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External Lighting in Hong Kong

PURPOSE

In view of increased public awareness toward the impact of external lighting, and following the Chief Executive's announcement in the 2008-09 Policy Address, the Environment Bureau (ENB) commissioned in 2009 a consultancy study on external lighting from the perspectives of energy wastage and light nuisance. This paper sets out the study findings and proposes the way forward.

PROPOSAL

2. We propose to adopt the following in addressing concerns on external lighting, specifically to enhance energy efficiency and minimize the extent of nuisance caused by external lighting by –

- (a) introducing a set of Guidelines on Industry Best Practices for External Lighting Installations to encourage voluntary action to minimize light nuisance and energy wastage. A draft of the proposed Guidelines, which will be further discussed with stakeholders before introduction, is at **Annex 1**;
- (b) Government setting the example by switching off external lightings which are for decorative and promotional purposes by 11 pm as far as possible. Individual departments would make appropriate measures to avoid their external lighting causing nuisance to nearby residents; and
- (c) setting up a Task Force, to be chaired by an independent non-official, to step up publicity and public education in the area of external lighting, advise on

the development of technical standards and related supplementary parameters specific to local circumstances, as well as to advise on the way forward to tackle nuisance caused by and energy wastage of external lighting, having regard to international experience and practices.

BACKGROUND

3. The lighting in our city, be it from households or commercial establishments, is part and parcel of the spectacular night scene of Hong Kong. It also contributes to the safe environment in our streets after nightfall. That said, the community is also aware of the impact external lighting may have on their daily life. Excessive external lighting, termed “light pollution”, is increasingly a community concern. While excessive external lighting is not clearly defined, the problem could be broken down into two main elements:

- (a) ***light nuisance*** caused by external lighting to residents nearby, usually as a result of strong, sometimes flashy, light; long operating hours and proximity to light sensitive receivers, etc.;
- (b) ***energy wastage*** due to excessive light intensity, use of inefficient lighting installations and long operating hours.

Current mechanism

4. In 2009 and 2010, the Environmental Protection Department (EPD) received 213 and 226 complaints respectively against external lighting caused by private organisations. Most of them were on light nuisance, in particular from advertisement signboards, decorative lightings, or spot lights on the external wall of buildings.

5. Upon receipt of complaints, EPD takes follow up action through liaison and mediation. Specifically, EPD will liaise with the responsible parties of the external lighting installations (the “light owners”), reflect to them the complainants’ concerns and seek their co-operation in minimising the extent of nuisance caused. Where appropriate, it will also offer practical advice to the light owners on possible mitigation measures, such as lowering the lighting intensity of relevant installations, adjusting the angle of spot lights to avoid nuisances from spill light, or switching off non-essential lights at an earlier time. At present, there is no legislation, regulation or guideline on light nuisance or energy wastage caused by external lighting installations.

Measures taken by relevant Government departments as light owners

6. On the part of the Government, a number of measures are being taken as the light owner to address the environmental problems of external lighting. For venues under the Housing Department, the Hong Kong Housing Authority (HA) promulgated technical design guidelines on external public lighting installations in 1998, which have been updated from time to time taking into account the need to protect the environment and to minimise the impact on residents. In line with the general rule, non-essential external lights are switched off by 11 pm; floodlights in ball courts are switched off when they are not in use or after midnight when the last hiring sessions expire; suitable lamp reflectors are used to focus light directly onto the ground in order to minimise spill light falling onto residential units; and lighting fittings directing upward to the sky are avoided as far as possible. In addition, in designing public housing estates and their lightings the relevant guidelines are complied with.

7. Taking into account operational and safety needs, the Leisure and Cultural Services Department (LCSD) seeks to minimise the impact on nearby residents in installing lighting systems at their venues. Reference is made to international standards to ensure that users can enjoy suitable illumination level while conducting activities in the venues. The lights are focused to illuminate the venue area as far as possible. LCSD has also adopted various measures to minimise lighting impact on residents nearby, such as adjusting the angle of spot lights, using lamp shades, directing lights at parks downwards, and using light bulbs with lower light intensity. Lighting of facilities with low utilisation rate at night is turned off as long as it will not affect operation and safety. Furthermore, LCSD is actively implementing energy saving measures at their venues. For instance, guidelines on operating hours of lights at parks and floodlights have been drawn up; sectional switches and photo sensors have been installed; energy saving fluorescent lamps or high efficiency light bulbs have been adopted progressively, and some decorative lights have either been removed or switched off. These measures also help minimise the impact of lighting installations on residents nearby.

