

URBAN PLANNING AND ENVIRONMENTAL LAW QUARTERLY

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As Asia’s “World City”, Hong Kong must implement effective measures to reduce our carbon footprint, such as adopting environmentally friendly energy policies. In this edition we consider the government’s commitment—or lack thereof—to switching to renewable energy.

The Editors

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HONG KONG LACKS COMMITMENT TO RENEWABLE ENERGY

Energy policy

The Environment Protection Department (EPD) and Environmental Bureau (ENB) are the government’s principal agencies overseeing our two electricity supply companies – China Light and Power Company Limited [now known as CLP Power Hong Kong Limited] (CLP) and The Hongkong Electric Co., Ltd. (HEC) – in the context of the environmental effects of their operations.

The EPD’s energy policy vision (published on its website) is:

“Our vision is of a Hong Kong

- *which enjoys an environment that is both healthy and pleasant*
- *in which the community places a premium on sustaining such an environment for both themselves and future generations, and pursues sustainable development; and*
- *in which the community enjoys a reliable and safe energy supply at reasonable prices, while improving energy efficiency, promoting energy conservation and minimising the environmental impacts from the production and use of energy”*

To realise this laudable, but very general, policy, EPD says:

“... we will continue to strengthen our ability to meet environmental sustainability goals. We will formulate policies and implement programmes to improve and safeguard the environment while contributing proactively to strategic decision-making in the government that will have an impact on the environment.

To realise our vision on energy side, we will continue to monitor the operations of the two power companies and the town-gas supply company through the established monitoring arrangements. We will strive to achieve energy efficiency and conservation through public education, promotion, legislation and implementation of various programmes. We will also promote competition and transparency in the local fuel market.”

The EPD has published a number of policies by which the above “goals” are to be achieved, such as, for example, minimising waste:

“We aim to plan and provide convenient and cost-effective waste management facilities, as well as promote a sustainable approach to waste management in Hong Kong, in which we consume less, produce less waste, and reuse or recover value from waste.

We will exercise the principles of Reduce, Reuse, Recycle and Responsibility in the consumption of materials and seek continual improvement in the efficient use of natural resources and energy in all our operations.”

Digressing for a moment, we observe that, as with 80% of the vision statement, this motherhood statement is next to useless for its complete lack of any concrete objectives or plans. However, even more galling for those of us (which should, of course, be the entire community) who are concerned about the state of our environment, is the almost complete lack of action over many years by the EPD, EBN or our other illustrious conservation watchdog, the Agricultural, Fisheries and Conservation Department (AFCD), to implement laws or programmes to achieve the saintly policy.

In relation to our subject topic, energy supply, EPD's stated policy is:

"... to continue to oversee the reliability of power supply and monitor the performance of the power companies. We will also actively promote energy efficiency and energy saving in the planning, design, production, use and maintenance of products, buildings and services. We aim to integrate energy conservation and efficiency considerations into policies, strategies, plans, programmes, implementation and operations in both the public and private sectors. We will actively promote partnership and community support, facilitate suitable research and development, and raise the awareness of the community on energy efficiency and conservation matters."

Clearly, a singularly important way of achieving more responsible electricity generation and supply is to reduce (greatly!) our current heavy dependence on fossil fuel generation by encouraging or, indeed, compelling CLP and HEC to utilise "renewable energy" sources. The government itself recognised this in its current renewable energy information website, where it is stated that: *"With the gradual reduction of available fossil fuel reserves and the impact on the environment of fossil fuel use, renewable energy is becoming increasingly important"*.

The government's description of "renewable energy" and its benefits is also to be applauded:

"Unlike fossil fuels such as coal and oil, renewable energy will never run out. It is abundant in the environment, and can come from the sun, wind, running water, waves, and biomass. Solar and wind energy, in particular, hold much promise in Hong Kong. But the absolute value of all renewable energy sources is that we can use them, and then use them again. Another important advantage is that they don't emit greenhouse gases or atmospheric pollutants. So if we use more renewable energy we can clean up our environment and help ourselves."

Renewable energy report

In 2000 the Electrical and Mechanical Services Department commissioned a "Study on the Potential Applications of Renewable Energy in Hong Kong" by Camp Dresser & McKee International Inc. (in association with GHK (HK) Ltd.). Their report was released in December 2002 as the "Stage 1 Study Report" (Report). The 240 page Report contains many findings and recommendations directly relevant to our renewable energy topic. Time and space do not permit a full overview, so we shall refer to only several aspects of the Report in the following discussion.

Firstly, however, the point must be made that in its current public position paper on renewable energy, the government says the Report: *"found that solar power, energy from waste and wind energy have the potential for wider use in Hong Kong. There are now plans to further develop renewable energy use so that you can benefit 1 more direct ways."*

The Report was released nearly 14 years ago, yet in that time the government has not introduced any significant "plans to further develop renewable energy use". This is yet another example of the EPD's (and other agencies') long standing practice of calling for studies/reports as a face-saving exercise, without ever actually *doing* something about the problem.

The Report outlines several renewable energy sources which Hong Kong should investigate as at least partial substitutes for fossil fuel generators, such as:

- (i) solar energy
- (ii) wind energy
- (iii) deployment of fuel cells
- (iv) energy-from-waste generators
- (v) biomass energy
- (vi) tidal and wave power
- (vii) geothermal energy

However, not all possible renewable sources are considered practical alternatives for Hong Kong. Indeed the Report suggests that an initial target should be generation of 3% of the total energy supply (against 1999 baseline) by 2022. But even this modest goal seems beyond the government's reach.

Wind and solar generated energy appear to have the best chance of becoming part of our energy supply, although the Report concludes the alternative source with most potential is energy generated from biomass. As to solar energy, the Report notes:

"The total energy resource available from solar PV technology is therefore related to the area of horizontal surfaces (and vertical also, though this is much less efficient) that is available for PV panel installation.

Hong Kong has a total land area of 1,098 km². If these were all fitted with horizontal PV panels, the total energy available would be 133 TWh per year. This would be sufficient to meet the SAR's current annual electricity demand (which was about 35.5 TWh in 1999). Obviously, the area that is actually available for PV panel installation would be much smaller due to many other land uses and constraints. However, PV systems can be integrated into buildings making use of otherwise alienated space, and have a potential for wide-scale application in Hong Kong."

Hong Kong's electricity supply is currently provided by CLP (Kowloon, New Territories, Lantau Island and some other islands) and HEC (Hong Kong Island, Ap Lei Chau and Lamma Island) and related generating companies. Electricity is generated from coal, natural gas, diesel fuel and nuclear power (Daya Bay). The companies also own and manage the distribution infrastructure in their respective geographical areas.

Under Scheme of Control Agreements (SCAs) the government controls the amount of electricity generated or supplied by CLP and HEC and the price consumers are charged. The SCAs do not confer exclusive supply rights on CLP and HEC, so other, perhaps more environmentally responsible, suppliers could enter the Hong Kong market.

