

AsiaConstruct 2016
Theme Paper - Hong Kong

Sustainable Construction Policy and Market in Hong Kong

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Content:

- **Main issues** with the construction Industry & market in Hong Kong
- **Efforts** made according to the conditions surrounding the construction industry
- **Future development** for sustainable construction policy & market

1. Main issues (1/5) : Overview

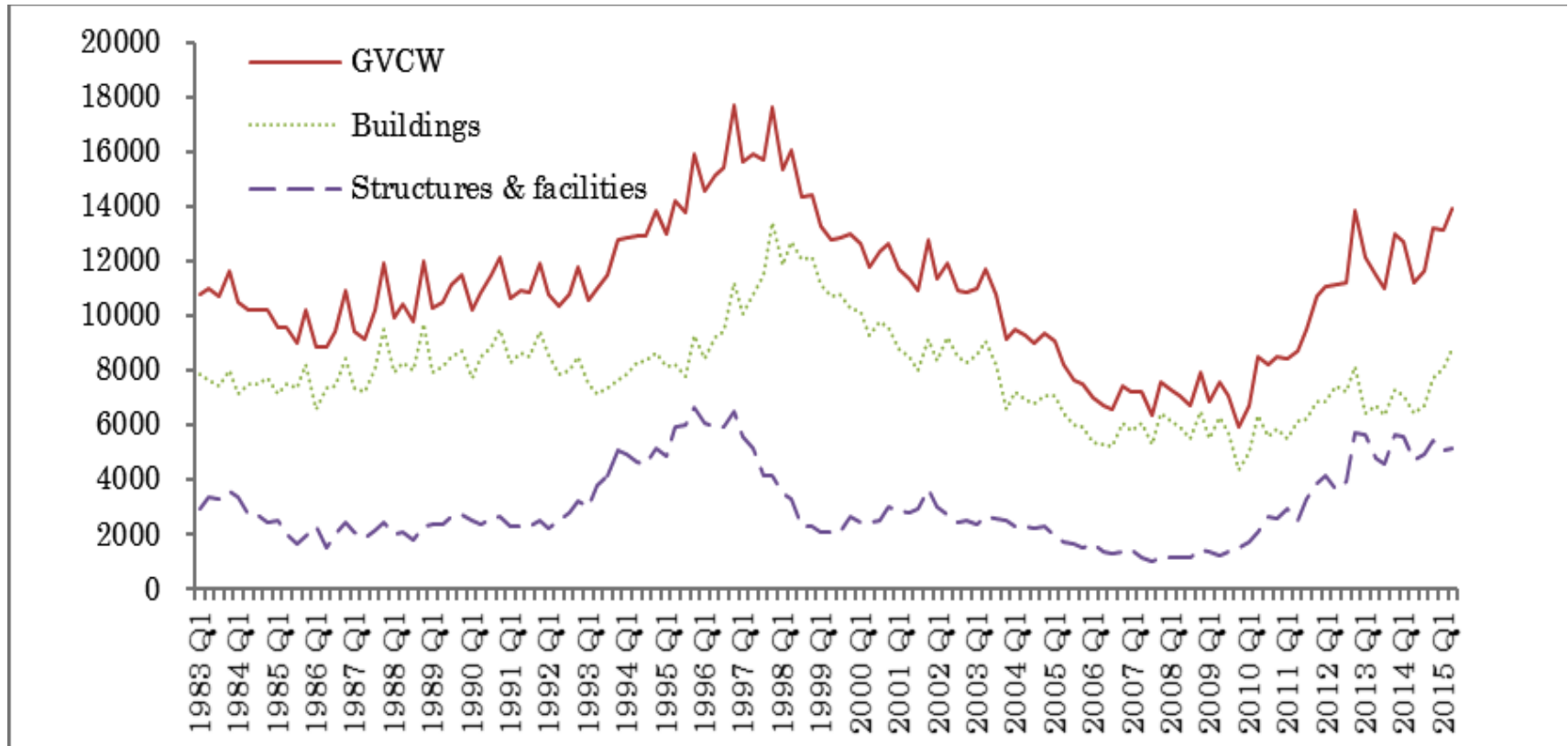


Fig. 1. Hong Kong GVCW, buildings, structures, and facilities construction values
(at constant 1990 prices; unit: HK\$ million)

Source: Census and Statistics Department, Hong Kong SAR.

