trees since 2011.

The department said it had adopted a prudent and anticipatory approach in managing trees. It would alert the office to problematic heritage trees.

[SCMP, 03/11/2014]

PM2.5 study in the PRD Region

The Hong Kong government has announced the launching of the first study under the "Cooperation Agreement on Regional Air Pollution Control and Prevention among Hong Kong, Guangdong and Macao". The study will focus on PM2.5, the most lethal air pollutant, due to its small size, in the whole PRD Region.

Clean Air Network (CAN) welcomes the proposal as air pollution is increasingly a regional problem. According to the EPD, the annual concentration of PM2.5 in Hong Kong in 2013 was 33ug/m3, much higher than the WHO recommended standards. Compared to 2012, Tap Mun and Yuen Long annual concentration of PM2.5 in 2013 increased 20% and 28% respectively, indicating the regional influence in Hong Kong's air quality.

Thus, Hong Kong cannot clear its air without greater co-operation among the three regions. The study indicates the three governments' determination to tackle the problem. With this new platform, CAN also hopes that the study will also encourage more transparent information exchanges.

It is said that this new study will synchronise the year-long concurrent field monitoring programmes of Hong Kong, Guangdong and Macau. CAN believes it will help concerned groups and the public to better evaluate the situation with comparable standards.

As the study will take a long time until its completion, CAN hopes that the research team can give us regular updates within the study period, so that we can be better informed of the current situation.

[Clean Air Network Press Release, 06/11/2014]

Labelling scheme extended to microwave ovens

The Electrical and Mechanical Services Department (EMSD) on 18th December 2014 extended the voluntary Energy Efficiency Labelling Scheme to include microwave ovens. Manufacturers, importers and local sales agents of microwave ovens are invited to join.

The voluntary scheme was launched by the EMSD in 1995. In order to qualify for this energy label, the product should meet the scheme's energy efficiency performance requirements. Currently, there are 22 kinds of household and office appliances covered by the voluntary scheme.

There are five kinds of household appliances required to display energy labels under the mandatory Energy Efficiency Labelling Scheme introduced by the *Energy Efficiency (Labelling of Products) Ordinance* in 2009.

By displaying energy efficiency information, the scheme helps consumers to make informed choices in purchasing energy-efficient products. It also encourages manufacturers and suppliers to market more energy-efficient products, thereby conserving energy.

[Press Releases, Environment Protection Department, 18/12/2014]

Grading of beach water quality released

The EPD released recent grading of water quality of four beaches which are open all year round for swimming.

Three beaches, including Clear Water Bay Second Beach, Deep Water Bay Beach and Golden Beach were rated as Good (Grade 1). However, Silverstrand Beach was rated as Fair (Grade 2).

Compared with the grading system, beaches are classified into four grades according to the level of E. coli in the water. Grades are calculated on the basis of the geometric mean of the E. coli counts in the five most recent sampling occasions.

Grade 4 is assigned to a beach whose last E. coli reading exceeded a threshold figure, irrespective of the geometric mean. Swimmers are advised to avoid these beaches until the water quality improves.

The EPD warned that many beaches may be more polluted than their grades indicated during and after periods of heavy rain. Therefore, bathers are advised to avoid swimming at beaches for up to three days after a storm or heavy rainfall.

[Press Releases, Environment Protection Department, 19/12/2014]

Landfill gas treatment and export

The Environmental Protection Department (EPD) has signed an agreement with the contractor of the Southeast New Territories (SENT) Landfill, Green Valley Landfill Limited (GVL).

Under the agreement, GVL will cooperate with the Hong Kong and China Gas Company Limited (HKCG) to provide onsite treatment facilities to convert landfill gas into synthetic natural gas, which will be fed to the HKCG supply grid at the Tseng Lan Shue Offtake Station through a 12 kilometre dedicated pipeline. The agreement is expected to reduce consumption of fossil fuels for town gas production and greenhouse gas emissions into the atmosphere.

Currently, some of the landfill gas from the SENT Landfill is used to generate electricity and some as a direct heating fuel for on-site facilities. Surplus raw landfill gas is flared off for safety reasons. The partnership of GVL and HKCG will export treated surplus landfill gas to the off-take station at Tseng Lan Shue for injection into the HKCG supply grid for a term of 20 years up to 2036. This project is expected to reduce approximately 56,000 tonnes of carbon dioxide emissions from the SENT Landfill, which is equal to the level of carbon dioxide removed by 2.4 million trees in a year.