The government has ample scope to use the SCAs and its broad powers to encourage, if not compel, CLP and HEC to take realistic and robust (i.e. not yet more consultations/reports/pilot studies) to incorporate renewable energy sources into their electricity generation matrix. To date, as with all matters in the field of environmental protection and innovation, the government (especially EPD and AFCD) has preferred to move at a glacial pace – if at all – towards switching to renewable power supplies. If developers or business people have a problem, there is instant support from the government. But when it comes to the more important matter of the environment, the government prefers a perpetual state of inertia.

Hong Kong's ambivalence towards renewable energy has been criticised by many experts over the years. An example is a recent article in the SCMP (4 August 2016) by Albert Lai (convenor at the Professional Commons) and John Sayer (director of Carbon Case Asia), who have some expertise in this area (especially in this region), and whose opinions the government should take notice of. Parts of this timely and important article are reproduced below.

Imagine if our chief executive announced that everyone had to pay an extra HK\$5,600 next year for their electricity to cover the cost of dealing with the effects of fossil fuel use. While there is unlikely to happen, the government is nevertheless subsidizing the use of fossil fuels here. Data from the International Monetary Fund shows that this annual subsidy came to more than HK\$40 billion in 2015.

Fossil fuel subsidies stand in the way of changes needed to achieve the goals set at last year's Paris climate summit of a net-zero carbon economy this century, according to both the UN and the World Bank.

In Hong Kong, the scheme of control agreements will expire in 2018, providing an important opportunity for change. The city has the potential for solar, wind, tidal and wave power. The key lies in shaping a beneficial renewable energy policy and an enabling market environment.

To shape policy, we can learn from the experience of similarly developed economies. First, market access and diversification is important. Beyond 2018, power company regulations should give priority access to all who are willing and able to generate renewable energy, with a guaranteed connection to the grid.

Second, investment in renewable energy must be supported by a guaranteed price for clean electricity. Guangdong province, for one, pays twice the rate for solar power as for coal-generated electricity.

Third, a redirection of existing funds is needed. The Environment Bureau wants to revise the scheme of control agreements so the return on fixed assets is lowered from 9.9 per cent to around 6 per cent. If all or part of the reduction went into a feed-in tariff fund, it could provide a stable source of funding to encourage the development of renewable energy in Hong Kong.

At a rough calculation, with 2 per cent return on revenue paid into such a fund, about HK\$30 billion a year would be generated. Assuming the government would contribute another half, an annual HK\$45 billion fund could be created. If the average feed-in tariff is set at HK\$2.50 per kWh, the fund would be sufficient to buy 1.8 billion kWh of clean electricity per year. This would kick-start renewable energy power generation by raising its contribution to 4 per cent of total production.

Fourth, providing space for community participation is vital. Citizens and businesses with suitable rooftops could take advantage of clean energy programmes. The government could allot space in housing estates, public facilities and other suitable areas for groups to form social enterprises and plan community-based investment in solar or wind power facilities.

In Hong Kong there are 17 reservoirs suitable for the installation of floating solar power plants, similar to those now appearing elsewhere. Offshore waters are also suitable for the installation of wind farms.

Finally, there's green finance for the new era. With a stable feed-in tariff, renewable energy schemes are predictable enough to attract green funds from around the world. To allow more people to start the fruits of renewable energy development, the government could consider issuing green bonds.

There are many advantages to the transition to renewable energy. A transformation of our energy system to multiple technologies and diverse suppliers will stimulate the economy and create green jobs.

For the public, implementing a feed-in tariff does not increase electricity tariffs. On the contrary, introducing more diverse renewable energy sources would reduce future vulnerability to increases in gas prices and electricity costs. The public would also benefit from reduced pollution and avoid hefty health care costs.

China's National Energy Administration has set a national average target for utility companies to generate 9 per cent of total electricity from renewable by 2020, not including hydroelectric or nuclear power. For Guangdong province, the target is 7 per cent.

In this context, the plan outlined above for Hong Kong to put in place incentives to generate 4 per cent of its power from renewable should be seen as only a first step in the right direction.

The authors conclude with this incisive question and comment: "Who in Hong Kong will have the decisiveness, courage and vision needed to set ambitious targets for renewable energy development? After all, Hong Kong's contribution to national and international reductions in greenhouse gas emissions will ultimately be even more important for the city's development and the well-being of its people than the next chief executive election."

Regrettably, but realistically, the answer to their question is very likely a resounding "no one!"

TOWN PLANNING

Draft Wong Nai Chung Outline Zoning Plan approved

The Chief Executive in Council approved the draft Wong Nai Chung Outline Zoning Plan ("OZP") on 26 August 2016.

The planning scheme area of the OZP covers approximately 138 hectares; its northern, eastern, southern and western boundaries are Leighton Road, Hong Kong Stadium and Tai Hang Road, Wong Nai Chung Gap Road and Stubbs Road respectively.

Specific zones are:

- 1.24 hectares are zoned "Commercial" covering 3 sites for commercial developments, such as offices, shops, services, places of entertainment, eating places and hotels;
- 38.88 hectares at the southern part of Wong Nai Chung area are zoned "Residential" allowing high, medium and low-density residential developments covering 5.65, 15.4 and 17.83 hectares respectively;
- 14.32 hectares are zoned "Government, Institution or Community" and 9.34 hectares are zoned "Open Space";
- 20.6 hectares are zoned "Green Belt"; and
- 35.5 hectares are zoned "Other Specified Uses", which includes the race course, the sports and recreation clubs to its north, the South China Athletic Association Stadium, the Jockey Club stables, private sports/recreation clubs and a public open space at the southern end of Shan Kwong Road, a petrol filling station at Sing Woo Road, and cemeteries to the west of Wong Nai Chung Road and at Shan Kwong Road.

[Town Planning Board Press Release, 26/08/2016]

Draft Kam Tin South Outline Zoning Plan approved

The Chief Executive in Council approved the draft Kam Tin South Outline Zoning Plan (“OZP”) on 09 September 2016.

The planning scheme area of the OZP covers approximately 785 hectares; its northern, eastern, southern and western boundaries are Kam Tin Road, Shek Kong Barracks and Ma Pau Ling, Tai Lam Country Park and Ho Hok Shan respectively.

Specific zones are:

- 2.5 hectares are zoned “Comprehensive Development Area” for comprehensive development / redevelopment of the area for residential use with supporting facilities with the northern part being designated for public use.
- 162.9 hectares are zoned residential, with approximately 119.1 hectares for “Village Type Development”, 11.8 hectares for “Residential (Group C)” for low-density residential developments and 32 hectares for “Residential (Group D)” to encourage residential upgrading of existing domestic structures to permanent buildings;
- 6.3 hectares are zoned “Government, Institution or Community” and 3.2 hectares are zoned “Open Space”;
- 234.1 hectares are zoned “Agriculture”;
- 258.8 hectares are zoned “Conservation Area” and 1.7 hectares are zoned “Green Belt”; and
- 67 hectares are zoned “Other Specified Uses” including an area for Railway Station and Public Transport Interchange with Commercial / Residential Development, an area for Railway Depot with Commercial / Residential Development, an area for Rural Use and 2 other sites for petrol filling stations.

[Town Planning Board Press Release, 09/09/2016]

Draft Po Toi Islands Outline Zoning Plan approved

The Chief Executive in Council also approved the draft Po Toi Islands Outline Zoning Plan (“OZP”) on 09 September 2016.