8. As regards street lights, the Highways Department (HyD) has promulgated internal guidelines that installing street lights on the external walls of buildings should be avoided as far as possible as this may affect the residents. In case street lights have to be installed near residential units on lower floors due to site constraints, the HyD endeavours to take practical measures to reduce the impact on residents, such as using cut-off lanterns and light shields.

STUDY ON EXTERNAL LIGHTING

Scope of study

9. The issue of tackling energy wastage and light nuisance of external lighting is a complex one. In addition to having a wide-ranging impact on every sector of the community, the success of such measures will depend on the enforceability which, in turn, relies on the formulation of an objective or commonly-accepted definition of energy wastage or nuisance. In order to help us determine the way forward, we have commissioned a consultancy study on energy wastage and light nuisances of external lighting. The study covers the following key areas that are important dimensions for consideration in formulating our measures to tackle the problem –

- (a) experience of metropolises similar to Hong Kong in handling external lighting problems;
- (b) survey on views of relevant stakeholders; and
- (c) research on the usage of external lighting in various representative areas in Hong Kong.

Major findings

Experience of Metropolises

10. Eight metropolises, namely Tokyo, Singapore, Shanghai, Sydney, New York, Los Angeles, London and Frankfurt, have been selected for studying their respective means to deal with external lighting problems. The study finds that the cities vary widely in their regulatory approaches and scope of coverage. The following summarizes the differences.

Mandatory VS voluntary

11. Of the cities surveyed, Tokyo and Singapore do not adopt any mandatory regulation over the management of external lighting. The Tokyo government adopts, for all external lighting installations, non-mandatory approach and guidelines without binding force; while Singapore made a policy statement without mandatory regulation or voluntary guidelines. Among the cities surveyed, none has in place full-blown mandatory regulation for external lighting both as a light nuisance and energy efficiency. Where regulation with limited scope is in place, some cities further

restrict the applicability of their regulatory framework to new lighting installations only, i.e. excluding the stock of existing installations. The remaining cities take a mandatory, yet partial, approach in the regulation of external lighting.

Light nuisance VS energy wastage

12. London, Frankfurt, Shanghai and Sydney have put in place legislation or mandatory requirement to regulate light nuisance caused by external lighting and empower authorities to order abatement. The enforcement authorities assess light nuisance complaints on a case-by-case basis with regard to guidelines developed locally (e.g. those recommended by independent professional associations) for parameters to measure and control the impact of external lighting. In New York and Los Angeles, legislation relating to external lighting aims to prevent energy wastage of lighting installations. It is important to point out that the regulatory framework of all these cities is underpinned by a set of reference guidelines/standards spelling out, for instance, benchmarks of lighting impact limits in different environmental zones of the cities, technical parameters for measuring the impact of outdoor lighting, or the maximum lighting power allowed for new outdoor lighting installations by type of use.

New VS existing installations

13. The mandatory regulations in London, Frankfurt and Shanghai cover both existing and new lighting installations. Sydney's regulations apply only to new installations. For cities regulating on energy wastage (i.e. New York and Los Angeles), their regulations apply only to new installations.

Zoning approach

14. In seven out of the eight selected metropolis (except Singapore), a lighting environmental zoning system is in place or has been proposed to divide different lighting environment for different levels of commercial or residential activities to control outdoor lighting. In London, for example, the guidelines seek to categorize different areas in the city into various lighting environmental zones¹ and recommend preset times² for external lighting. The enforcement authorities would also take into

¹ Different limits on external lighting parameters may be prescribed for different types of environmental zones (e.g. commercial, residential, rural, etc.), and the classification of such zones may depend on human activities, land use properties and the prevailing brightness of the environment.

² Preset times, or "curfew hours", generally refer to the time after which stricter requirements for the control of obtrusive light apply.

account factors such as duration, frequency, and intention of use of the external lighting installations in assessing the complaints.

15. A summary of legislative control on external lighting in the eight selected metropolises is at **Annex 2**.

Survey on Public Opinion

16. On the opinion survey, views had been collected from around 2,700 respondents from various sectors in Hong Kong, including residents, light sensitive receivers, shop owners, customers, building owners, property management sector, tourists, interest groups, professional institutions and relevant trade associations.