[Press Releases, Environment Protection Department, 22/12/2014]

ADVISORY COUNCIL ON THE ENVIRONMENT (ACE)

Summary of minutes of the 201st Meeting of the Advisory Council on the Environment held on 13 October 2014:

Review of the Third Technical Memorandum for Allocation of Emission Allowances for Power Plants

1. Members were briefed on the review of the Third Technical Memorandum for Allocation of Emission Allowances for Power Plants and asked to support to the proposal to reduce emission allowances for power plants starting from 1 January 2019 by issuing a new Technical Memorandum (TM) under the Air Pollution Control Ordinance (Cap. 311) (APCO).
2. In response to a member's enquiry regarding the process of defining and benchmarking the best practicable means (BPM), a member said that in setting the BPM requirements for both current and new power plants, EPD would make reference to the control technologies and guidelines adopted by environmentally advanced countries e.g. USA and the European Union. For the current power plants which had emission control equipment in place and no scope for further retrofit of emission reduction devices, they would concentrate on maintaining the good condition of the generation equipment in setting the BPM and its emission control performance. During the review of the Third TM, it was found that the performance of some emission control devices of the current power plants had above the design standards. That would provide room to further tightening the emission allowances through the Fourth TM.
3. A member mentioned that the attainment of the new Air Quality Objectives (AQOs) would depend on the emission reduction from other major emission sources including vehicles and marine vessels. The fuel mix of the power sector was an important factor in the attainment and maintenance of AQOs, Environmental Protection Department (EPD) would conduct a further review of the TM in 2015 to take into account the outcomes of the fuel mix review and the overall emission reduction aims for 2020.
4. A member explained that the proposed Fourth TM did not impose a limit on CO₂. Since the source of CO₂ was mainly from the carbon part of the burnt fuel, reduction in CO₂ emission could be achieved through adjusting the fuel mix by maximizing the use of gas-fired generation units and tapping renewable energy.
5. Natural gas inherently had fluctuations in its sulphur content because it came from diverse sources. Database showed that the natural gas supplied through West-East Gas Pipeline II had a sulphur content lower than the stipulated standard in the supply contract. Therefore, EPD considered it possible to further tighten the emission allowance for sulphur dioxide (SO₂) in the Fourth TM.
6. A member mentioned that both The Hong Kong Electric Company Ltd. (HEC) and CLP Power Hong Kong Ltd. (CLP) had carried out extensive retrofitting of emission control devices after the First TM review, this leaving little room for further reduction in emissions through these methods. The two power companies were required to carry on the emission reduction.
7. A member said that the emissions limits in the BPM (in mega grams per cubic metre) were related to the concentrations of the pollutants at the emission points such as the stack of the power plant, whereas the AQOs limits governed the concentrations of the pollutants in the ambient air after they had been emitted from their sources and dispersed in the atmosphere. A member confirmed that the proposed tightening of emission limits would be conducted in 2015 to take into account the results of the fuel mix review.
8. The Chairman enquired why the setting of emission limit on PM_{2.5} was impracticable. A member explained that without reliable measurement techniques at this stage, it was not meaningful to impose a limit on PM_{2.5} emissions.
9. A member pointed out that the roadside PM_{2.5} level had been decreased since the government's programmes in reducing emission from diesel vehicles. While EPD would continue working on the reduction of particulates, the recent major challenge was to reduce the level of roadside NO₂ concentration.
10. The Chairman suggested that in the long run, a strategic sampling monitoring by the government should be established to collect sampling data to analyse the impact of the emission limit on the reduction of ambient PM_{2.5} concentration.

11. Members were briefed on the post-Environmental Impact Assessment follow-up programme on the five on-going railway projects, namely: the Hong Kong Section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL); Shatin to Central Link (SCL); West Island Line (WIL); South Island Line (East) (SIL(E)) and Kwun Tong Line Extension (KTE).
12. A member pointed out that most of the complaints were regarded to noise and dust issues. The complaints statistics in a particular time frame could not reflect the overall environmental performance of the railway projects as each project was progressing at different stages and would face construction issues at different timelines.
13. A member informed that there were only a few conviction cases related to non-compliance of construction noise permit condition.
14. Referring to the handling of the archaeological finds at SCL To Kwa Wan works site, a member suggested Environment Manager of MTR Corporation Ltd. to consider displaying archaeological information in the relevant MTR stations for public education purpose. The Chairman and a member agreed to the suggestion that the display should be made on a permanent basis.

CLIMATE CHANGE

BHP – Billiton supports a global carbon price

BHP Billiton's assets have already been impacted by climate change and the world's largest miner supports a global price on carbon to drive technology to reduce emissions.