1. Main issues (2/5) : Manpower

- Labor shortage

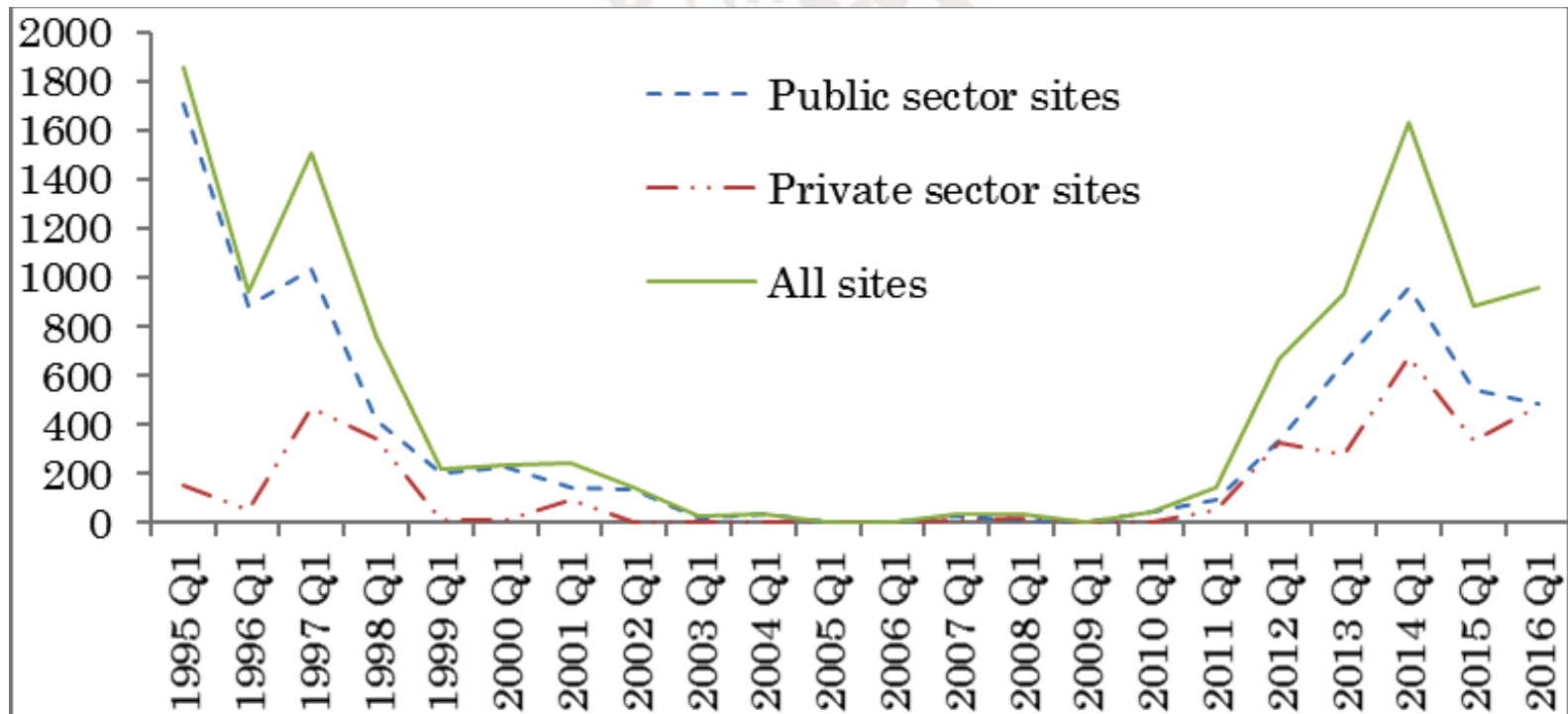


Fig. 2. Quarterly vacancies of manual workers at construction sites in Hong Kong

Source: Quarterly Report of Employment and Vacancies at Construction Sites,
<http://www.censtatd.gov.hk/hkstat/sub/sp452.jsp?productCode=B1050004>