17. The survey finds that respondents have mixed feelings and opinions towards external lighting in Hong Kong. More than 70% of respondents had the impression that there was “light pollution” in Hong Kong. Some considered that there were too many external lighting installations, their sizes were too big and they were too bright. About 40% of residents in the “light sensitive receivers”³ group considered that external lighting had adversely affected their daily life, work or health, but less than 10% of residents in general had the same opinion.

18. On the other hand, a large proportion of respondents acknowledged the benefits of external lighting. About 78% of residents in general considered that external lighting installations helped beautify the environment, boost Hong Kong’s image as a “dynamic metropolis” and promote tourism. About 87% of residents in general considered that external lighting helped provide safe environment and reduce crime. The corresponding percentages of tourists who held these views were even more overwhelming (more than 90%).

Research on External Lighting in Hong Kong

19. The consultancy study also researches into the usage of external lighting in Hong Kong. External lighting installations in a number of representative areas have been measured and assessed by technical parameters. **Annex 3** provides a full list of these areas. The selected areas are considered representative of various districts in Hong Kong with different land use properties, including commercial,

³ In the opinion survey study, “light sensitive receivers” refers to those persons who were more affected by external lighting, including people whose working or living locations are exposed to more external lighting in the surrounding.

commercial-cum-residential, urban residential, new town and rural areas. The research in these areas sheds some light on the usage and impacts of external lighting in different districts.

20. The technical parameters adopted include light trespass to residents, glare effect due to direct viewing from residents and sign/building façade luminance, etc. **Annex 4** provides an illustration of different impacts of external lighting. The measurements obtained have been compared with limits on lighting impacts recommended by the Commission Internationale de l'Eclairage (CIE) – International Commission on Illumination⁴. The use of CIE guidelines as the basis of comparison is for reason of convenience and in the absence of any local standards.

21. The study finds that light nuisance is a “localized” problem, which mainly occurs in commercial-cum-residential areas like Mongkok and Causeway Bay. These areas have high building density and intermingling of shops, entertainment venues and residential buildings is common. In other areas where the use is predominately commercial or residential and in new towns, light nuisance may not be a prevalent problem. For example, the average assessed values on glare, sign luminance and building façade luminance were all within recommended limits in the surveyed areas except Mongkok. However, the assessed luminance of illuminated signs was found to be spreading over a wide range, indicating that there might be individual cases where the signs might be too bright.

22. As regards light trespass, its levels have been assessed before and after certain preset times (say, after 11 pm or midnight). Before the preset times, the light trespass levels on the vast majority of residents were found to be within recommended limits in all surveyed areas, except Mongkok and Causeway Bay. However, the proportion of residents affected by light trespasses with values exceeding recommended limits was found to increase substantially after the preset times. A possible explanation of this phenomenon is that professional associations usually recommend more stringent limits on light trespass after certain hours to provide a darker environment at night. The findings also suggest that the ambient light level in Hong Kong at night is relatively high as many lighting installations have not been

⁴ CIE is an independent, non-profit making, international organisation devoted to worldwide cooperation and exchange of information on matters relating to the science of light and lighting, colour and vision, and image technology. CIE has developed a set of guidelines on limiting the effects of obtrusive light from external lighting for possible adoption by countries as reference standards or codes.

switched off after normal operation hours.

PROPOSED WAY FORWARD

23. We need to respond to the growing public awareness toward the impact of external lighting. The number of complaints received in recent years also shows excessive external lighting posing an increasing problem to the public. This is particularly the case in commercial-cum-residential areas like Yau Tsim Mong and Wanchai.

24. Our survey on overseas regulatory regimes showed that cities differed in their approach to and scope of control over excessive external lighting. Hong Kong is also distinct from such cities in the high mix of commercial-residential activities at densely-populated spots of the city. However, one thing in common for all cities with some form of regulatory regime in place, be it mandatory or voluntary, is that such regimes are underpinned by a set of reference guidelines/standards (either on light nuisance or energy efficiency) for owners or operators of lighting installations to follow.

25. On public opinion, our survey finds that while the majority (over 70%) of respondents considered that there was “light pollution”, many also considered external lighting helped beautify the city (78%) and contributed to the safe environment (87%) of Hong Kong.