BHP marketing president, Mike Henry, said climate change was something the company had been focused on for almost 20 years, adding the miner had a clear record of action. "Our assets are already being impacted by climate change and we have taken a number of measures to mitigate those impacts," he said at a company briefing on environment, social and governance.

"For the world to effectively address climate change it needs to evolve the portfolio of responses. In that, we think a price on carbon is going to be important, and the world focusing on how we mitigate greenhouse gas emissions by way of low emissions technology and energy efficiency."

BHP's rival Rio Tinto was also recently pushing the need for the advancement of technologies to reduce emissions. Rio's chief executive of energy, Harry Kenyon-Slaney, has pointed to carbon capture and storage as one solution to addressing climate concerns around coal use. Mr. Henry said that under all plausible scenarios, fossil fuels will remain an important part of the energy mix for decades to come. "Therefore it is important that the world accelerates the focus on energy efficiency, lower emissions technology and adaptation to climate change impacts," he said.

BHP's marketing chief would not be drawn on what carbon price the company used for its internal models, but he argued the price of Australia's carbon tax, at \$25 a tonne, was too high.

Mr. Henry added that BHP had in recent days been one of a number of business and government signatories to a World Bank statement calling for a price on carbon. "The reality is that over the short to medium term carbon pricing will be at either a national level or regional level but over time that could be expected to evolve potentially to a more globally co-ordinated carbon scheme," he said.

[*The Australian*, 26/09/2014]

Tokyo contributes US\$1.5b to climate change fund

Japan plans to give up to US\$1.5 billion to the UN-backed Green Climate Fund (GCF) to help developing countries fight global warming. The cash adds to a reported US\$2.5 billion that Washington is offering for the GCF, a mechanism designed as a way for wealthy countries to help poorer ones to become greener and to bolster their defences against the effects of climate change.

France and Germany have pledged to contribute US\$1 billion each to the UN's new climate framework. Christiana Figueres, head of the UN Framework Convention on Climate Change, has called for an initial capitalisation of US\$10 billion by the end of this year.

China set a target for its greenhouse gas output to peak "around 2030", the first time Beijing has agreed to an approximate target date for beginning to reverse its emissions trend. President Obama set a goal for the US to cut such emissions by between 26 per cent and 28 per cent from 2005 levels by 2025.

[*SCMP*, 15/11/2014]

Tepid response to climate change agreement

Don't expect the landmark US-China climate change agreement to nudge the world's rising thermostat downward much on its own, scientists say.

While they hail it as a start, experts who study heat-trapping carbon dioxide don't see the deal, making significant progress without other countries joining in. The maths shows that even with the agreement, the globe is still rushing toward another 2 degrees Celsius temperature rise – a level that world leaders have pledged to avoid as too dangerous.

China, the world's No.1 polluter, will still increase its emissions until 2030 or so, under the agreement. The US, which ranks second, promised to cut pollution from the burning of coal, oil and gas to levels that haven't been seen since 1969. But whatever cuts the US makes will be swamped by the Chinese growth in pollution over the next 15 years.

"It doesn't change things much," said Glen Peters, a Norwegian scientist who was part of the Global Carbon Project, an international team of researchers that tracks and calculates global emissions every year. "This is not far off the business as usual" scenario the world is already on, he said.

In 2009, countries across the globe set a goal of limiting global warming to about 1 degree above current levels. Peters' team has calculated that the world would hit that mark around 2040 and the US-China accord doesn't change that.

World leaders forged the first international treaty to combat global warming in Kyoto, Japan, in 1997. But developing countries, including China and India, were not required to reduce greenhouse gas emissions and that caused a big rift. The United States signed the agreement, but did not ratify or honour it.

Climate Interactive, a group that makes projections on emissions, has run simulations that showed the new agreement will mean about 700 billion tonnes of carbon dioxide will be kept out of the air by 2100, reducing expected cumulative carbon pollution by about 8 per cent. That would only prevent temperatures from rising about two-tenths of a degree, said Andrew Jones, co-director of the project at MIT. If all other countries followed the US-China example, temperatures could be reduced by as much as 0.8 degrees.

In the agreement, China set a target for its emissions to peak in 2030 or earlier. That's the first time China has set a deadline for stopping its emissions growth. China also said it would increase the share of clean energy sources like wind and solar power to 20 per cent by 2030, about double what it is today.

The US-China agreement, even when combined with pledges already on the table from other nations, represents only half of the world's carbon dioxide emissions. Much of the rest are coming from the developing world, which are likely to see their carbon pollution soar in the future.