1. Main issues (2/5) : Manpower (cont'd)

- Ageing labor

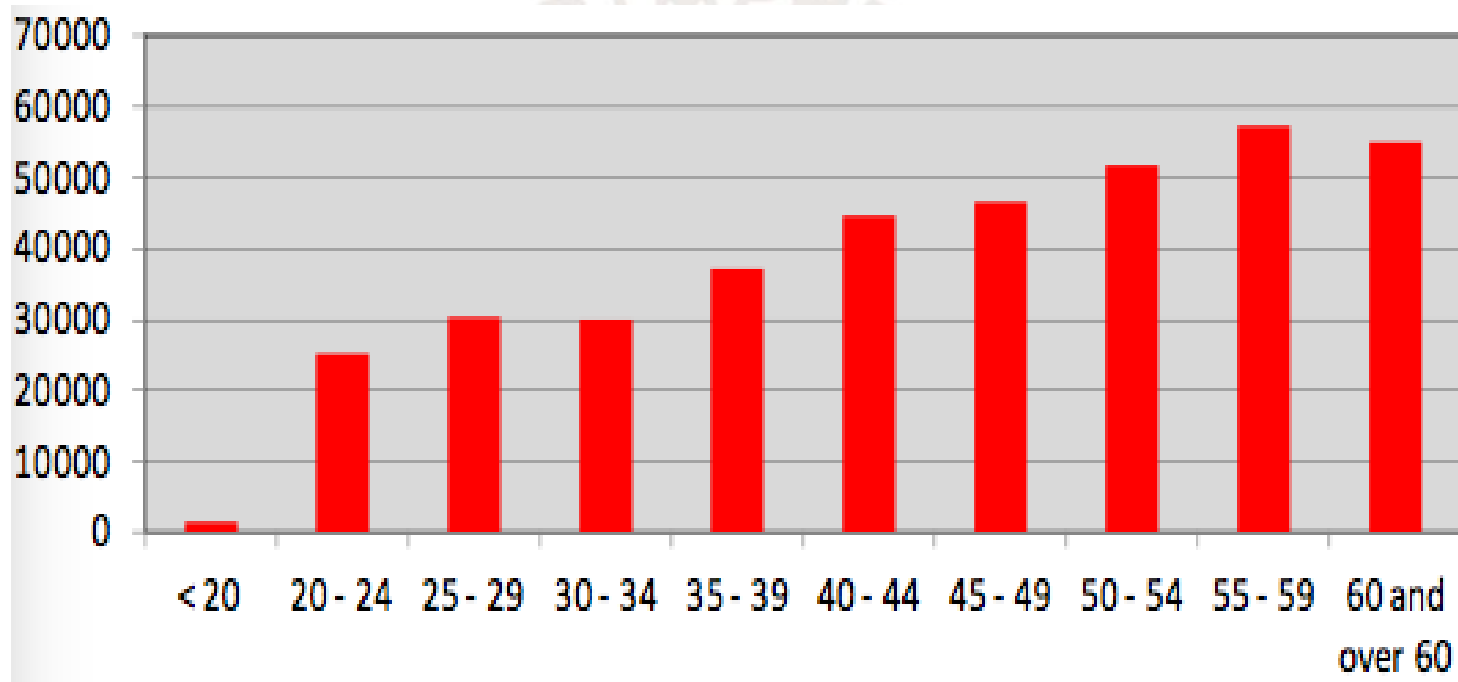


Fig. 3. Age distribution of the registered construction workers (by 31 March 2016)

Source: http://cwr.hkcic.org/download/Chi_Age_Distribution_by%20alphabetical%20order.pdf

Table 1. Age distribution of the registered construction workers (by 31 March 2016)

