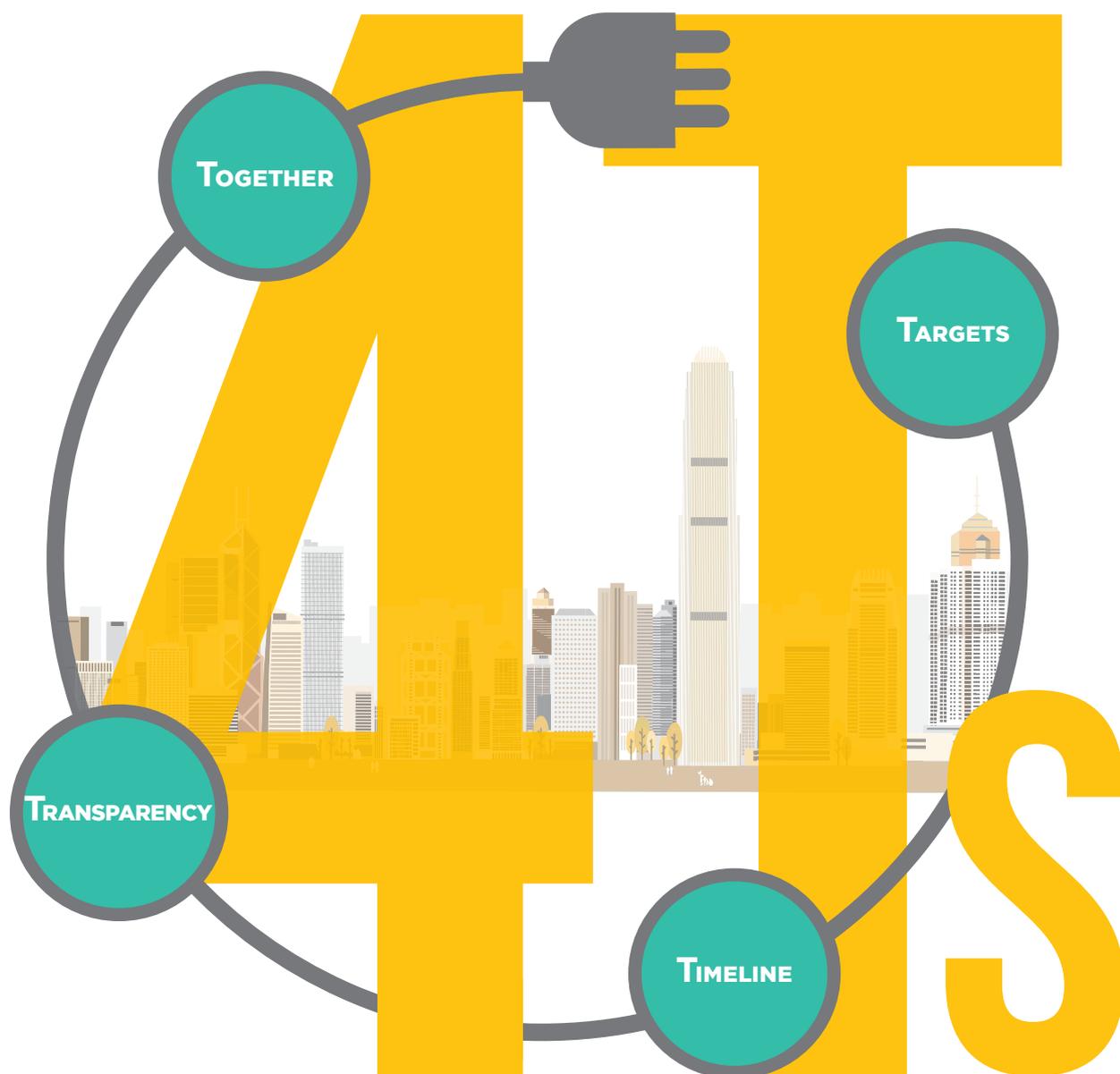


# DEEPENING ENERGY SAVING IN EXISTING BUILDINGS

IN HONG KONG  
THROUGH '4Ts' PARTNERSHIP



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# 1 | THE BIG PICTURE

## Paris Agreement

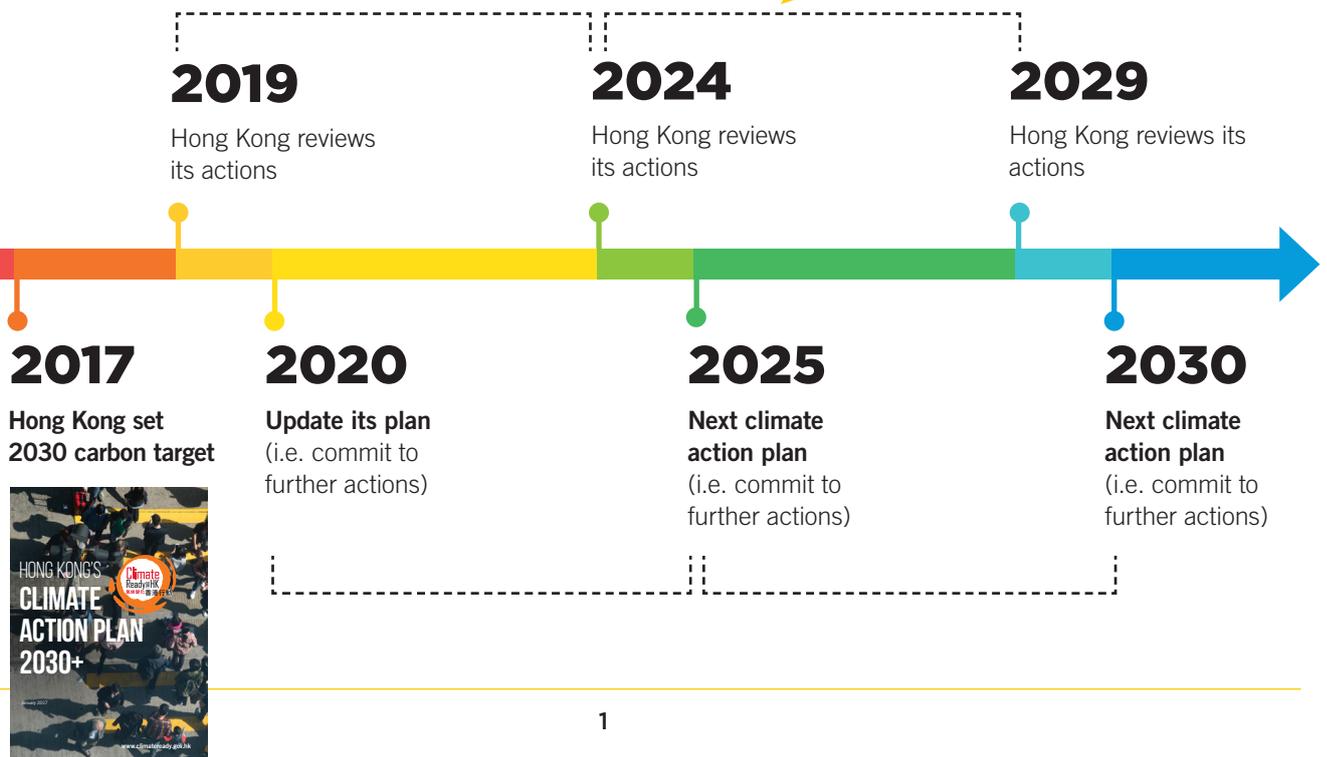
The Paris Agreement under the United Nations Framework Convention on Climate Change, effective from 4 November 2016, is now a global driving force for climate change action, to which Hong Kong is also bound. The Paris Agreement is based on sound science and calls upon the world to keep global average temperature increase well below 2°C of pre-industrial levels and to pursue efforts to limit it to 1.5°C. Obligations under the Paris Agreement require us to follow a defined cycle of reporting on existing efforts and to ratchet up on new and suitably ambitious efforts. Figure 1 shows the timeline for this cycle that Hong Kong has to follow.