The planning scheme area covers approximately 549.67 hectares and mainly includes Po Toi, Mat Chau, Beaufort Island, Sung Kong and Waglan Island. The OZP is intended to conserve areas of high ecological significance.

Specific zones are:

- 0.17 hectare is zoned “Residential (Group D)” for improvement and upgrading of existing temporary structures within the rural areas through redevelopment of existing temporary structures to permanent buildings, mainly covering one or two-storeys temporary structures built on private land to the southwest of Po Toi Village;
- 0.74 hectare is zoned “Village Type Development”;
- 0.24 hectare is zoned “Government, Institution or Community” covering Tin Hau Temple, an abandoned village, the lighthouse and other Government facilities at southern Waglan Island;
- 0.06 hectare in front of the Tin Hau Temple is zoned “Open Space”;
- 0.07 hectare is zoned “Other Specified Uses” (annotated “Pier”);
- 150.45 hectares are zoned “Green Belt”;
- 30.49 hectares are zoned “Coastal Protection Area”; and
- 367.45 hectares are zoned “Conservation Area”.

[Town Planning Board Press Release, 09/09/2016]

WEST KOWLOON CULTURAL DISTRICT

The 53rd Board Meeting of West Kowloon Cultural District Authority

The Board of the West Kowloon Cultural District Authority (“WKCD”) held its 53rd meeting on 20 July 2016.

It was reported to the meeting that construction of core arts and cultural facilities in the district had continued to move forward. Construction of the Xiqu Centre is now at the stage of completing the external envelope, while contractors engaged in constructing the M+ Pavillion are preparing to erect the major trusses which support the tower section of the structure. To commemorate the completion of M+, a dedication ceremony will take place on 22 July.

Members also noted that on 12 July 2016 the WKCD entered into a partnership agreement with the Shanghai Centre of Chinese Operas, under which both parties will take turns to organise exchange activities every year.

[WKCD Press Release, 20/07/2016]

The 54th Board Meeting of West Kowloon Cultural District Authority

The Board of the West Kowloon Cultural District Authority (WKCD) held its 54th meeting on 05 September 2016.

Members were informed that construction of the various venues has been progressing well. Work on the Art Park has been underway for about 1 month. It is anticipated that the outer shell of Xiqu Centre will be completed within this year. As for the M+ site, it was reported that the tower section will begin to emerge soon after the major trusses supporting it are completed in mid-2017.

It was noted that the site safety record remained excellent. The reportable accident rate of was only 0.05 per 100,000 man-hours worked.

The Board further reviewed the possible development of a Mega Performance Venue and Exhibition Centre in light of relevant government policies. Survey results revealed increasing use of alternative venues for performances in recent years and the Board, after thorough discussions, came to the conclusion that the original proposal to build a Mega Performance Venue (to be financed by private sectors) is no longer suitable. Instead, the Board will now explore the possibility of constructing a medium-sized, multi-purpose venue through private sector financing for exhibitions, convention and performance purposes to complement other arts and cultural facilities.

[WKCD Press Release, 05/09/2016]

Trash swamping beaches

Photos evidencing tons of garbage from the Mainland being washed up in Nim Shue Wan and Cheung Sha Beach on Lantau Island have gone viral on the internet. The flotsam is mostly made up of discarded packaging, plastic bottles, diapers, rubber slippers and tableware, many with Simplified Chinese markings. The EPD has also received reports of serious pollution in Deep Water Bay, Shek O and on Po Toi Island.

An official from the EPD explained that heavy rain in several Mainland provinces, including Guangdong, Guangxi, Hunan and Jiangxi, has caused the problem in Hong Kong.

An assistant professor at the Education University of Hong Kong said the garbage did not appear to be newly discarded and many have Simplified Chinese markings. A representative from Sea Shepherd Conservation Society suspected illegal dump sites in the Pearl River Delta might have been responsible for the garbage pile-up. In any event, all agreed the EPD should meet with its Mainland counterparts to tackle the problem.

[*EJ Insight*, 05/07/2016]

Sand dump sparks fear

Following the Tin Shui Wai mud hill incident in March, a "sand hill" has been discovered only 10 metres away from the homes of troubled villagers of Mai Po Lung Village in Yuen Long. A villager surnamed Choi, who has lived in the village for more than 50 years, recalled she first spotted dumper trucks entering the site 2 weeks ago. In just a week, the hill has grown to be 2 stories high and covering an area equivalent to 2 basketball courts.

Choi said she is gravely concerned as the sand hill is next to a path frequented by the villagers, and a family lives right next to the dump. She also feared the "thin metal boards with a few screws" enclosing the sand hill will not prevent a collapse. Driven by her concerns, she attempted to reason with the dumper truck drivers, but all disclaimed responsibility, saying they were just following orders.

According to the Buildings Department spokesperson, if there is a real risk of the sand hill collapsing and endangering lives and properties, the department will issue a Dangerous Hillside Order, mandating the owner to investigate and carry out necessary works to rectify the situation. It should be noted the government issued such order to the parties responsible for creating the Tin Shui Wai mud hill. However, concern groups reported the dump did not get any smaller thereafter.

[*The Standard*, 01/08/2016]

Boosting e-waste recycling

The EPD announced the implementation of the producer responsibility scheme ("PRs") for waste electrical and electronic equipment ("WEEE") is making good progress. In the past 6 years, WEEE collections through various pilot schemes aggregated approximately 1,600 tonnes in total. Items that are still serviceable are donated to the needy after refurbishment. Others are dismantled and recycled. It is estimated that over 25,000 pieces of refurbished equipment have been donated to some 7,800 needy families.

The department is optimistic that the Waste Electrical and Electronic Equipment Treatment and Recycling Facility ("WEEETRF"), which is expected to be commissioned by mid-2017 and capable of handling 30,000 tonnes of WEEE annually, will further assist the recycling rates of WEEE. In anticipation of the WEEETRF, in March 2016, the Legislative Council enacted the *Promotion of Recycling and Proper Disposal (Electrical Equipment and Electronic Equipment) (Amendment) Ordinance 2016*, providing the legal framework for the PRs.

[*Press Release, Environmental Protection Department*, 04/08/2016]

Illegal site formation prosecuted

The Environmental Protection Department ("EPD") announced today that a contractor was convicted and fined \$147,000 for illegal site formation work and disposal of construction waste opposite Kingswood Villas in Tin Shui Wai.

The site formation work was assessed by the EPD to have failed to follow regulatory measures, and illegal disposal of construction waste was found on nearby government and private land. The EPD prosecuted the contractor for nine offences under the *Air Pollution Control (Construction Dust) Regulation* and five offences under the *Waste Disposal Ordinance*.

The *Regulation* specifies categories of construction works as notifiable works. The subject site came within one of these. Failure to notify the EPD prior to the commencement of such works attracts a maximum fine of \$25,000. Further, a range of measures is stipulated to limit the dispersion of dust. Failure to adopt those measures may result in a fine of up to \$50,000. The *Ordinance* states that anyone who disposes of construction waste on government land or private land without permission is liable to a fine of \$200,000 and 6 months' imprisonment.