26. In determining the way forward, it is important to ensure the enforceability of the regulatory approach, particularly in designing the standards of excessive external lighting that are in line with the needs of Hong Kong as a business centre, tourism destination, as well as a safe and livable city. As such, we propose a two-phase approach in tackling the issue.

27. In the short run, voluntary measures will be taken to address the problem of excessive external lighting, through the introduction of the Guidelines on Industry Best Practices for External Lighting Installation. Meanwhile, the government will set the example by switching off external lightings which are for decorative and promotional purposes by 11 pm as far as possible. Individual departments would take appropriate measures to avoid their external lighting causing nuisance to nearby residence.

28. As we take concerns over external lighting seriously, we would not rule out

statutory control on external lighting. We propose to set up a Task Force to advise on the development of technical standards and related supplementary parameters specific to local circumstances, as well as to advise on the way forward to tackle nuisance caused by and energy wastage of external lighting, having regard to international experience and practices.

Draft Guidelines on Industry Best Practices for External Lighting Installations

29. While there is yet any local statutory technical standards or regulations on external lighting from the perspectives of energy wastage or nuisance, we have developed a set of draft guidelines on Industry Best Practices for External Lighting Installations, at **Annex 1**, having regard to the community feedback and practical experience in mediating complaints. These guidelines are drawn up with a view to facilitating discussion between the interest parties on the subject, including management of commercial properties, relevant industries including advertising, lighting installations, tourism, retails etc, residents' groups, District Councils, green groups and other concerned groups. These guidelines cover major areas of operating hours of external lighting, automatic controls, light pollution control measures, energy efficiency measures, lighting design, and avoidance of glare to road users. They however do not include road lighting by HyD which is governed by the Public Lighting Design Manual.

30. Though the draft guidelines are not exhaustive, they would provide a platform for deliberation of views and refinement in the light of feedback of all stakeholders. We would write to all stakeholders and invite their comments in the next three months before the draft guidelines are finalized for promulgation. Where the stakeholders consider it appropriate and necessary, we would be happy to meet and listen to their views in the consultation period.

Government to take the lead

31. The Government will continue to take the lead in reducing the environmental problems arising from external lighting. Relevant departments have been reviewing their guidelines on external lighting regularly, to prevent any nuisance to the public caused by external lighting at Government venues. Upon expiry of the existing contracts, the departments concerned will implement the initiative of switching off of decorative and promotional external lighting by 11 pm. Individual departments will also continue to take forward relevant measures outlined in paragraphs 6 to 8 above to minimise the impact of lighting installations.

Public education

32. A broad-based public support is crucial to the success of any voluntary or mandatory regulatory framework. In terms of public education, we support environmental protection initiatives from the community through various means. For instance, with funding support from the Sustainable Development Fund in 2008, Friends of the Earth (HK) implemented the "Dim it: A Project on the Best Use of Light Resources" project. The project, which commenced in April 2008 and completed in June 2009, aimed to enhance public awareness and understanding of light pollution with a view to reducing excessive use of lights.

33. In addition, the Environment and Conservation Fund (ECF) of the EPD also financed the University of Hong Kong to conduct a "Survey of Light Pollution in Hong Kong" from November 2007 to April 2009. Data on night sky brightness were collected by over 200 volunteers including secondary school students and astronomy enthusiasts. The project team compiled the first "Light Pollution Map of Hong Kong" with data collected, which has been uploaded to the project website for public's reference. The project team has also obtained funding from the ECF to conduct more comprehensive monitoring by setting up a "Hong Kong Night Sky Brightness Monitoring Network". The study commenced in June 2010 and is expected to last for two years.

Setting up of a Task Force on the development of technical standards and related parameters to tackle nuisance caused by and energy wastage of external lighting

34. While implementing the Guidelines, we would not rule out statutory control on external lighting. We shall continue to assess the effectiveness of the Guidelines, and at the same time seek to forge community consensus on the agreed technical standards and control limits for various parameters in measuring light pollution or energy wastage caused by external lighting installations. The development of any such standards and control limits to suit local circumstances is likely to involve appropriate lighting zoning of districts or local areas, as well as designation of preset times for application of more stringent controls.

35. We also need to address the potential challenge presented by the unique urban landscape of Hong Kong if we are to take the path of statutory control. The definition and establishment of the claim of light nuisance, for instance, would need to be carefully worked out in order for such a regulatory regime to be effectively implemented. As light pollution is very often caused by multiple sources, the

apportionment of responsibilities among different light sources may further complicate enforcement.