In order to operationalise the Paris Agreement, we have developed the “4Ts” framework which everyone can use as an operational model. Every organisational unit can adopt 4Ts – whether it is the HKSAR Government as a whole or a department, a commercial entity or a non-profit organisation. Indeed, even a family or an individual person can use 4Ts as a guide. Figure 2 shows the 4Ts framework.

In summary, there must be a carbon-related reduction ‘Target’ and ‘Timeline’, the efforts made can be shown with appropriate metrics so that there is ‘Transparency’ and everyone’s effort matters so we must work ‘Together’.

Hong Kong plays a part to help fulfill the obligations that China has under the Paris Agreement. As such, Hong Kong will need to review our climate change efforts every 5 years and align them with the submission timelines under the Paris Agreement. The timeline for review up to 2030 for Hong Kong is expected to be as follows:

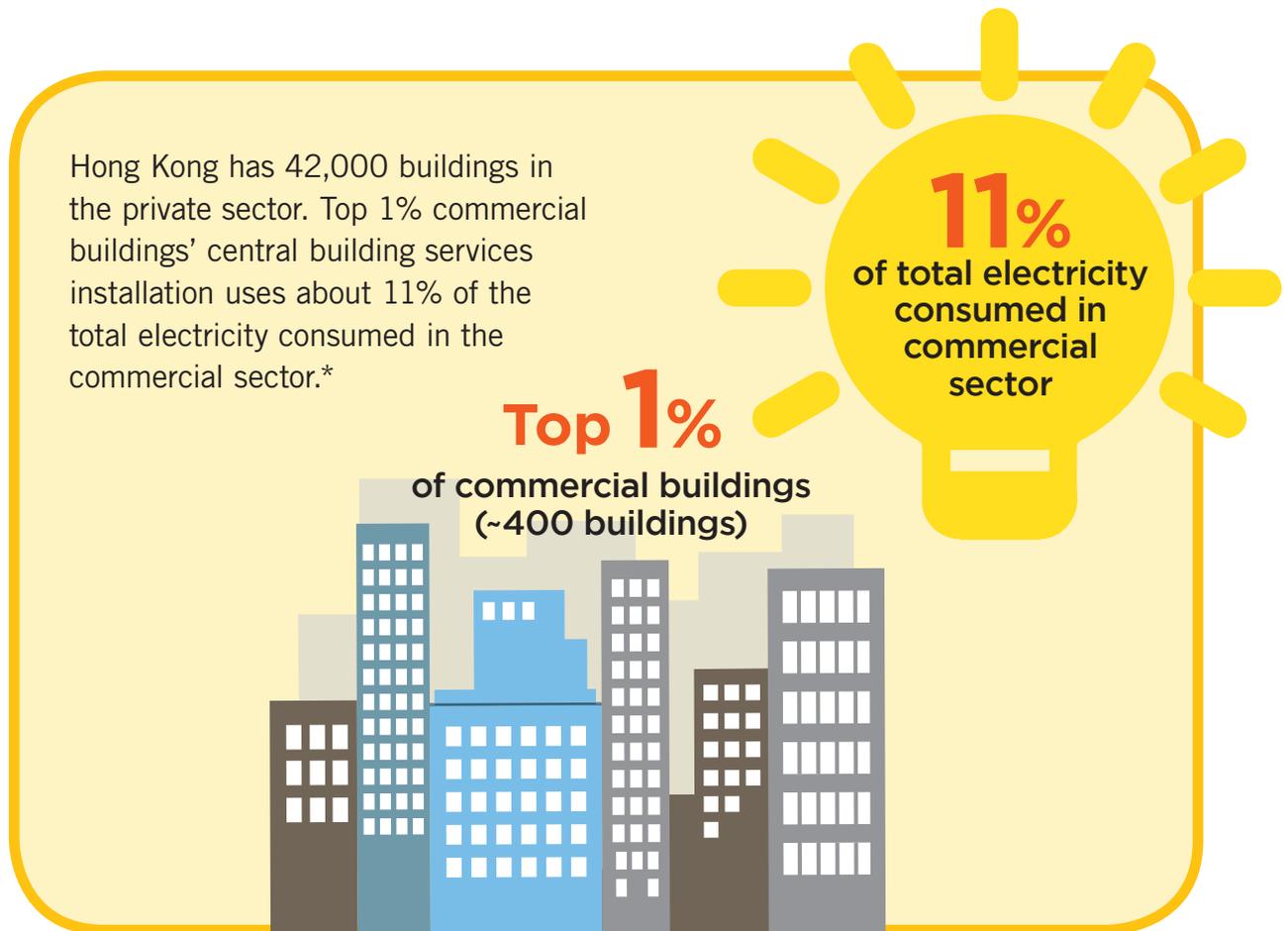
**FIGURE 1** Timeline 2017-2030



**FIGURE 2** 4Ts Operational Framework



Hong Kong has 42,000 buildings in the private sector. Top 1% commercial buildings' central building services installation uses about 11% of the total electricity consumed in the commercial sector.\*



\* Electricity consumption by commercial sector accounts for 65% of the total electricity consumption in Hong Kong in 2014.

### Existing Buildings

Buildings account for about 90% of the electricity used in Hong Kong and over 60% of the carbon emissions. Energy saving in buildings must be a long-term, on-going part of our work to achieve our climate mitigation goals.