[*Press Release, Environmental Protection Department*, 16/08/2016]

ADVISORY COUNCIL ON THE ENVIRONMENT (ACE)

Summary of Minutes of the 36th Meeting of the Waste Management Sub-Committee held on 19 July 2016:

The Waste Management Sub-Committee held a meeting on 19 July 2016. The main items of that meeting were: (1) Update on the EcoPark Development and (2) Plastic Shopping Bag Charging: Evaluation of Effectiveness.

(1) Update on the EcoPark development

The EcoPark is Hong Kong's first recycling-business park. It is a 20-hectare facility in Tuen Mun Area 38 specifically constructed for the recycling industry.

Mr. H M Wong of the EPD briefed the sub-committee on the background of the EcoPark and reported the latest development, such as: (a) improvements that were made for Phase 2 (e.g. extension of tenancy period from 10 to 20 years); (b) objectives that were achieved and (c) benefits provided to the community (e.g. creating over 330 job opportunities and an annual throughput of 160,000 tonnes of recyclables in 2015).

Mr. H M Wong also confirmed that the tenancies of Yan Oi Tong and St. James Settlement would be terminated, as these non-government organisations have already achieved their objectives. Therefore, the sites currently rented by those non-government organisations will be returned to the market for bidding by interested recyclers.

In addition to the same tendering arrangements that applied to Phase 1, proposals involving waste types which require more support, such as plastic and waste cooking oil, will be given a higher technical score during the tender evaluation process when the lots are re-tendered. This should encourage certain kinds of recycling businesses to be established, while allowing market flexibility.

Regarding the competition between private recyclers and the government-funded Waste Electrical and Electronic Equipment Treatment and Recycling Facility (WEEETRF), Mr Samson Lai, the Assistant Director of Environmental Protection, explained that whilst WEEETRF serves the entire community, private recyclers tend to focus at the more profitable market segments.

Mr. H M Wong also pointed out that in addition to the Yan Oi Tong EcoPark Plastic Resources Recycling Centre (PRRC), there are 18 community recycling centres supported by the Environment Conservation Fund which will enhance community promotion and education projects concerning waste reduction and recycling. Indeed, the EcoPark Visitor's Centre, which has set up a gallery to display the products manufactured by the EcoPark tenants, has already received 120,000 visitors. The EcoPark will also engage non-government organisations to further promote recycling at housing estates.

(2) Plastic shopping bag charging: evaluation of effectiveness

Mr Samson Lai also briefed members on the background and the findings concerning the plastic shopping bag charging scheme which took effect on 01 April 2015. A member suggested the possibility of including paper bags in future surveys, given the switching effect. However, it was noted that this might not be feasible, especially when paper bags might be worn out after being mixed with trash and soil. Besides, some retailers have already taken the initiative to promote "Bring your own bag" and impose charges for providing paper bags.

As well, Mr Lai explained that a "retention" approach was adopted for the second phase of the producer responsibility scheme. He remarked that switching back to the "remittance" approach would be difficult in the current situation and that it would be better to further improve the scheme along current directions.

It was also clarified for members that the current findings with regards to donation of the PSB charges collected reported on the background paper might not portray the overall situation in the retail industry, since many companies donated money without publicising their charitable work.

CLIMATE CHANGE

China vowed to cut meat consumption

Globally, 14.5% of planet-warming emissions emanate from the keeping and eating of cows, chickens, pigs and other animals – more than the emissions from the entire transport sector. Livestock emit methane, a highly potent greenhouse gas, while land clearing and fertilizers release large quantities of carbon into the atmosphere.

China now consumes 28% of the world's meat. The Chinese government has outlined a plan to halve its 1.3 billion population's meat consumption by 2030. This would save 233 million tonnes of greenhouse gases from being released to the atmosphere each year, as well as relieving the increasing strain on the country's water supply, which is already blighted by polluted rivers and groundwater.

New dietary guidelines drawn up by China's health ministry recommend a maximum daily consumption of 40-75 grams of meat by an adult. If the guidelines are followed, carbon dioxide equivalent emissions from China's livestock industry would be reduced by an aggregate of 1 billion tonnes by 2030.

The emergence of China as a global economic power has radically altered the diets of a newly wealthy population. The average Chinese person now consumes 63kg of meat a year. Consumption of an additional 30kg of meat per person is expected by 2030 if nothing is done to disrupt this trend. The new guidelines would reduce this to 14-27kg a year.

Despite the Chinese government's latest commitment, it may be difficult to convince the country's rising middle classes to reduce its consumption of meat, as meat has gone from rare treat to a regular staple for many Chinese people. There are also strong cultural traditions attached to the eating of many animals. In fact, the Chinese character for "home" depicts a pig underneath the roof of a house.

Further, to meet the skyrocketing meat consumption, Chinese companies have been buying farms in the United States and Australia. In 2013, a Chinese company purchased the largest US pork producer, Smithfield Foods, to help keep up with demand.

[*The Guardian*, 20/06/2016]

Climate change kills Australian mangroves

Some 7,000 hectares of the mangroves in the Gulf of Carpentaria perished in just a month, the first time such an event has been recorded. The dieback – where mangroves are either dead or defoliated – was confirmed by aerial and satellite surveys.

Norm Duke, a mangrove ecologist from James Cook University, attributed the dieback to an extended drought period. Duke explained that although droughts are normal, with the intervention of climate change the dry season has become unusually long and severe. He added that although defoliated mangroves could recover, most would not and will be dead, given the severity of the drought.

Local rangers reported creatures like shellfish, dependent on the shade of the mangroves, are dying and turtles and dugongs that are dependent on the ecosystem could be starving in a few months' time. Duke predicted that as the climate becomes more erratic, similar drought will become more commonplace in the near future.

[*SCMP*, 12/07/2016]

Cloning trees to fight climate change?

Climate change is increasingly worrying. The first 6 months of 2016 were the hottest ever on record, according to NASA and National Oceanic and Atmospheric Administration. It is the third year in a row in which a record has been set.

A group of arborists claim they have part of the solution to slowing climate change: cloning trees. The group is cloning giant California trees and re-planting them worldwide. They believe the trees are ideal for absorbing greenhouse gases that drive climate change. During the past twenty years, the group has planted more than 300,000 of the cloned trees worldwide.

The arborists believe the massive size and longevity of the California trees – Sierra Nevada sequoias, which can reach nearly 300 feet tall and 3,000 years old – indicate they are ideal for greenhouse gasses absorption. However, others remained sceptical.

Todd Dawson, professor of integrated biology at the University of California, Berkeley, said he admires the effort but it remains unclear if it would help to prevent climate change. Although it is generally accepted that through photosynthesis, trees absorb carbon dioxide and other pollutant particulates and emit oxygen in return, a study published in 2007 found that more trees may not necessarily correlate with decrease in global warming. In any event, more has to be done, given the scale of the problem.

[*International Business Times*, 20/07/2016]

Climate projections based on science

In response to a letter from a climate change sceptic questioning Hong Kong Observatory's objectivity in warnings on climate change, the Observatory's Senior Scientific Officer, Lee Sai-ming, wrote as follows.