[SCMP, 16/11/2014]

Chinese scientists aim to tackle climate change

The Chinese Academy of Sciences recently hosted a small workshop which involved scientists from around the world who work on a device called the Expendable Bathythermograph (XBT). The XBT is used to measure ocean temperatures. It was invented many decades ago to determine the depth of the thermocline so that submarines positioned below the thermocline are more able to avoid detection. The device is released from the deck of a ship and descends through the water to record temperatures on the way. As the XBT descends, it releases a spool of copper wire which is connected to a data collection device so that temperatures can be recorded.

Every year, hundreds of thousands of XBTs are used to collect a database of ocean temperatures for climate studies. As the devices will sink to the ocean floor and cannot be used again, they are designed to be low cost. To save costs, no pressure sensors are installed on the devices. However, this means that XBTs do not enable scientists to accurately measure the energy of ocean waters.

Understanding the accuracy of XBT descension rates is one of the most important and difficult issues in all of climate science. However, only a small handful of scientists are actively working to improve XBT accuracy, and the Chinese Academy of Sciences decided to bring them all together. They met for three days to try to hammer out a best practices standard. Approximately half the attendees were Chinese and travel funding was provided by the Chinese Academy of Sciences.

While in many countries, such as Australia and the USA, funding for basic research is decreasing, funding is increasing in critical scientific areas in China. Scientists are greatly respected by the Chinese nation. It is expected that China will have a forward looking view of the future in terms of clean energy and climate.

[*The Guardian*, 28/11/2014]

Poorest states need more climate aid

Half of nearly US\$8 billion in climate finance given to the developing world since 2003 went to just 10 countries, and nations most at risk got the short end of the stick, a report said.

The top recipients were Morocco, Mexico and Brazil, which each got more than US\$500 million of the US\$7.6 billion total, according to an analysis of spending over the last decade in 135 countries.

The report of the Overseas Development Institute (ODI), a UK think tank, was released ahead of the second and final week of UN negotiations in Lima for a world pact to curb potentially disastrous global warming. "Mexico and Brazil are among the top 10 emitters of greenhouse gases, and with Morocco, all have huge renewable energy potential," the report says.

However, many of the poorest countries were left behind. The DDI said that: "Conflict-affected and fragile states such as Ivory Coast and South Sudan, where it is generally difficult to spend finance, received less than US\$350,000 and US\$700,000 respectively." Several middle income countries that are vulnerable to the impacts of climate change and have significant clean energy potential, such as Namibia, El Salvador and Guatemala, also received less than US\$5 million each.

The aid from rich nations is meant to help poor and vulnerable countries adapt to climate change impacts and curb earth-warming greenhouse gas emissions through a shift away from fossil fuels such as oil, coal and gas. Funding for adaptation rocketed from US\$3.8 million in 2003 to US\$2 billion this year, said the report. "While not enough, the trends in spending are positive," it said. "Poor countries such as Niger, Bangladesh and Nepal have received nearly US\$400 million over the last decade to help them cope with this growing threat." However, the 10 most vulnerable nations, including Somalia, the Solomon Islands, Burundi, Niger and Eritrea, benefited from only seven per cent of the adaptation aid.

Finance is a sore point at the UN climate talks, with the developing nations insisting that the rich economies show how they intend to honour promises to muster up to US\$100 billion in climate finance per year from 2020. To date, nearly US\$10 billion in start-up capital had been promised for the Green Climate Fund, the main vehicle for channelling the money.

A recent UN report said that the developing countries might need up to US\$500 billion per year by 2050 just for adaptation alone.

[SCMP, 09/12/2014]

Rigorous review of emissions rejected in Peru talks

Climate negotiators from more than 190 countries salvaged a compromise deal in Lima on 14th December 2014. They set the stage for a global pact in Paris next year, but rejected a rigorous review of the limitation of greenhouse gas emissions they plan. An agreement on what information should go into the pledges that countries submit for the expected Paris pact was reached.

Representatives had argued for a day over the wording of the decision. Developing nations expressed concern that the text blurred the distinction between what rich and poor countries will be expected to do. The final draft alleviated those concerns by including language to the effect countries have "common but differentiated responsibilities" to deal with global warming.

The target of climate change discussions is to form a global agreement in Paris that puts the world on a path to reduce the heat-trapping gases that scientists say are warming the planet. Many developing countries, which are the most vulnerable to climate change's impact, accuse rich nations of decreasing their responsibilities to curb climate change and pay for its damage.