### Co-benefits

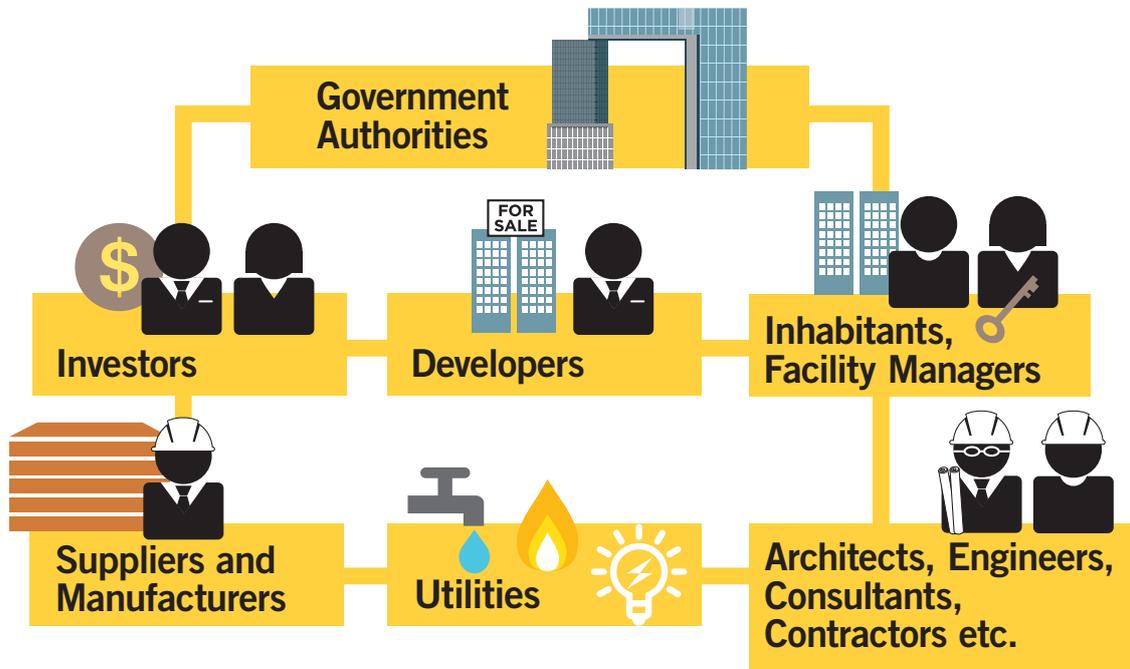
Beyond climate change mitigation, energy saving in buildings also plays a critical function:

- a. Buildings that perform well on energy efficiency is crucial for better livability and 'smart' low carbon living; and
- b. Energy saving is a new growth area for business and job creation, particularly suited to younger people, as a variety of skills in design, technology, operations and management, data and digitalisation, information services and communication is essential.

### Buildings Coming ‘Alive’

For Hong Kong’s buildings to be much more energy efficient, we need building owners in the public and private sectors to adopt a new attitude. Buildings should no longer be seen as just inert structures that need patching-up from time to time. Buildings can be seen as ‘living’ organisms to provide a variety of functions for inhabitants. New buildings can

be designed to be smart and green. Many existing buildings, including older buildings, have great potentials to perform better through retro-commissioning and retrofitting, which also increase the value of the assets for owners. The behaviour of building inhabitants also determines whether energy and other resources are used wisely.



## 2 | 4Ts PARTNERSHIP

The Environment Bureau has made energy saving in buildings a target area for long-term stakeholder engagement, and our major focus is to work with existing building owners in both the public and private sectors. Beyond the owners, whose role is of the utmost importance, it is also necessary to

work with built environment and financing professionals since they work with building owners and their knowledge about energy saving and the benefits that could be reaped by owners need to be better understood and integrated into the whole equation.

**FIGURE 3** Relative energy saving priorities for different types of buildings in Hong Kong



### Getting Owners On Board

We have a three-fold methodology to get building owners on board in the short and medium-term.

#### a. Engaging stakeholders through dialogue

The Secretary for the Environment has invited leaders in the property development and energy supply sectors to engage in extended dialogue to examine what they can contribute to

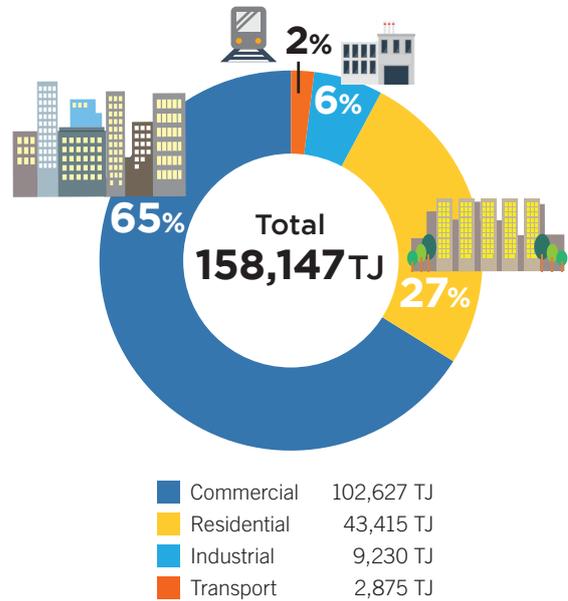
energy saving in buildings in the short to longer term. We have also sought collaboration with professionals in the built environment and energy sectors to work alongside one another, as well as together with relevant Government departments to share knowledge so that all the key stakeholders can embark on Hong Kong's deepening energy saving journey for buildings together.