36. In order to tackle such complex issues that may arise, we propose setting up a Task Force to provide an appropriate forum for stakeholders and relevant trades to –

- (a) forge stronger community consensus for tackling the external lighting problem;
- (b) develop technical standards and related supplementary parameters on appropriate lighting levels acceptable to local circumstances; and
- (c) to address potential enforcement problems.

37. In the process, the Task Force will help assess the impact of any regulatory measure on different sectors of the community and their dynamic priorities, address the unique city fabric of Hong Kong and resolve complicated issues such as the multiple sources of light pollution, and the apportionment of responsibilities etc.

IMPLEMENTATION

38. We plan to set up the Task Force in the second quarter of 2011 and work in collaboration with different stakeholder groups and relevant trades. In developing technical standards and related supplementary parameters, it may consider all relevant issues, including the case for presetting operating hours for external lighting installations, technical parameters that should be taken into account in design planning of external lighting installations, specific measures to reduce light pollution and enhance energy efficiency, etc. The Task Force will also work to step up publicity and public education, and advise us on the best way to implement the agreed standards and practices. We expect the Task Force to complete its work in early 2012.

39. As the issue of energy wastage and nuisance caused by external lighting involves a wide range of stakeholders and the community views are divergent, we consider the Task Force should be organized in a way to encourage extensive discussion amongst professional bodies, businesses, residents, green groups and practitioners. We therefore recommend that the Task Force be chaired by a non-official with membership drawn from different sectors of the community in addition to representatives of the relevant government departments.

ADVICE SOUGHT

40. Members are invited to advise whether the proposal in paragraph 2 should be endorsed.

Environment Bureau
April 2011

**Proposed Guidelines on Industry Best Practices
for External Lighting Installations**

The proposed guidelines below seek to provide a basis for further discussion on the best practices for external lighting installations that Government departments and the private sector should observe. The proposed measures are not exhaustive and are subject to refinement after consultation with stakeholder groups and relevant trades.

Introduction

1. External lighting in Hong Kong exists in many different forms and some typical examples include signs (either internally illuminated or externally illuminated), lighting for facades and features, lighting outside buildings (including those for shops), lighting for sports fields and playgrounds, external video structures (e.g. video walls, display panel).
2. The guidelines in this document aim to outline some general good practices on design, installation and operation of external lighting for the reference of lighting designers, contractors, owners and users with a view to minimizing the adverse impacts arising from external lighting.
3. The guidelines are not intended to cover road lighting maintained by Highways Departments (HyD), which should comply with the Public Lighting Design Manual issued by HyD.
4. For easy reference, the guidelines are grouped under the following sub-headings: operating hours for lighting, automatic controls for lighting, light pollution control measures, energy efficiency measures, lighting project design planning, glare prevention to road users, and advertising signs.
5. The good practices stipulated in this document are not exhaustive. Relevant professionals, such as experienced practitioners and consultants in the lighting field, should be consulted for further advice if necessary.

Operating hours for lighting

6. Limiting the use of external lighting after a specified time at night could reduce the possibility of light pollution and energy consumption and in turn foster a good living environment for everyone. It is advisable to :
 - (a) switch off the external lighting when not needed or after business hours.
 - (b) switch off the external lighting after certain time at night (say, after 11 pm as recommended by International Commission on Illumination (CIE))^{#1}.
 - (c) maintain only essential lighting (e.g. lighting for safety and security) at the acceptable level as required.
 - (d) feature lighting serve to enhance a particular feature/building/structure may be subject to even more stringent control as to their lit time.

Automatic controls for lighting

7. Automatic controls could help reduce adverse impacts of external lighting by optimizing the use of the external lighting. Examples of such measures include :
 - (a) Incorporate automatic control (e.g. timer switch) to switch off the external lighting when not needed or after business hours, or when concerned premises are not in use, or after certain time at night (say, 11 pm as recommended by CIE).
 - (b) Incorporate automatic control (e.g. photo-sensor for maximizing daylight utilization) to switch on the external lighting only when necessary.
 - (c) Incorporation of occupancy sensor control (e.g. motion sensor or passive infra red sensor) to switch on the external lighting from off or dimmed state where applicable.