Additionally, top carbon polluter China and other major developing countries objected to the plans for a review process that would allow the pledges to be compared before Paris. The new draft stated only that all pledges would be reviewed a month ahead of Paris to assess their combined effect on climate change. In the past, Western nations were the biggest CO2 emitters. Currently, China and India have the highest emissions.

According to the scientific panel on climate change of the United Nations, the world can pump out no more than 1 trillion tons of carbon per year to have possible chance of avoiding dangerous levels of global warming.

[*South China Morning Post*, 15/12/2014]

Global warming will cut wheat yields

Reports show that global wheat yields are likely to decrease significantly as climate change takes hold. Researchers found that wheat production will fall by 6 per cent for every 1 Celsius increase in temperatures. It is confirmed that by the end of this century the world is likely to warm by at least 2 degrees Celsius compared with pre-industrial levels. Political efforts are focusing on holding the potential temperature rise to no higher than that limit. However, some analyses suggest that if greenhouse gas emissions continue to grow at current rates then warming of as much as 5 degrees Celsius could be in store.

In anticipating the effect on wheat production, researchers tested 30 computer models against field experiments to establish the most likely scenario. Although a fall of 6 per cent in yield may not sound dramatic, as the world's population grows the pressure on staple crops will increase.

Due to the sudden rises in food prices, food price riots have been seen in several developing countries, demonstrating the vulnerability of the poor to grain prices. The global population is currently over 7 billion and is estimated to be as high as 12 billion by 2050. It is expected that the world shortage of agricultural land and water sources will become more serious.

[*The Guardian*, 23/12/2014]

REGIONAL & INTERNATIONAL

CHINA

China raises the roof on solar

China, the world's biggest solar market for two years running, is pushing to install more panels at factories, schools and even greenhouses as it seeks to meet its goals under a historic climate agreement with the US.

China expects to install up to 8 gigawatts of small solar systems this year, more than 10 times the amount installed last year. The country had almost 20GW of solar capacity at the end of last year, equivalent to about 20 nuclear reactors. Most of that came from massive solar farms in remote areas and policymakers are now promoting smaller systems closer to where they are needed. Solar's proportion of electricity generation capacity rose to 2 per cent, from 0.08 per cent four years ago, which was double nuclear power's share last year.

Producing so much power in isolated areas creates bottlenecks in the grid. So-called distributed power, smaller systems installed locally, eliminates the need for costly transmission cables and will speed the country's transition away from the coal-fired power plants that help create some of the world's dirtiest air.

The push to promote wider use of rooftop solar comes amid growing health concerns about smog from residents and foreign companies. It also adds to the nation's push to be a leader within the global climate community. The National Energy Administration introduced policies in September to boost the use of distributed solar power. The agency asked local authorities to identify potential sites for rooftop plants and smaller, ground-mounted projects. These would include industrial and commercial companies with large roof-tops, as well as railway stations and airport terminals.

Some commentators forecast that China will install in one year about twice as many panels atop factories, office buildings and other distributed sites as there are in operation today in Australia, one of the world's sunniest countries.

It is expected the roof-top systems will become more competitive as solar panel costs continued to drop. But the industry is not expanding fast enough because a series of institutional problems, such as limited subsidies from the government and complex payment processes. China also needs to build smart grid systems to coordinate the distributed power network.

[*SCMP*, 14/11/2014]

Big polluters shamed

Mainland environmental groups have named and shamed big publicly listed polluters, accusing more than 200 Shanghai or Hong Kong-listed firms of worsening the country's smog crisis with unchecked emissions exceeding national standards.

Using pollution data published by government agencies, the Beijing-based Institute of Public and Environmental Affairs (IPE) for the first time compiled an extensive database of public companies' environmental practices, finding that 1,069 of the companies, or more than 40 per cent of those on the mainland, had recorded violations. The main environmental offenders were companies involved in the power, cement, non-ferrous metal smelting, iron and steel, and chemical sectors.

IPE found that 34 out of 36 listed iron and steel companies on the mainland had environmental violation records. Nearly 80 per cent of the mainland's listed power companies also had a record of breaches. The group tracked more than 200 companies – many of them large state-owned firms – in the biggest smog-related sectors over 92 days between August and October, and found widespread environmental violations by their local branches and subsidiaries.

IPE and two local green groups from Hunan and Jiangsu provinces singled out a number of listed companies for repeated violations. These companies included top state enterprises Sinochem International Corp and Aluminum Corp of China Ltd (Chinalco). IPE said: "Such findings are alarming, especially because many of the publicly listed companies are large state-owned firms, which should have better resources to tackle pollution."