**b. Evidence-based approach**

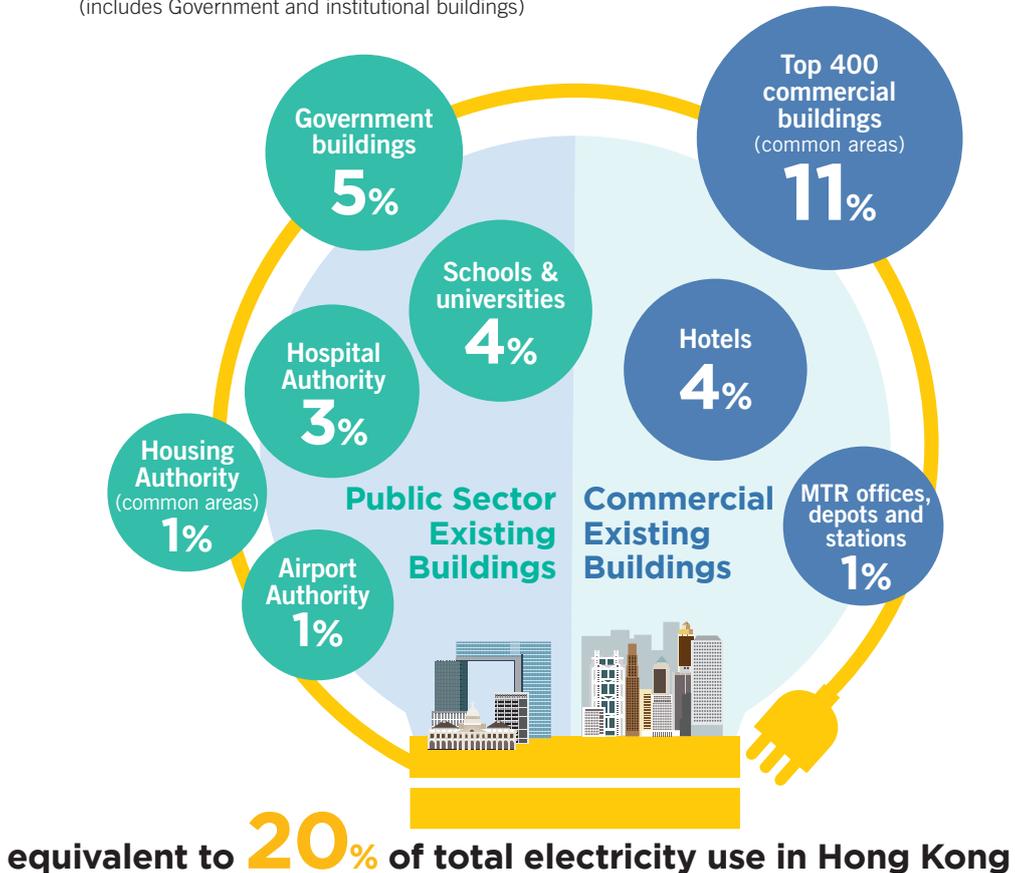
We have taken an evidence-based approach to segment our stakeholder engagement work. Figure 4 shows the electricity consumption by sector in Hong Kong and Figure 5 shows the top users among the buildings in the commercial sector (which include Government and institutional buildings).

**We believe in data and talking to people**

**FIGURE 4** Electricity consumption by sector, 2014



**FIGURE 5** Percentage of electricity in commercial sector (includes Government and institutional buildings)

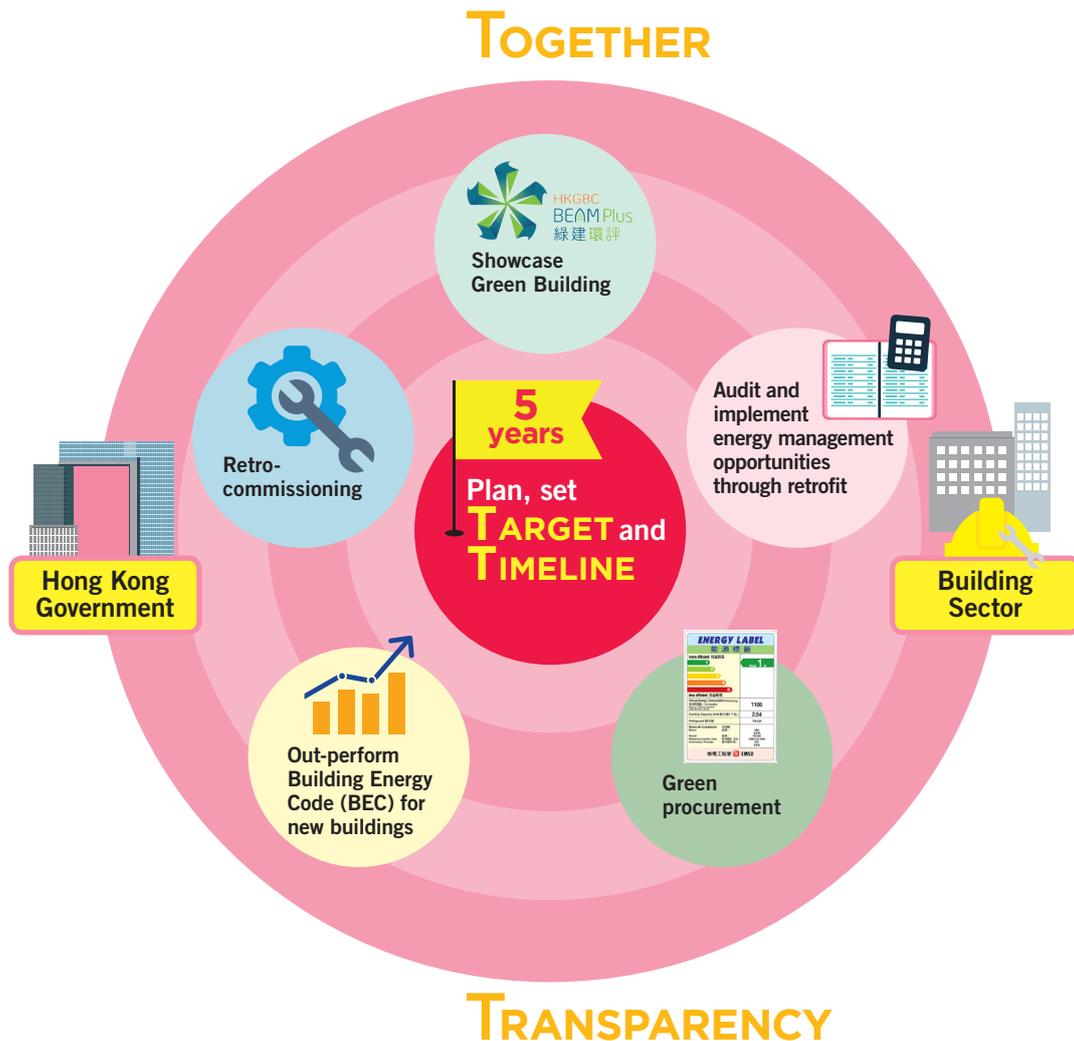


**c. Expanding engagement**

Our evidence-based approach informed us of how to prioritise our engagement since there are many organisations to reach out. In April 2016, we created a dialogue platform, starting with the senior management of Hong Kong major property development companies and energy suppliers, followed by the hotel sector, and others. We explained our

rationale and approach, discussed the importance of the Paris Agreement, and asked them to join us in taking forward the 4Ts partnership for existing buildings. We asked the leaders of these companies to adopt the same approach as we have in the HKSAR Government with our own buildings (Figure 6). We are grateful to them for their broad agreement.