^{#1} International Commission on Illumination (CIE), an international professional body on light and lighting, suggests curfew at 11:00 p.m., unless otherwise specified, after which stricter requirement for control of obtrusive light will apply.

Light pollution control measures

8. Measures to reduce light pollution impacts (e.g. light overspill, light trespass, glare and sky glow) arising from external lighting include :
- (a) Avoid over-illumination of signs, facades, shop fronts, video walls and facilities with lighting. Over-illumination will increase possibility of light pollution.
 - (b) Position and aim the lighting properly to avoid overspill of light to outside the area being lit up.
 - (c) For lighting up vertical structures (e.g. signs & façade), direct the beam of light downwards where applicable.
 - (d) Use lighting with appropriate shields, baffles, louvers and cut-off features to prevent light overspill to nearby residence and into the sky, and glare from the light source. Where necessary, consider to use luminaires with appropriate cut-off classification. To avoid imposing additional wind load which will affect the structure of the existing lighting columns and foundation, please consult relevant professionals in the design of shields, baffles, louvers, etc. for retrofit works.
 - (e) Switch off the lighting when it is not operationally required or dim down the lighting when a high illumination level is not essential (e.g. after business hours and where the lighting devices are not for security purposes).
 - (f) Avoid using video walls or signs with flickering, colour changing or movement effect in cases where the video walls or signs are facing directly at residents (e.g. when the lighting device and residential premises are on the opposite sides of a road or street). Where unavoidable, reduce the period of operation and/or the flickering rate.
 - (g) For signs with LEDs, use suitable type of LEDs (e.g. LEDs with baffles, louvres or optic diffusers to control light distribution) to reduce sign luminance and light overspill and to prevent glare from direct view of the light source.

- (h) Avoid directing light at glass curtain wall, shiny shop front display panel, or light colour fabric materials (e.g. used in shade structures in parks, amphitheatres or piazzas) etc. to prevent light overspill and nuisances caused by reflection of light.

Energy efficiency measures

9. Measures to enhance energy conservation and energy efficiency of external lighting include :

- (a) Avoid over-illumination of signs, facades, shop fronts and facilities with lighting. Over-illumination will consume more lighting energy.
- (b) Use more energy efficient lighting equipment, e.g. T5 fluorescent light, compact fluorescent lamp (CFL), ceramic metal halide (CMH) lamp, metal halide lamp, LED, and electronic ballast.
- (c) Dim down lighting as applicable and switch off lighting when it is not needed (e.g. after business hours) by automatic or manual control.
- (d) Incorporate sectional controls such that the sections of lighting not operationally required are switched off or dimmed down as appropriate.
- (e) Clean up the external lighting (as part of regular maintenance) to reduce lumen depreciation due to dusts and wastes on the lighting. Adequate provision for easy access and/or appropriate facilities should be allowed to facilitate regular cleaning of external lighting.

Lighting project design planning

10. Good design planning for an external lighting project could help prevent occurrence of adverse impacts from the lighting installations. Design and planning measures include :

- (a) Assess the impacts of external lighting as part of the lighting design development process before firming up the lighting design for installation. Some aspects to be considered may include critical or sensitive locations that the lighting may affect, ambient brightness condition, orientation and

positioning of external lighting, types of external lighting, lighting energy consumption, and importance of lighting pollution impacts.

- (b) Review whether the external lighting will have the possibility of shining outside the area it intends to light up, affecting neighbourhood or the sky. If so, refine the lighting design, consider re-positioning the lightings and adjusting the aiming angles, and choose luminaires with suitable light distribution characteristics (e.g. light pattern, beam spread, cut-off angle) or light control devices (e.g. shields and baffles) as appropriate.
- (c) For floodlighting, ensure the beam angle of the lighting from the vertical is not excessive and the lighting is fitted with shields and cut-off features to control glare, and if possible, use lower intensity lamps to reduce glare from the light source.
- (d) Whenever there is residence nearby, use lighting with appropriate shields, baffles, louvers and cut-off features to prevent light overspill, and glare from the light source. Where necessary, consider using luminaires with appropriate cut-off classification.
- (e) For sports lighting, use luminaires with double asymmetric beams as appropriate so that the front glazing is kept nearly parallel to the surface being lit to minimize overspill light. The light output should be adjustable to different illumination levels to meet different purposes (e.g. training/competitions). For floodlighting provision, adverse effects to nearby residents due to light nuisance such as glare should be thoroughly assessed before the installation of the lighting and suitable measures should be taken to minimise the impact to a level acceptable to nearby residents. Consideration should be given to take into account the physical environment of the facilities to be provided with floodlighting with a view to reducing the light nuisance as well as to provide suitable light-breaker to reduce the glare if necessary. Special care should also be taken to avoid over-concentrating the floodlights on a few lighting towers/columns which could cause light nuisance or glare problems to nearby residents.