Power plants, coking companies, cement mills and aluminium smelters in Shandong and Hebei provinces, the mainland's most polluted areas, pumped out high levels of pollution even on days of heavy smog, when emergency regulations demand a cut in production.

Environmental groups also called for investors to heed the risks of investing in such companies. But Guo Peiyuan, founder of environmental consultancy SynTao, said: "Investors won't really care about the environmental problems as long as the costs of violating the environmental laws are lower than abiding by them."

[SCMP, 10/12/2014]

JAPAN

Japan seeks action against coral poachers

Japan's foreign minister has urged China to take steps to stop Chinese fishermen poaching red coral in Japanese waters. As many as 200 Chinese fishing boats were seen last Thursday near populated Japanese islands 440km south of Tokyo Bay. Japan complained to China about it.

The boats have been sailing north from near the Ogasawara islets, 1,800km south of Japan's mainland, since mid-September. Five poaching-related arrests had been made since September. The illegally gathered red coral can fetch high prices on the black market in China. A Chinese Foreign Ministry spokeswoman said that the "illegal harvesting" of red coral was prohibited and that Chinese authorities would enforce the law more vigorously.

[SCMP, 05/11/2014]

Bright future for fuel-cell cars

Toyota Motor Corp has chosen the name Mirai, which means "future" in Japanese, for a fuel-cell powered sedan that can travel 483km using a hydrogen tank that can be refilled in less than five minutes.

Most electric cars, reliant on batteries, can travel only less than 160km on a full charge, and charging them can take hours. Toyota argues that fuel-cell cars can provide the same clean transportation with far greater convenience. And with a low centre of gravity, the Mirai was particularly fun to drive, chief executive Akio Toyoda said. "Today, we are at a turning point in automotive history ... where people will embrace an environmentally friendly car that is a pleasure to drive," Toyoda said. Toyota did not provide details on how much the Mirai would cost in the US, or how many the company hoped to sell. Toyota had said previously that the car would go on sale in Japan in April priced at about 7 million yen (HK\$468,000).

Carmakers are under pressure in the US, Europe, Japan and South Korea to offer vehicles that emit little or no carbon pollution and reduce petrol use. Battery-powered cars championed by Tesla Motors and Nissan Motor store electricity in large lithium-ion packs. Fuel cells generate electricity in an electro-chemical reaction of hydrogen and air, producing only water vapour as a byproduct.

Honda has said it will offer a revamped hydrogen sedan for sale in California next year. In May, Hyundai began leasing a fuel-cell version of its Tucson SUV.

To help promote fuel-cell sales, California plans to install more than 50 hydrogen fuel stations within two years, partly with financial support from Toyota and other carmakers. Toyota will also start working with Paris-based Air Liquide to build 12 fuelling stations in five north-eastern US states. Most commercial hydrogen is made from natural gas in a process that consumes energy and emits carbon. Hydrogen, the most abundant element in the universe, is also the lightest, marking it difficult and sometimes dangerous to store and transport. Tesla chief executive Elon Musk said hydrogen's shortcomings made it a dead-end for vehicles. "Fuel cells should be renamed 'fool cells', they are so stupid," Musk said in an interview last year.

By 2025, California plans to require about one of seven vehicles sold by each of the biggest carmakers to eliminate or reduce emissions by using fuel cells, batteries, or gas-electric hybrid engines. Ten other states are taking similar steps. Over time, California's Air Resources Board has been shifting to favour fuel-cell cars at the expense of battery-only vehicles.

[SCMP, 18/11/2014]

AUSTRALIA

Apartments feature hanging gardens and an internal water recycling plant

A residential building in Sydney has been named the best tall building in the world. One Central Park beat 88 other international entries to top the list, and was commended for its visible use of green design. The building's key features include hanging gardens, a cantilevered heliostat, an internal water recycling plant and low-carbon power plant.

French landscape artist Patrick Blanc was commissioned to design the 1,120 square metres of vertical gardens that cover the surface of the building. Some 35,200 plants and 383 different species were used, including some natives such as acacias. The gardens use a remote-controlled, dripper irrigation system and a special process developed by Blanc in which the roots of a plant are attached to a mesh-covered felt, soaked with mineralised water.

It is the building's on-site water recycling factory and power plant that are responsible for most of the water and energy savings, and the gardens are a visible and tangible reminder of innovative green infrastructure. One Central Park is also unusual for its cantilever heliostat that is covered in a series of reflector panels. These panels automatically redirect natural sunlight to a nearby park during shady periods of the day. The 623-apartment building was completed in 2013.