**FIGURE 6** 4Ts partnership between Government and Building Sector



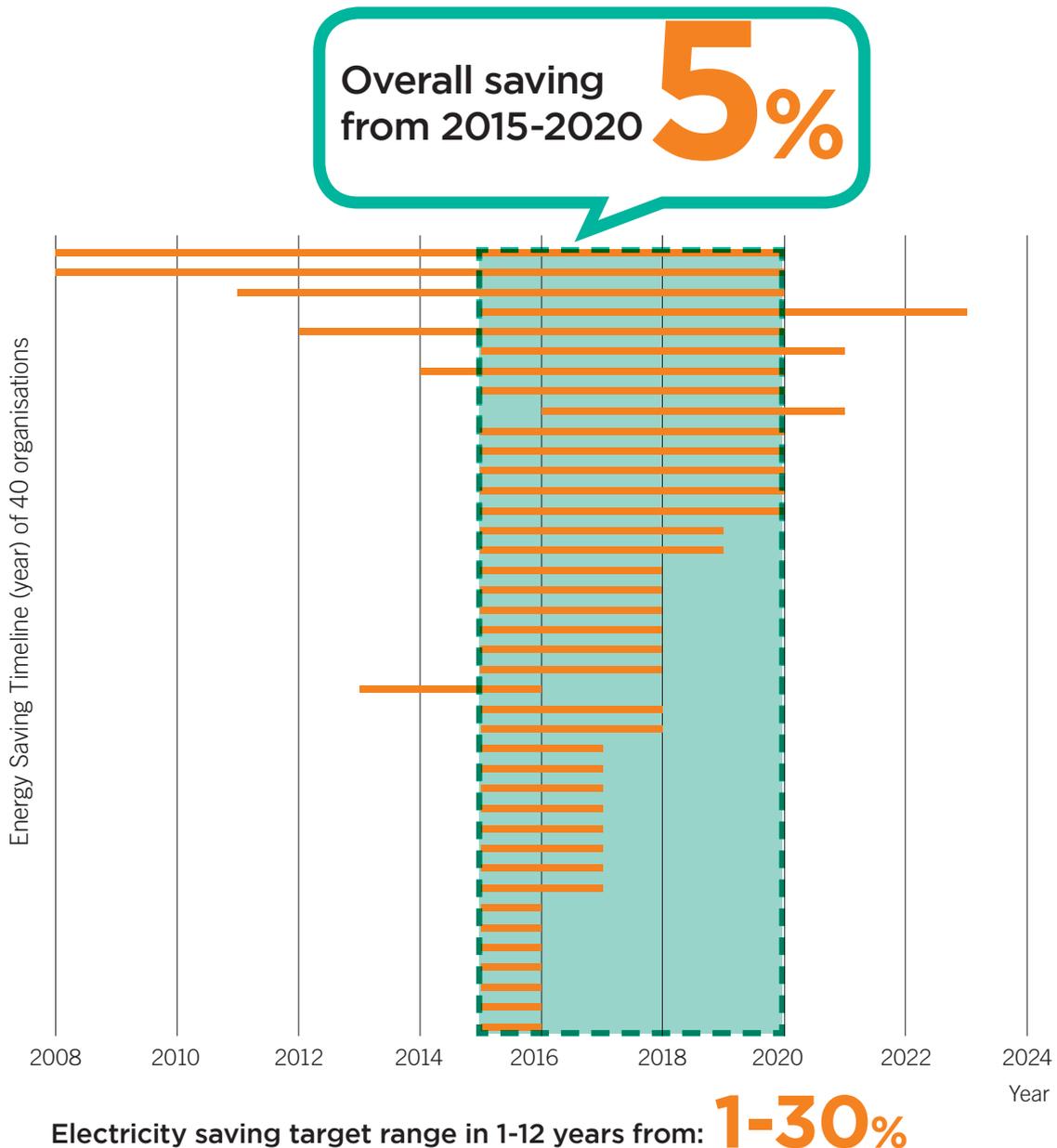
### 3 | TRANSPARENCY

#### Establishing Trust

We asked our public and private sector 4Ts partners to share data with us – such as their electricity consumption and whether they have already set energy saving targets and timelines. We agreed to anonymise the

collated information and for it to be shared with each other (Figure 7). The purpose of sharing is for the 4Ts partners to see the range of efforts being made. This openness allowed the sharing of perspectives and the business case for deepening energy saving on an on-going basis.

**FIGURE 7** Electricity Saving Target and Timeline of 4Ts Partners



### Data Transparency and Technical Co-Learning

There are two other aspects that are critical to the success of the dialogue platform, both of which are technical in nature that require deliberation and sharing:

- **Transparency:** There needs to be an agreement on how energy saving performance is to be calculated, evaluated and presented.
- **Co-learning:** There needs to be effective ways to share best practices to speed up and deepen energy saving adoption.

It was further agreed that building management staff from the partner companies should work with the Electrical and Mechanical Services Department



(EMSD) and private sector professional bodies such as the Hong Kong Green Building Council (HKGBC) and the Business Environment Council (BEC). Several workshops have been organised and these will need to be done on an on-going basis.

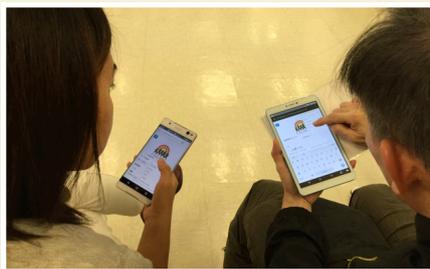
Some of the leading building owners are also partnering with organisations that work with inhabitants to show how the inhabitants use energy so as to help them save energy.



▲ Ambassadors appointed

St James' Settlement, on partnering with an energy service provider – Blue Sky, has embarked on a 2-year energy saving pilot project which covers approximately 85% of St James' Settlement's service locations and involves 1,200 staff. The project intends to use energy data transparency to drive their employees' behavioural change in energy use.