Prevention of glare to road users

11. Glare from external lighting may affect road users resulting in safety concerns.

Measures to reduce such glare impact include :

- (a) Ensure the external lighting is appropriately positioned, aimed or shielded so that illumination of nearby roads will not be adversely affected.
- (b) Ensure appropriate type of lighting is used (e.g. lighting with suitable light distribution pattern, or appropriate cut-off classification) to reduce glare impact on road users.

Advertising signs

12. Advertising signs should also comply with the advice and guidance on safety, health and related issues stipulated in the *Practice Notes for Authorized Persons and Registered Structural Engineers APP-126* and the *Guide on Erection & Maintenance of Advertising Signs* issued by Buildings Department.

**Legislative Control against External Lighting
in Selected Metropolises**

Metropolis	Against energy wastage		Against light nuisance	
	Applicable to new installations	Applicable to existing installations	Applicable to new installations	Applicable to existing installations
Tokyo	No	No	No	No
Singapore	No	No	No	No
Sydney	No	No	The City of Sydney Exterior Lighting Strategy sets out requirements for consent from the City of Sydney Council in private sector development applications for illuminated signage, exterior lighting of buildings and under-awning lighting. Lighting proposals submitted for	No

Metropolis	Against energy wastage		Against light nuisance	
	Applicable to new installations	Applicable to existing installations	Applicable to new installations	Applicable to existing installations
			Development and/or Construction Certificate Approval are required to comply with the development control policies stated in the lighting strategy. The City of Sydney Council will consider lighting proposals and issue construction approval.	
London	No	No	The law treats light nuisances as a kind of statutory nuisance and empowers the authority to order the abatement of nuisance. Enforcement relies on assessment on a case-by-case basis taking account of various factors, including guidelines or international reference standards. Offender of statutory nuisances is subject to imprisonment or a fine. New projects on external lighting are required to have planning approval by the local planning authority.	
Frankfurt	No	No	The law provides a framework of making reference to permissible illuminance and luminance limits and further	

Metropolis	Against energy wastage		Against light nuisance	
	Applicable to new installations	Applicable to existing installations	Applicable to new installations	Applicable to existing installations
			restrictions on those limits during the night. Enforcement relies on assessment on a case-by-case basis taking account of various factors, including guidelines or international reference standards. The authority can issue orders to ensure compliance and in case of non-compliance, prohibit the operations of the installations.	
Shanghai	No	No	The law stipulates that external lighting “should not affect the normal living of nearby residents” and empowers the authority to order the abatement of nuisances.	
New York City	The law governs and prescribes the limits of energy consumption of new external lighting installations with reference to Energy Conservation Construction Code of New York State. In case of non-compliance, design professionals and contractors can be fined	No	No	No

Metropolis	Against energy wastage		Against light nuisance	
	Applicable to new installations	Applicable to existing installations	Applicable to new installations	Applicable to existing installations
	and/or denied certain privileges of licensing by the Department of Buildings.			
Los Angeles	The law governs and prescribes the limits of energy consumption of new external lighting installations with reference to California Energy Code. In case of non-compliance, design professionals and contractors can be fined and revoked of Certificate of Occupancy by Los Angeles Department of Buildings and Safety.	No	No	No

**Representative areas where external lighting have been
measured and assessed**

- (a) Shun Lee Estate in Kwun Tong (urban residential area);
- (b) Des Voeux Road Central/ Charter Road in Central (commercial area);
- (c) Peterson Street/ Great George Street in Causeway Bay (commercial-cum-residential area);
- (d) Nathan Road/ Sai Yeung Choi Street South in Mongkok (commercial-cum-residential area);
- (e) Yan King Road/ Kai King Road in Tseung Kwan O (New Town area); and
- (f) Clear Water Bay Country Park with nearby villages, Tai Hang Hau and Tai Wan Tau in Sai Kung (rural area).

Illustration on the Different Impacts of External Lighting