[SCMP, 13/11/2014]

Sperm whales die on beach

A pod of six sperm whales has washed up dead in a rare mass stranding on the coast of the state of South Australia. Animal welfare officials are struggling with the logistics of handling the huge carcasses.

The whales, which can weigh up to 50 tonnes, were found at low tide by residents on Parara beach, about 150 kilometres northwest of Adelaide. "We're not sure why they beached," said a Department of Environment official. "A theory is that one was ill and moved to shallow waters and then called out to fellow pod members who followed it in."

Animal welfare manager Deborah Kelly said it was rare to see whales beach in the area. "I haven't seen a marine event like this in South Australia since the mass stranding of 58 dolphins at Nepean Bay in the 1990s." The department official said police and the council were considering their options on how to handle the carcasses, which were now in shallow waters and could attract sharks.

The sperm whale is the largest of the toothed whale species and can grow up to 16 metres in length.

[SCMP, 09/12/2014]

U.S.A.

Clovis, a town of 38,000 in a renowned dairy region of eastern New Mexico, may become famous as the centre of something else: a unified, national electrical grid.

If all goes according to plan, ground will be broken in coming months on a vast electrical city of sorts, covering as much ground as Clovis itself, on state-owned land a dozen miles north of town. Tres Amigas, as it's called, will, for the first time, provide a real link between the three discrete North American electrical grids: the Western, Eastern and ERCOT, or Texas, Interconnections.

That linkage would potentially turn the three grids into one giant one, and it could change the way power is bought and sold. "Conceptually it's going to send things in an interesting, and new and important direction," said David Mooney, center director at the National Renewable Energy Labs in Golden, Colorado. "It has the potential of taking very large solar farms (in the Southwest) and taking that power at the peak of its output and shipping that power back east as the sun is starting to go down and utilities are seeing their peak demands."

Numerous delays in commencing construction reveal how difficult it is to raise cash – some \$550 million – to build a project that carries rather than generates electricity, even if the project has the potential to be one of the most critical parts of the grid. Tres Amigas would provide not only a physical link between the three grids, but also a real-time exchange system by which utilities and power producers could buy and sell power on a short-term market. That would provide more options for a utility looking for backup power when demand increases substantially, for example, or when intermittent power sources like wind or solar experience natural fluctuations.

Whilst the Clovis facility will be the actual hub through which electricity flows, the project also includes an equally critical marketing hub, where sales of electricity will be brokered on the very short term. "It will be like a commodity exchange," says Chief Operating Officer Dave Stidham. "(Advanced software) will allow us to make thousands of transactions instantaneously across the Grid. You'll be able to detect deals and enact them instantaneously. If all of a sudden the price (of electricity) goes up in Nebraska, and the sun's shining in California (on solar plants), we'll broker that deal and transfer that power."

The expansive, mostly flat landscape is already desirable for wind and solar producers. Tres Amigas will provide a way for them to hook into not just one, but three grids, with access to millions of potential customers (assuming, that is, that adequate transmission is in place to connect Tres Amigas to the bigger Western Grid). That, in turn, could draw other alternative energy businesses – compressed air power storage, for example, or big battery banks – to the area.

Experts expected Clovis could someday become as well known for clean power as it is for dairies. Who knows, maybe when – or if – Tres Amigas is built, it will provide a catalyst for capturing the methane emitted by the dairies and their thousands of bovine residents, and converting it into electricity to power homes in far off cities.

[High Country News, 02/12/2014]

Seattle's polluted river to be cleaned-up

Kids who were born the year Seattle's Lower Duwamish Waterway was designated a Superfund clean-up site are now approaching high school. If everything goes according to plan, the federally ordered river clean-up will be finished by the time they are well into their 30s.

So it's hard to describe anything in this sluggish process as "momentous," but Tuesday's announcement certainly fits that bill, with the release of the Environmental Protection Agency's final cleanup order for Seattle's only river.

The order is the EPA's prescription for returning the Duwamish to health after more than a century of the river-equivalent of a life of hard drinking and chain smoking: In the last 100 years, the Duwamish has been choked off from most of its headwaters and straightened from 13 miles to five. It was used for decades as an industrial waste dump for corporations like Boeing, which was founded along its banks and will foot a significant portion of the cleanup bill. Today, the river is so saturated with industrial pollutants, like polychlorinated biphenyl, that toxicity in some fish surpasses the Washington State threshold for safe human consumption by a factor of 10. Cutting through south Seattle en route to the Puget Sound, the river has long been a glaring mar on the city's proud reputation as a clean and green metropolis.