In the second edition of "Hong Kong in a Warming World" (www.weather.gov.hk/climate_change/climate_change_e.pdf), the Hong Kong Observatory has updated the climate projections for the globe and Hong Kong taking into consideration the emission reduction pledges made at the Paris climate summit (COP21) in late 2015.

While the COP21 pledges aim to steer the world away from the worst scenario, the projection results suggest that the world could still be heading towards a temperature rise of around three degrees Celsius (relative to pre-industrial levels), and more mitigation efforts in reducing carbon emission are required to achieve the COP 21 target of keeping global temperature rises below two degrees.

Adaptation efforts are also needed to make our city more resilient to climate change effects including a higher chance of extreme weather.

As the world is finally taking positive steps in the right direction, your correspondent has refused to acknowledge the reality of the situation and continues to make use of your newspaper to spread sceptical and denial views that are counterproductive and scientifically unfounded.

The Hong Kong Observatory has tried its best to respond time and again, and I am not going to take up more of your columns reprising all the arguments here.

While G. Bailey can pick and choose what to believe, the Observatory is a government department with a purview on climate change science and related issues. It has a duty to inform and educate the general public based on the best information and evidence available, such as the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change that represents the consensus view of climate scientists.

Climate projections are generally based on objective numerical modelling techniques in accordance with well-established law of physics.

Of course, projection so far into the future always contains an element of uncertainty, but the driving force of nature behind such laws would lead to trends that are inevitable if we continue regardless with unchecked greenhouse gas emissions.

[*SCMP*, 04/08/2016]

Forced relocation of Alaskan village

Shishmaref, home to generations of seal hunters and fishermen in Alaska, will be abandoned to the rising seas. It is estimated within the next two decades, the whole island will erode away completely.

Although the decision has been made, many feared the forced relocation may break-up their intimate community, since all 650 villagers might not live together post relocation. Against that backdrop, it is essential to understand what reality has forced the villagers to concede their home is likely to be inundated by increasing sea levels.

In the past 35 years, the island has lost 3,000 feet of coastline. Rising temperatures have shrunk the sea ice, which buffered Shishmaref from storm surges. At the same time, the permafrost that the village is built on has begun to melt. The shore is receding at an average rate of up to 10 feet per annum. Warmer waters allow more commercial ships to pass, polluting the seas and disturbing their fragile ecosystem. Importantly, thinner ice has led to a surge in fatalities among hunters, who plunge to their deaths through unexpected cracks.

Now that the village has made its decision, the immediate challenge is the relocation cost, estimated at approximately US\$180 million. Villagers were angered when in 2013 John Kerry announced that Vietnam will receive US\$17 million from America to deal with climate change, while Shishmaref has been told that no federal funding was available to assist the relocation. Activists have urged America to address adaption issues in its own Arctic communities as the country assumes the Chairmanship of the Arctic Council.

[*The Telegraph*, 18/08/2016]

Hottest July on record

Earth just broiled to its hottest month in recorded history, according to Nasa. Even after the fading of a strong El Nino, which spikes global temperatures on top of man-made climate change, July burst global temperature records. Nasa calculated that July 2016 was 0.84 degrees Celsius warmer than the 1950-1980 global average. Scientists blame mostly man-made climate change from the burning of fossil fuel, exacerbated every few years El Nino a natural warming of parts of the Pacific Ocean that changes weather worldwide.

[*SCMP*, 18/08/2016]

Flooding in Louisiana

Bill Nye, the science educator best known for his educational videos, appeared on CNN to discuss the recent flooding in Louisiana that killed 13 people, damaged 60,000 homes, and forced the evacuation of thousands of others. He said that the disaster is the result of climate change, and it is only going to get worse.

Last week, a slow-moving, low-pressure storm hit parts of coastal Louisiana, resulted in 31 inches of rainfall over a two-day period. The Red Cross is calling the consequent flooding the worst natural disaster in the US since Hurricane Sandy, which killed over 200 people in 2012.

Nye explained that as the ocean gets warmer, its molecules expand, which allows more evaporation from the sea surface. It is reasonable to expect that the increase in evaporation is connected to storms, such as Louisiana experienced. Scientists around the world concurred with Nye, and warned that disasters like the Louisiana floods will not be an isolated incident.

Nye also took the opportunity to call out CNN for employing a “climate change denier” as one of their meteorologists. CNN meteorologist Chad Myers, who has a long history of climate change denial, has since renounced those views. Myer tweeted yesterday that “A scientist can be swayed by data and I was”.

[Quartz, 24/08/2016]

REGIONAL & INTERNATIONAL

CHINA

Prosecution of agency for inaction

The Chinese government has declared war on pollution, vowing to abandon the growth-at-all-costs economic model that has spoiled much of China’s water, skies and soil. In 2015, the National People’s Congress authorised prosecutors to file environmental lawsuits in a pilot programme. Later, China’s Supreme Court said it would give environmental groups the power to sue before any pollution had occurred if they could show that a particular activity could threaten the public interest.

Two years ago, Qingshun Chemical Technology Company was found to have produced dye without adequate safeguards. However, the Eastern Shandong Environmental Agency imposed only nominal administrative punishments and permitted the company to start trial operations. Against the backdrop of growing public discontent over such environmental problems, a test case was filed in December 2015.

Today, China’s top prosecutor, the Supreme People’s Procuratorate, announced it has successfully prosecuted the Eastern Shandong Environmental Agency for inadequately punishing the sewage company. This case was described by the prosecutor as China’s first “administrative public interest litigation case”.

[SCMP, 21/06/2016]

New rules to limit pollution

China plans to raise environmental standards in its highly polluting mining sector, according to a policy draft circulated by the Ministry of Environmental Protection.

Amid rising concerns about the state of its environment, the country has declared war on polluters and has drawn up new laws, standards and punishments aimed at forcing firms and local governments to toe the line.

The mining sector has been a crucial part of the mainland’s rapid economic expansion in the last three decades, but poor regulation and weak enforcement of standards has contaminated much of its soil and left parts of its land and water supplies unfit for human use, threatening public health.

According to draft rules published on the ministry’s website late last week, miners will be forced to treat more than 85 per cent of their wastewater and must put systems in place to achieve the “comprehensive utilisation” of tailings and other solid waste.

They will also be forced to rehabilitate land and minimise emissions while mines are still in operation, rather than treating soil and water long after it has been contaminated.

Mining companies will also be pressured to implement measures to protect or even relocate valuable ecosystems. Producers of toxic heavy metals like lead or cadmium also need to make use of biological or chemical technologies to decontaminate soil. The new rules will not apply to the coal industry, which has separate guidelines.

As much as 16 per cent of China’s soil exceeds state pollution limits, according to environment ministry data published last year. Farming on 3.3 million hectares of contaminated land across the country has been banned indefinitely.

[SCMP, 10/08/2016]

New national panda park

A plan to build a national park for giant pandas has been completed and will be submitted to the central government for approval, Xinhua reported yesterday. The provinces of Sichuan, Shaanxi and Gansu had determined the area for the park, said Yao Sidan, head of Sichuan’s provincial forestry department. Yao said authorities had tried to keep the pandas’ habitat intact when designing the plan, while also integrating existing nature reserves, parks and scenic areas into the national park, which will cover parts of all three provinces.