Users' real-time access through mobile devices ►



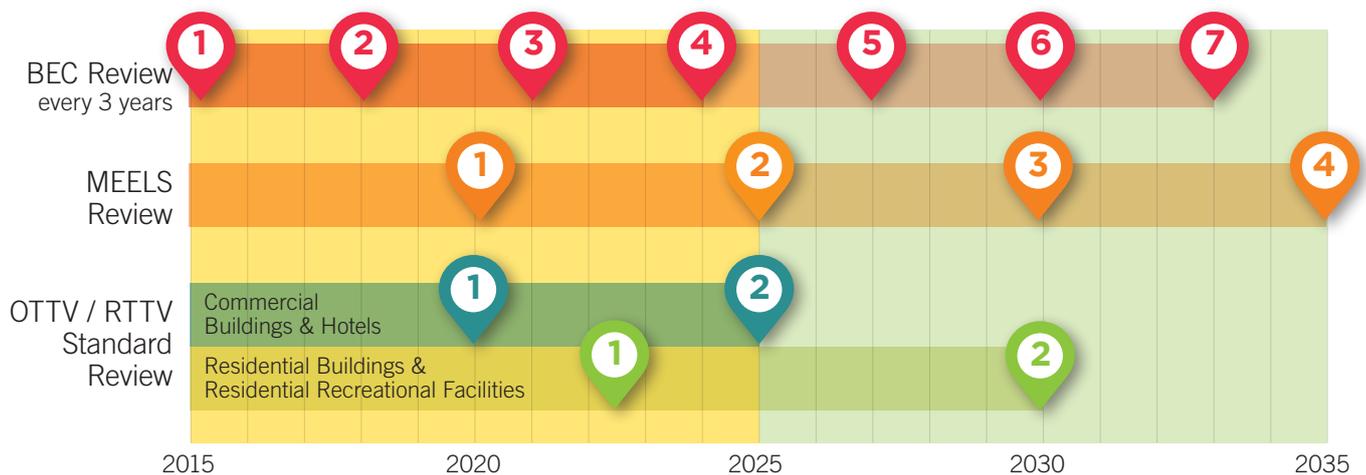
## 4 | ACTING TOGETHER

### The Financial Case Makes ‘Green’ Sense

The financial performance arising from energy saving has often been an issue where the thinking of technical and financial managers are not aligned. We have found that through the dialogue platform, peer-to-peer discussion on how and why choices are viewed and made on energy saving have been extremely useful. Furthermore, co-learning between technically and financially trained professionals can also advance understanding of the benefits. The HKSAR Government also has an important role to play by articulating a clear policy direction for energy saving in buildings and what the private sector can expect for the

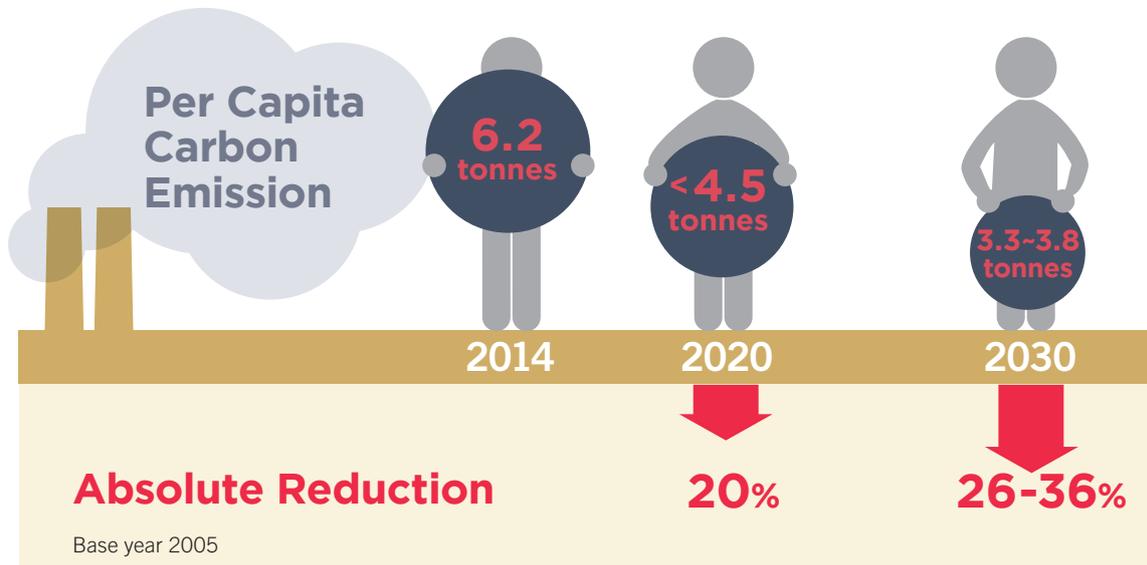
short to longer term future as the HKSAR Government implements the Climate Action Plan 2030+. While the current rounds of discussion ask building owners to go beyond statutory compliance (with the six domains on page 7), we have also made it clear that policies and regulations will be progressively tightened. Notably, Figure 8 shows the timelines for reviewing regulations on energy reduction. We are also asking building owners to adopt energy saving targets, such as we have in the HKSAR Government of a 5% electricity saving target in 5 years. Private sector organisations can do the same. In addition, they can take note of Hong Kong’s climate change target as per Figure 9 and work with us for better outcomes.

**FIGURE 8** Timeline of regulatory tools reviews on energy reduction



BEC Building Energy Code  
 MEELS Mandatory Energy Efficiency Labelling Scheme  
 OTTV Overall Thermal Transfer Value  
 RTTV Residential Thermal Transfer Value

**FIGURE 9** Hong Kong's expected absolute carbon emissions reduction and per capita carbon emissions level in 2020 and 2030



## Government Leadership

### a. Policy and Commitment

Overall, we have set an energy intensity reduction target of 40% by 2025 using 2005 as the base for Hong Kong as a whole. We have also worked hard on reducing energy consumption in Government buildings. From 2003 to 2014, we have already reduced electricity consumption by 16% in Government buildings through implementing more than 400 energy saving projects and other energy saving measures. We saved 58 million kWh annually.



The HKSAR Government has set a new target to save 5% electricity consumption in Government buildings by 2020.<sup>1</sup> This target may be re-set for another 5% from 2020 to 2025. To achieve the 2020 target, energy audits were

conducted for over 450 Government buildings in order to identify energy management opportunities. We have earmarked at least \$500 million for implementing energy saving projects to achieve our target.

We are encouraging all building owners to make use of various tax concessions, loan schemes and funding schemes to procure energy saving installations. The Urban Renewal Authority is also conducting a study on building rehabilitation so as to formulate strategies to prolong the life span of buildings and explore the feasibility of retrofitting for building rehabilitation.

In the international arena, we also maintain collaborative efforts with other international organisations such as APEC and the C40 Cities Climate Leadership Group, in sharing and co-learning from other jurisdictions on best policy initiatives for driving energy efficiency

1. Paragraph 176 of Policy Address 2015, <http://www.policyaddress.gov.hk/2015/eng/p173.html>

### Architectural Services Department adopting BEAM Plus Interiors & Existing Buildings

The Architectural Services Department has been conducting pilot projects to transform existing Government premises into green and energy efficient buildings as the two are inextricably connected<sup>2</sup>. The renovation of 1/F APB Centre in Hung Hom and 10/F Government Logistics Centre in Chai Wan into administrative offices have achieved BEAM Plus

Interiors Platinum rating in 2015. APB Centre is also participating in the BEAM Plus Existing Buildings 2.0 assessment under the Selective Scheme on Energy Use Aspects with a target to obtain at least the second highest rating i.e. “Very Good” to showcase Government’s effort for promotion of green building and energy efficiency through leading by example.



in buildings. We believe our efforts are on a par with those best performing cities as noted from a research survey report “Urban Efficiency: A Global Survey of Building Energy Efficiency Policies in Cities” published by the Tokyo Metropolitan Government of Japan. An updated summary on our policy initiatives corresponding to the Report’s identified policy elements is provided at Appendix.