Boeing and other major polluters – which include the city of Seattle itself – have already spent more than \$150 million on cleaning the river since it was designated a Superfund site in 2001. Tuesday's order adds another \$342 million to the planned work, though that cost will be shared by hundreds of entities that have contributed to the pollution over the decades. The figure is almost \$40 million higher than initially proposed by the EPA, since the agency decided more toxic mud needed to be removed up from the river-bottom. Nearly 1 million cubic yards of poisonous sludge will be scooped up, put onto barges and trucks and hauled to a storage site in Eastern Washington.

Other toxic mud will be left in the river but "capped" to prevent contamination from reaching the water; still more will be buried in sand. Active cleanup of the river will take seven years, after which the EPA will monitor the river for another 10, in hopes that more pollution will naturally flush from its system.

The *Duwamish River Cleanup Coalition*, a feisty activist group that had lobbied the federal government for more dredging to be included in the final plan, applauded the EPA for increasing the amount of polluted sediment that would be removed from the river.

However, even a vastly restored Duwamish will carry a sober message about what happens to rivers when the land around them is heavily developed. Even as old pollution is removed from the river bottom, the waterway's heavily industrialised and urbanised valley will still act as a giant catch basin for hydrocarbons and industrial chemicals. That's because many of Seattle's urban and industrial stormdrains still runoff into the river untreated. Efforts to control this sort of pollution are underway, but no one believes that the Duwamish can be completely quarantined from the everyday pollutants used in the world around it.

EPA Region 10, which oversees the cleanup, has reiterated what regulators have been saying for years: no matter how much is spent restoring the Duwamish, the fish that live in the water will never be clean enough to eat without restriction. (As is, the state health department has put all resident Duwamish fish and shellfish under a "Do Not Eat" advisory, meaning no fish should be consumed from the river.)

The clean-up should make consuming a limited amount of crab OK. But even that is many years away. "We're still looking at a 20 year period," said BJ Cummings, development and policy advisor with the *Cleanup Coalition*. "That's a whole other generation of families growing up with poison fish on the table."

[High Country News, 03/12/2014]

WORLD

Nature parks lack funding

Vast areas of land and sea have become environmental sanctuaries in recent years, but are not being funded adequately, the UN says. The United Nations Environment Programme (Unep) said that countries were on track to meet targets to protect 17 per cent of land and 10 per cent of marine areas by 2020.

The warning comes as thousands of delegates attend this week's World Parks Congress in Sydney, Australia, to lay out a global agenda for protected areas over the next 10 years. The Unep, citing a 2012 estimate, said US\$76 billion was needed each year to effectively establish and manage the world's protected areas.

Unep executive director Achim Steiner said taking care of sanctuaries was critical to tackling climate change and supporting biodiversity. "This report shows that the will to do so is present," he said. The UN agency estimates 15.4 per cent of land and inland water areas and 3.4 per cent of oceans – 32.6 million sq km in all – are now protected areas, up 1.6 million sq km since 2012.

The report warned that only 0.25 per cent of the high seas – open ocean outside territorial waters – was currently included, "highlighting the urgent need to overcome challenges in establishing such areas where national governance systems do not exist".

A further 21.5 million sq km of the high seas need to be protected to meet the 2020 goals, which were outlined at the Convention on Biological Diversity's last meeting in Japan in 2010.

[SCMP, 14/11/2014]

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Convictions under environmental legislation: October and November 2014 (December 2014 data not available)

[Note: the EPD no longer classifies second (and subsequent) offences.]

The EPD's summary of convictions recorded and fines imposed during the above period is as follows:

October 2014

Thirty-five convictions were recorded in October for breaches of legislation enforced by the Environmental Protection Department.

Fifteen of the convictions were under the *Air Pollution Control Ordinance*, 4 were under the *Noise Control Ordinance*, 14 were under the *Waste Disposal Ordinance* and 2 were under the *Water Pollution Control Ordinance*.

The heaviest fine in October was \$40,000 on each count, assessed against a company that carried out notifiable work other than in accordance with the *Construction Dust Regulation*.

November 2014

Seventeen convictions were recorded in November for breaches of legislation enforced by the Environmental Protection Department.

Two of the convictions were under the *Air Pollution Control Ordinance*, 6 were under the *Noise Control Ordinance*, 7 were under the *Waste Disposal Ordinance* and 2 were under the *Water Pollution Control Ordinance*.

The heaviest fine in November was \$20,000, assessed against a company that contravened the provisions of a licence.

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