[SCMP, 18/08/2016]

Endangered sturgeon face new threat

A man-made ecological disaster on the Yangtze River could drive a critically endangered species of fish closer to extinction in the wild, according to a news report.

The increased threat to the Chinese sturgeon, which has existed for some 140 million years, comes after dams were opened to cope with flooding on higher reaches of the river this year. Huge numbers of several similar, commercially farmed species were then washed into the habitat of the wild fish on the Yangtze, Thepaper.cn reported.

Experts fear that the other species of sturgeon will compete with the endangered native breed and wipe it out. Only 57 native sturgeon are thought to survive in the wild due to factors that include native sturgeon water pollution and dams, which prevent the fish from getting to their spawning grounds.

Nearly 10,000 tonnes of non-native sturgeon were swept into stretches of the Yangtze after dams in central Hubei province had to release huge amounts of water in July, the report said. The rush of floodwater destroyed pens at fish farms containing species including Amur, Kaluga and Siberian sturgeon.

An official at the Chinese Academy of Fishery Sciences, and a member of the investigative team, said that the escaped commercially bred sturgeon not only outnumbered the wild Chinese variety but also the total number of some fish species in tributaries of the lower Yangtze.

He also expressed concern that the non-native species might breed with Chinese sturgeons, putting a further strain on their ability to survive in the wild.

It takes Chinese sturgeons seven to eight years to mature and it is only after they do so that any genetic contamination can be detected.

[SCMP, 22/09/2016]

AUSTRALIA

Uranium mine plan rejected

Cameco, based in Canada and the world's largest publicly traded uranium company, has been exploring for uranium in Australia since 1996. Besides the Yeelirrie lode, it also owns the undeveloped Kintyre deposit in Western Australia, which it bought from Rio Tinto in 2008. Last year, the Kintyre project received environmental clearance to commence mining operations. Now the company proposes to mine up to 7,500 tonnes of uranium oxide annually from the Yeelirrie deposit, 630 km northeast of Perth.

After thorough investigation, the Western Australia Environmental Protection Authority ("EPA") concluded the proposal would threaten more than 70 species of underground fauna, known as "stygo fauna", and recommended that the state's environment minister reject the plan. The report is now open for a two-week public appeal period, closing 17 August 2016.

In its statement, Cameco said it respected the findings and would continue to seek a resolution. The company believed the subterranean fauna can be appropriately managed following further sampling and research.

[Reuters, 03/08/2016]

NEW ZEALAND

Researchers link air pollution to strokes

A new study has found air pollution could be a direct cause in some of the thousands of deaths due to strokes which occur in New Zealand each year. A global research team, co-led by Auckland University of Technology (AUT) professor Valery Feigin, analysed data from other studies, reports and official statistics to create a mathematical model estimating stroke risk for 188 countries from 1990 to 2013. It found about five per cent of strokes in New Zealand were caused by smog – with Timaru's air pollution levels rating the worst in Oceania.

Accordingly to figures recently released by the World Health Organisation, Christchurch was the worst of New Zealand's major cities. Wellington and Auckland's air was found to be much cleaner. Although the study found that there was a direct link to air pollution, about 90 per cent of strokes are preventable. The study found the link between air pollution and strokes varied in different parts of the world. In China, air pollution accounted for 40 per cent of strokes, but in Australia it was responsible for approximately one per cent.

[Sunday Star Times, 26/06/2016]

NICARAGUA

Environmental activists expelled

Six foreign environmental activists have been expelled after they were detained on allegations of handling explosive substances without authorisation. Nicaraguan authorities have not commented on the reason for the expulsions, but announced that no charges will be pressed against the foreigners.

The six activists were part of a caravan that has been holding workshops on ecological projects in Central American communities in recent months. They were detained in a town in southern Nicaragua, after an explosion occurred during a workshop on making low-fuel-consumption ovens.

Earlier in June, Nicaraguan authorities detained and expelled a Mexican citizen who they alleged had faked his own disappearance to hurt the image of the Nicaraguan government. About two weeks ago, Nicaragua expelled three recently arrived US government officials, who it accused of conducting anti-terrorism and anti-drug work without the necessary local authorisations.

[The Guardian, 28/06/2016]

PHILIPPINES

Nickel mines shutdown

The Philippines is the world's biggest source of nickel ore, and supplies almost all of the ore needed by Chinese mills to make stainless steel. In 2015, 32.3 million dry tons of ore were shipped out of the country.

Recently, Gina Lopez, environment secretary in President Rodrigo Duterte's administration began an audit of all mines and imposed a moratorium on approval of new projects. At the start of July, she proclaimed the audit may result in mines being closed in the next six months. This effectively extends a department directive issued under President Benigno Aquino in 2015, which gave miners until April to be ISO 14001-certified.

Today, the audit has resulted in the suspension of the operations of Berong Nickel Corporation, adding to the list of miners that the government has shut down for failing to meet environmental and welfare standards. Reportedly, the corporation's suspension was due to its failure to control river siltation in Palawan province. Siltation is measured by the accumulation of fine mineral particles in water. Before the suspension, the company had shipped 868,000 dry tons of ore in 2015.

Mining in the Autonomous Region in Muslim Mindanao in the south of the country has also been halted as authorities start to review company permits.

Nickel Asia Corporation and Global Ferronickel Holdings Incorporated, the nation's top two producers, both said they operate according to the standards demanded by their new regulator.

[*Bloomberg*, 18/07/2016]

UNITED KINGDOM

Ban microplastics to save oceans

Microplastics pollution comes from the fragmentation of larger pieces of plastic waste, small synthetic fibres from clothing and microbeads used in cosmetics and other products. The small size and weight of microplastics mean that they can be ingested by marine life to transfer the chemicals to and from different marine environments; alternatively tides and currents can carry them along with pollutants across oceans to remote locations, such as deep sea sediments and arctic sea ice.

Between 80,000 and 219,000 tonnes of microplastics enter the European marine environment each year. Globally, it is estimated that 15-51 trillion microplastic particles have accumulated in the ocean.

Members of the United Kingdom's Environmental Audit Committee have called for a ban of plastic microbeads in scrubs, toothpaste and beauty products within 18 months, after hearing that trillions of tiny pieces of plastic are accumulating in the world's oceans, lakes and estuaries, harming marine life and entering the food chain.

In fact, many large cosmetics companies have already made voluntary commitments to phase out microbeads by 2020. Regardless, the Committee believes a national ban will have advantages for consumers and the industry, in terms of consistency, universality and confidence.

Academics concurred and stressed urgent research is needed as relatively little has been done to understand the potential impacts of microplastics to human health or the marine ecology. Ideally, any legislation to control microplastics should be implemented on an international level.

[*The Guardian*, 24/08/2016]

UNITED STATES

Volkswagen sued again

Despite federal regulators and many states having agreed to a US\$14.7 billion settlement for Volkswagen's violation of consumer protection and state environmental regulations, the Attorneys General of New York, Massachusetts, and Maryland have filed coordinated lawsuits against Volkswagen for violating their environmental regulations and anti-fraud statutes by its diesel emissions cheating scam. The New York Attorney General stated that the revealed culture of deeply-rooted corporate arrogance, conscious disregard for the rule of law and damage to public health and the environment must be accounted for.