#### b. Legislation and Codes

The Government has been instrumental in implementing Hong Kong’s first two pieces of energy efficiency legislation. The Mandatory Energy Efficiency Labelling Scheme (MEELS) enacted in 2009 covers different types of electrical appliances and will achieve 800 million kWh saving annually by 2025. The Buildings Energy Efficiency Ordinance (BEEO) enacted in 2012, with its Building Energy Codes, will achieve 1,000 million kWh saving annually by 2025.

We launched the Fresh Water Cooling Towers Scheme in 2000 to promote wider use of fresh water in evaporative cooling towers for air-conditioning systems in non-domestic buildings, which is most relevant for existing commercial buildings. Up to end of 2016, over 2,200 fresh water cooling towers were installed with an estimated annual saving of 460 million kWh.

We are conducting pilot projects on retro-commissioning at Government buildings and will share the results of these pilot projects together with new technical guidelines for public reference by mid-2017.



2. Hong Kong’s Climate Action Plan 2030+, page 37

**c. Engagement and Incentives**

The Government makes continuous efforts to raise public awareness about the importance of energy saving and this work will continue to be important in the future. Youngsters are well served by EMSD's year-round school outreach programmes, talks and tours, as well as its education path. The "Energy Saving for All" website ([www.energysaving.gov.hk](http://www.energysaving.gov.hk)) is the internet portal for the public to access latest energy efficiency activities from over 50 organisations.

We work with all key stakeholders, such as property owners and managers, as our partners. We have organised the Energy Saving Charter since 2012 to encourage shopping malls, shops, office buildings and offices, housing estates, residential buildings and properties of non-governmental organisations, schools and post-secondary education institutions, etc. to maintain an

average indoor temperature between 24°C and 26°C during summer months. Over the years, the number of signatories to the Charter has increased significantly from about 100 signatories in 2012 to over 3,300 signatories in 2016.

The scope of the Charter has been extended to switching off electrical appliances when they are not in use, and adopting green procurement by choosing energy efficient appliances. The 2017 Charter has used the 4Ts partnership framework in the building and property management sectors to achieve energy saving in existing buildings.

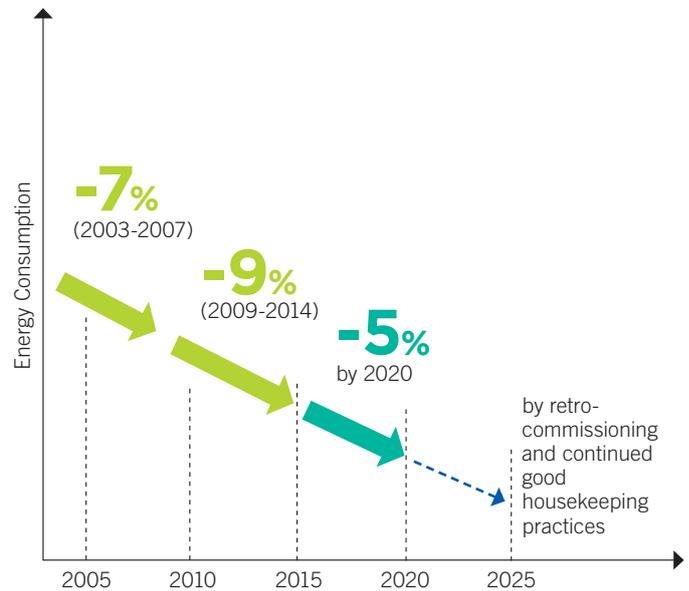


**全民慳神 全民節能**  
 Be Hanson  
 Energy Saving for All

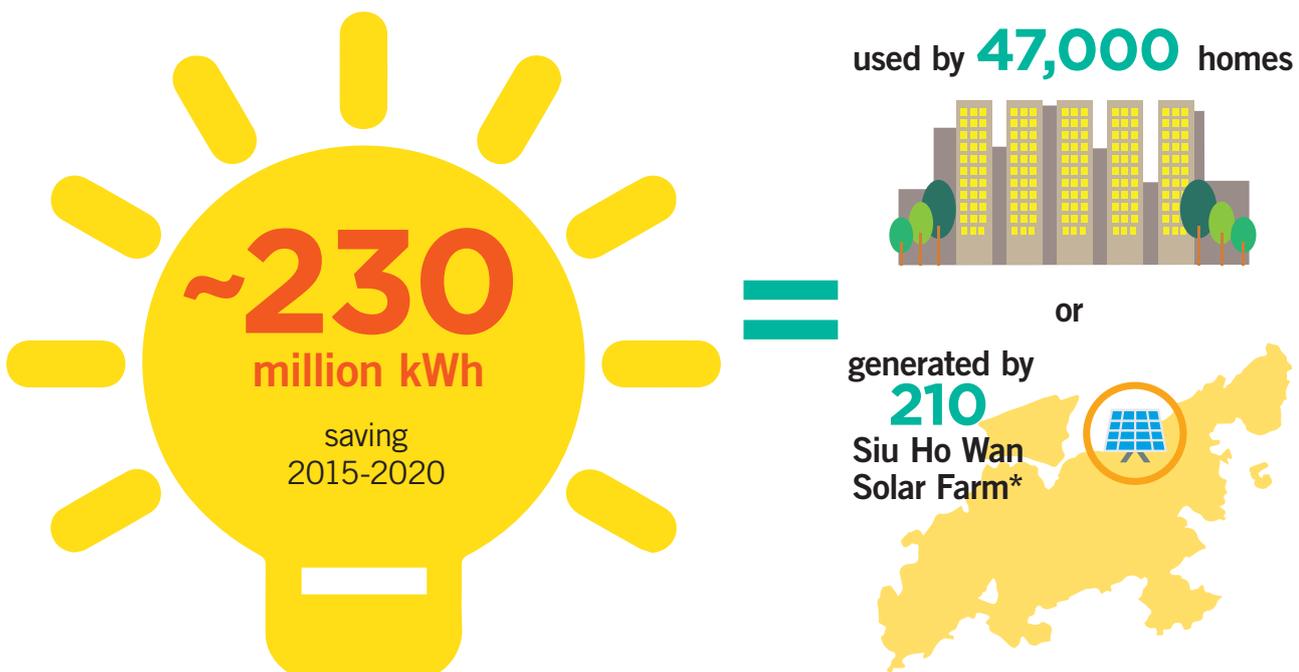
## 5 | INITIAL RESULTS AND NEXT STEP

Our ambition, like that of the Paris Agreement, is based on a belief that it is through building broad buy-in that energy saving action can grow and be sustained. The Paris Agreement and our policy direction in energy saving is a key driver for change. We expect to see impressive results in some individual cases in the near-term but our ambition is to bring forward the building sector as a whole – the efforts of the whole sector is important to us. We will work hard on Government buildings to show good results (Figure 10). We applaud the top energy performers among the public sectors and encourage them to exceed expectation. In the private sector, we also see some very good performers with long-term plans, and we wish to showcase their efforts (Figure 11). We also see green bonds launched by the property sector to fund new green buildings and retrofit of existing buildings.