In response to the lawsuits, Volkswagen stated the company has continued to work cooperatively with the relevant United State's governmental bodies on a comprehensive national resolution of all remaining environmental issues, and regrets that some states have decided to sue now, notwithstanding their prior commitment to the ongoing federal-state collaborative process. The company highlighted that to date it has agreed to buy back or modify affected 2.0L TDI vehicles, establish a \$2.7 billion environmental remediation trust for the benefit of all 50 states, and invest \$2 billion in infrastructure to increase the use of zero emission vehicles across the United States.

[*The Verge*, 19/07/2016]

Call to limit aircraft carbon emissions

The cornerstone of President Barack Obama's climate agenda is the programme to cut carbon emissions from hundreds of coal-fired power plants, which the Supreme Court temporarily blocked earlier this year. Other pillars include a fuel-efficiency standard for vehicles and regulations cutting methane emissions from oil and natural gas drilling. As well, this week, the Environmental Protection Agency ("EPA") advanced a plan to limit carbon emissions from aircraft, which accounted for about 3% of emissions from the transportation sector of the country.

The trade association representing U.S. airlines and air cargo carriers, Airlines for America ("AA"), has commended EPA's action. AA emphasised the need to set aircraft emissions standards at the international level, in view of the international nature of the industry. Naturally, environmental groups also praised the move, believing the EPA's measure sets the stage for the country to step up its commitment to environmental protection.

In line with the objective to achieve carbon-neutral growth by 2020, any future growth in air travel will not result in a net increase in carbon emissions. AA reported that United States airlines have burnt 6% less fuel in 2015 than they did in 2000, despite carrying almost 24% more passengers and cargo. From 2020 through 2050, the industry aims to reduce its 2015 emission levels by half, through the use of sustainable fuels.

However, whether the EPA will follow through depends largely on who wins the presidential election in November 2016, as any rule or regulation cannot be implemented by January 2017. Democratic nominee Hillary Clinton has sworn to keep and expand on Obama's climate regulations. On the other hand, Republican nominee Donald Trump has questioned the scientific findings underpinning the climate rules and has vowed to repeal them.

[*The Wall Street Journal*, 25/07/2016]

Bottled water will outsell fizzy drinks

Bottled water will be more popular than carbonated soft drinks for the first time in the US this year, thanks to its convenience – and fears over what's coming out of the tap. The expectation that future sales of bottled water will rise has to do with crumbling infrastructure.

Lead contamination in Flint, Michigan; Washington, DC; and Newark, New Jersey, has focused attention on America's decaying pipes. At least US\$384 billion of improvements are needed to maintain and replace essential parts of the country's water infrastructure through 2030, according to the US Environmental Protection Agency.

“Concerns in places like Flint do bring bottled water to people’s attention as a safe and sealed source of drinking water,” said Jane Lazgin, a spokeswoman for Nestle Waters North America, the largest bottled-water maker.

Bottled water, of course, is vastly more costly than tap water and, many contend, far tougher on the environment. It’s about 2,000 times more expensive than tap on average, says Peter Gleick, president emeritus and chief scientist at the Pacific Institute. And it takes a lot of water to manufacture the bottle – triple the amount that’s inside, according to data from the Pacific Institute. Moreover, only 30 per cent of the plastic bottles are recycled, the National Association for PET Container Resources estimates.

[SCMP, 04/08/2016]

Asian beetle wreaks havoc

Over the next two years St Louis, Illinois, will cut down nearly one out of every five trees, altering the city’s leafy landscape for at least a generation. The Midwestern metropolis made the tough decision in the knowledge that if it does not cut down the trees, most will die.

St Louis is the latest victim of the emerald ash borer, an Asian beetle smaller than a penny, which emigrated from China via shipping materials and is destroying millions of trees in the US. The insect targets the ash tree – a common variety in Midwestern cities, where the tree can survive cramped sidewalks, harsh winters and road salts used to keep streets clear of ice and snow.

To head off the Emerald Ash Borer’s advance, St Louis will cut down almost all the cities’ 14,000 Ash trees – or roughly 17 per cent of all trees – over the next two years. A forestry expert surveyed the value of each tree, quantifying the benefits they provide in terms of property values, reducing storm water cut-off, and reducing energy costs through natural cooling. Only 1,000 made the cut.

The insect burrows into an ash tree, creating tunnels that completely destroy the tree’s ability to move nutrients through its bark. The destruction is so thorough that the tree usually starves to death in less than five years. The US Forest Service labels the beetle “the most devastating forest insect to reach North America in modern times”.

[SCMP, 10/08/2016]

GLOBAL

Deadliest year for environmental activists

A report released Monday by the not-for-profit watchdog group Global Witness, “On Dangerous Ground”, claims that 2015 was the deadliest yet for people who sought to protect their land, forests and rivers from mining, logging and dams. The report revealed 185 deaths it identified from news reports and public records, a nearly 60% increase on the previous year, and the highest annual toll on record.

The most dangerous countries for environmentalists were: Brazil, where 50 were slain; the Philippines, where 33 were killed; and Colombia, where 26 people lost their lives. At least 42 slayings were linked to mineral-mining operations, the most among categories that included logging and dam building.

Hardly anyone is brought to justice for these crimes. The reasons, according to the author, are that governments are lured to assist a broader corporate quest for resources on virgin land, and incidents often happened in remote areas where killers can easily escape or intimidate witnesses. To illustrate, the report provided a list of horrific incidents.

Last September, in the Philippines region of Mindanao, three armed men marched into a village and ordered Dionel Campos and Bello Sinzo – activists fighting a new mining operation and who remained in the village with their families in spite of repeated threats – out of their homes. In front of fellow villagers and students at a local school, the two men were executed. Afterwards, the gunmen fired their weapons skyward, causing the villagers to scatter. When the villagers returned, they found a third victim, Emerito Samarca, the executive director of the Alternative Learning Center for Agricultural and Livelihood Development, dead in a chair with his hands bound, a stab wound to his stomach and his throat slit. No arrests have been made.

Last March, in Honduras, environmental activist Berta Cáceres was slain. A video crew documenting her work for the Goldman Environmental Prize witnessed a situation so tense that they feared Cáceres would not live to receive the recognition. They provided her with a grant to upgrade her security detail. In spite of the upgrade, however, Cáceres was shot as she lay in her bed. Weeks later, Nelson Garcia, a fellow worker with the Civic Council of Popular and Indigenous Organizations of Honduras was murdered. The Honduran government has done little to seek justice.

Rigoberto Lima Choc, a Guatemalan teacher who spoke out against pollution of rivers caused by a palm oil operation, was shot on the steps of a court building.

Saw Johnny was gunned down by unidentified assailants in the Karen State of Myanmar after advocating for stronger land rights in the state.

Alfredo Ernesto Vracko Neuenschwander was shot and killed near his home in Peru’s biodiverse Tambopata region, where he protested against a gold mine.

Maria das Dores dos Santos Salvador was kidnapped and killed, likely for speaking out against the sale of her community’s land in the rural Amazonas area of Brazil.

In India, Sandeep Kothari’s body was found beaten and burnt after the journalist wrote a critique of sand mining in Balaghat district.

Following the assassination of Campos in the Philippines, his 17-year-old daughter, Michelle, left school and took up his fight and the cause of finding his killers, placing her own safety at risk. Her mission was duplicated less than a year later when Cáceres’ daughter, Bertha Zúñiga Cáceres, abandoned her studies to continue her mother’s cause, exposing herself to constant threats.

The author of the report believed these examples are just the tip of the iceberg. The toll in other countries could be higher as the author could only uncover deaths where there was some public or private record of a fatality. In many nations, slayings are not reported. The author believed 2016 threatens to be worse.

[The Washington Post, 20/06/2016]

Plastic waste is destroying our oceans

For years, fish have been feeding on tiny pieces of plastic in the ocean, mistaking them for food. These “microplastics”, sometimes thinner than human hair are now in 85-90 per cent of some fish populations, albeit in relatively small quantities, says Richard Thompson, a marine biology professor at Plymouth University.

In 2014, researchers bought dozens of fish from markets in California and Indonesia. One in 10 Californian fish had plastic in it, and one in four from Indonesia. A study last month projected that by 2050 there will be more plastic than fish in the world’s oceans.

Scientists have found that microplastics act like a sponge and absorb other chemical pollution already found in the water, such as DDT, a pesticide linked to reproductive system damage that was banned in the United States 40 years ago, but is still used in some countries, such as China.

The extent of the harm these chemical additives and absorbed chemicals can cause to fish, ecosystems and people is unknown. There are many different kinds of plastic in different sizes, with an array of different additives and absorbed pollutants.

In 2013, scientists fed medaka fish with food containing microplastics collect from the marine environment. Some of the fish developed lesions and symptoms of liver damage. But one impact was most apparent – the first were starving. The plastic in their stomachs made them feel full, which led to malnutrition.

That may hinder reproduction. At least that’s the impact on sea turtles: when they eat plastic, it causes them to become malnourished, and they end up reproducing less or not at all.

“The best research currently available,” estimates there are over 165 million tonnes of plastics in the oceans today, according to a World Economic Forum paper released in January. That’s the weight of over 3500 Titanics. And people have been adding about 9 million tonnes – some 190 Titanics – every year. Considering that plastic use is expected to double in the next 20 years, there will be 1 tonne of plastic for every tonne of fish in the oceans by 2050, the report predicted.

Between 102,000 tonnes and 260,000 tonnes of plastic debris were floating in the ocean in 2014, according to a study published in *Environmental Research Letters*. They were found on the shores of all inhabited continents, and even in remote areas and the Arctic.

Microplastics can be so small that they flow right through wastewater treatment plants. And because microplastics can absorb chemicals, they may even prevent treatment plants from removing dangerous chemicals from the water. Even worse, the treatment plants themselves use chemicals, like chlorine, to clean the water. Microplastics can absorb these chemicals and carry them out of the plants.

A World Economic Forum study suggests that proposed solutions to the microplastics problem should focus on plastic packaging, which makes up more than a quarter of all plastic produced and a major share of the pollution. Most of it is single use.

The study authors argue for creating plastics that are reusable to the point where they will “never become waste”. Yet they also acknowledge that’s not feasible with today’s technology.

The pollution problem is partially due to insufficient infrastructure for handling plastic waste. About a third of all plastic packaging produced doesn’t get incinerated, recycled or sent to a landfill upon disposal. It just leaks through the infrastructure and ends up in oceans, soil and waterways. Tackling the problem will require global cooperation between plastics industries, government, legislators and NGOs. So far, there’s no sign of that happening.

The United States passed a law last year banning “rinse-off” cosmetics from containing microplastic beads – tiny pieces of plastic, used for exfoliation, for example. But that only deals with a tiny fraction of the plastic pollution.

In 2012, 18-year-old Boyan Slat presented a concept of a passive floating barrier that would skim plastic debris off the ocean’s surface as the water naturally flowed through it. Slat set up The Ocean Cleanup foundation in 2013, and in June this year, the foundation deployed a 100-metre-long prototype of his invention in the North Sea, some 14 miles off the coast of the Netherlands.

The final barrier, more than 62 miles long, should be deployed in 2020. The project estimates the barrier will help extract almost 80,000 tonnes of plastic debris over 10 years. That’s about 8000 tonnes a year.

In comparison, it took 800,000 volunteers to remove 9000 tonnes of trash from beaches and waterways around the world last year, according to the Ocean Conservancy’s International Coastal Cleanup report.

But there’s a hard pill to swallow: the project will cost an estimated \$350 million over 10 years of operation – about \$4500 per tonne of plastic. That means it would cost about \$40 billion a year to extract the 9 million tonnes of plastic we’re currently releasing into the ocean every year.

And that’s not accounting for the increase in plastic production. Or the 165 million tonnes of plastic already in the oceans. It would take another more than \$740 billion to clean that up, assuming The Ocean Cleanup could capture all plastic – which it can’t. The barrier misses about 20 per cent of the pollution, partly because it only reaches to 10 feet deep.

It is also unable to capture particles smaller than 2 centimetres (about 0.8 inch), meaning it can’t clean up microplastics. But it can snag the bigger pieces before they turn into microplastics. However, there were already 102,000 tonnes – 260,000 tonnes of microplastics in the oceans in 2014. How much more will there be before The Ocean Cleanup launches?

As well, the project has no firm plans beyond 2020, much less any billion-dollar pledges from governments or corporations.

[*Epoch Times*, 11-17/08/2016]

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Convictions under environmental legislation: June to August 2016 (September 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:

June 2016

Seventy-six convictions were recorded in June 2016 for breaches of legislation enforced by the Environmental Protection Department (EPD).

Ten of the convictions were under the Air Pollution Control Ordinance, 3 were under the Noise Control Ordinance, 60 were under the Waste Disposal Ordinance, and 3 were under the Water Pollution Control Ordinance.

The heaviest penalty in June was assessed against a person that deposited waste unlawfully, who was sentenced to three weeks' imprisonment, suspended for 12 months.

July 2016

Sixty-four convictions were recorded in July 2016 for breaches of legislation enforced by the Environmental Protection Department (EPD).

Three of the convictions were under the Air Pollution Control Ordinance, six were under the Noise Control Ordinance, one was under the Ozone Layer Protection Ordinance, 51 were under the Waste Disposal Ordinance, and three were under the Water Pollution Control Ordinance.

The heaviest fine in July was \$80,000, assessed against a company that imported or exported ozone depleting substances without a licence.

August 2016

Eighty-four convictions were recorded in August 2016 for breaches of legislation enforced by the Environmental Protection Department (EPD).

Fifteen of the convictions were under the Air Pollution Control Ordinance, 15 were under the Noise Control Ordinance, 53 were under the Waste Disposal Ordinance, and 1 was under the Water Pollution Control Ordinance.

The heaviest penalty in August was assessed against a person who stored chemical waste in unsuitable containers and failed to display warning panel. He was sentenced to two weeks' imprisonment, suspended for 12 months.

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