**FIGURE 10** Existing Government Buildings Energy Consumption



**FIGURE 11** Total Electricity Saving of Current 4Ts Partners from 2015 to 2020



\* Completed in late 2016, the largest of its kind in Hong Kong so far.

## Join Us

Our goal is to reinforce our dialogue platform to deepen collaboration. The Environment Bureau will need to plan and sustain the partnership. We will continue to invite others to join us. In time, we will need to outreach beyond our ‘starter’ pool of partners. The Paris Agreement requires Hong Kong, and all other jurisdictions, to **ACT, EVALUATE** and **REDOUBLE** efforts in order to keep global average temperature increase well below 2°C of pre-industrial levels and to

pursue efforts to limit it to 1.5°C. Let’s work together to combat climate change and create a more livable and sustainable future.

To find out more, please visit the website of Climate Ready@HK ([www.climateready.gov.hk](http://www.climateready.gov.hk)) and Energy Saving for All ([www.energysaving.gov.hk](http://www.energysaving.gov.hk)).



# APPENDIX

## List of Policy Initiatives on Greening and Energy Efficiency in Existing Buildings

Policy Elements <sup>3</sup>	Government's Direct Effort	Partnering with External Organisations
1. Building Energy Codes	The regulatory codes under the Buildings Energy Efficiency Ordinance (BEEO): Building Energy Code (BEC), Energy Audit Code (EAC); they would be reviewed and tightened regularly.	
2. Reporting and benchmarking of energy performance data	Prescribed buildings under the BEEO are required to disclose the Energy Utilisation Index (EUI) of their central building services installations.  EMSD provides online benchmarking tools for selected residential and commercial segments.	The Hong Kong Green Building Council (HKGBC) launched the HKGBC Benchmarking and Energy Saving Tool (HK BEST) Series for office occupants (HK BESTOO) and commercial buildings for office and retail use (HK BESTOF and HK BESTRET)
3. Mandatory Auditing and Retro-commissioning	Prescribed buildings under the BEEO have to carry out energy audit every 10 years.  EMSD is conducting pilot projects on retro-commissioning at Government buildings.	HKGBC is developing an "ACT-SHOP" programme in promoting retro-commissioning as a good energy saving practice in the local building industry
4. Emission Trading Schemes	Its applicability in our local context will be kept in view.	
5. Green Building Rating and Energy Performance Labelling	Government, in implementing the "Revitalisation of Industrial Buildings" programme, went one step further by encouraging wholesale conversion projects to be retro-fitted with green features/ measures and to obtain green building certification.	HKGBC developed and has been operating green building rating schemes (BEAM Plus) including assessment on New Buildings (including major renovation), Existing Buildings and Interiors.

3. The policy elements are those referred in the *Tokyo Metropolitan Government.TMG-C40 Report/Urban Efficiency: A Global Survey of Building Energy Efficiency Policies in Cities*, Tokyo, 2014 (updated May 2015) pp 21

Policy Elements <sup>3</sup>	Government's Direct Effort	Partnering with External Organisations
6. Financial Incentives	<p>Implemented the Buildings Energy Efficiency Funding Scheme to subsidise building owners on a matching basis to conduct energy-cum-carbon audits and carry out energy efficiency projects.</p> <p>Allowed profits tax deductions for expenditure on:</p> <p>(1) "Building refurbishment" covering renovation and refurbishment of buildings other than domestic buildings,</p> <p>(2) "Environmental protection installations" and energy efficient buildings registered under the "Hong Kong Energy Efficiency Registration Scheme for Buildings".</p>	<p>The two power companies, under the Scheme of Control Agreement (SCA), operate subsidised schemes to building owners on matching basis to carry out energy efficiency improvement works. Under the post-2018 SCAs, more funds will be available under the energy efficiency funds of the power companies to support the carrying out of retrofitting and retro-commissioning, including the implementation of building-based smart/IT technologies to enhance the energy efficiency of a wider range of buildings.</p> <p>The Urban Renewal Authority operates the "Integrated Building Maintenance Assistance Scheme" (IMBAS) to provide funding support on domestic buildings' common area repair works which includes energy efficiency retrofits.</p>
7. Non-financial Incentives	<p>Applicability in our local context will be kept in view.</p>	
8. Awareness Raising Programmes	<p>EMSD maintains the "Energy Saving for All" website for access to the latest energy efficiency activities from over 50 partner organisations.</p> <p>EMSD conducts outreach programmes for school children.</p> <p>On-going promotion and publicity programmes/campaigns to raise awareness and public education.</p>	<p>The Environment and Conservation Fund has supported environmental, educational and minor works/demonstration projects on greening, energy efficiency and renewable energies carried out by non-profit making organisations like universities, community bodies, and schools.</p>
9. Promoting green Leases		<p>HKGBC has launched a "Green Tenancy Driver" handbook for reference by landlords and tenants. Promotional campaigns are being carried out in local shopping malls.</p>

Policy Elements <sup>3</sup>	Government's Direct Effort	Partnering with External Organisations
10. Voluntary Leadership Programmes	<p>ENB/EMSD launched various energy saving charters, e.g. on maintaining summer indoor temperatures; banning use of Incandescent Light Bulbs (ILB); and external lighting.</p> <p>EMSD, through a new “Energy Saving Championship Scheme”, will commend organisations (covering 5 categories, namely shopping malls, office premises, housing estates, primary/secondary schools, and post-secondary education institutions) with excellent performance in energy saving.</p>	<p>HKGBC runs a bi-annual “Green Building Award” to recognise leaders in the green building industry for outstanding green building projects and products.</p> <p>The “Hong Kong Awards for Environmental Excellence” (HKAEE), which includes the “Energywi\$e certificate award” has been held annually since 2008.</p>
11. Government Leadership	<p>Promulgated the “Energy Saving Plan for Hong Kong’s Built Environment 2015~2025+”.</p> <p>Implementing green building and energy efficiency policy frameworks for Government buildings through promulgation of Development Bureau Technical Circular/Environment Bureau Circular Memorandum on Green Government Buildings.</p> <p>Implementing a green procurement policy.</p>	<p>In collaboration with the Construction Industry Council (CIC), the Government developed Hong Kong’s first zero-carbon building to share knowledge and expertise in low/zero carbon building design and technologies, and to help raise community awareness about low carbon living.</p>
12. Other	<p>Launched the “Fresh Water Cooling Towers Scheme” for non-domestic buildings in 2000 for saving energy used in their air-conditioning installation.</p>	