Age	Registered general workers	Registered semi-skillful workers	Registered skillful workers	Total
Below 20	0.36%	0.00%	0.05%	0.40%
20-24	5.74%	0.75%	0.15%	6.64%
25-29	6.38%	0.98%	0.66%	8.03%
30-34	5.17%	0.85%	1.92%	7.95%
35-39	5.67%	0.69%	3.40%	9.77%
40-44	6.94%	0.66%	4.13%	11.74%
45-49	7.33%	0.59%	4.32%	12.26%
50-54	7.52%	0.56%	5.53%	13.62%
55-59	7.43%	0.60%	7.05%	15.11%
60 or above	7.65%	0.55%	6.28%	14.49%
Total	60.17%	6.28%	33.45%	100.00%

Source: Calculated from the statistics provided by Hong Kong Construction Industry Council at http://cwr.hkcic.org/download/Chi_Age_Distribution_by%20alphabetical%20order.pdf.

1. Main issues (2/5) : Manpower (cont'd)

- High accident and fatalities rate

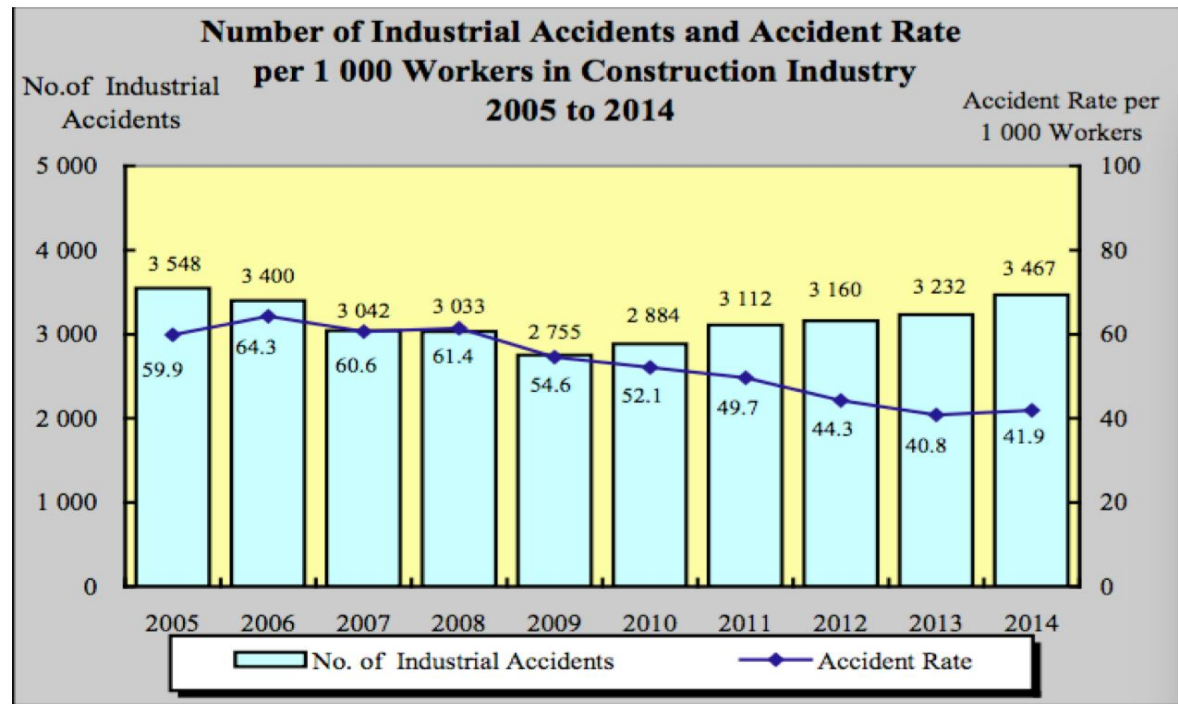


Fig. 4. Industrial accidents in Hong Kong construction industry (2005-2014)

Source: <http://www.labour.gov.hk/eng/osh/pdf/Bulletin2014.pdf>

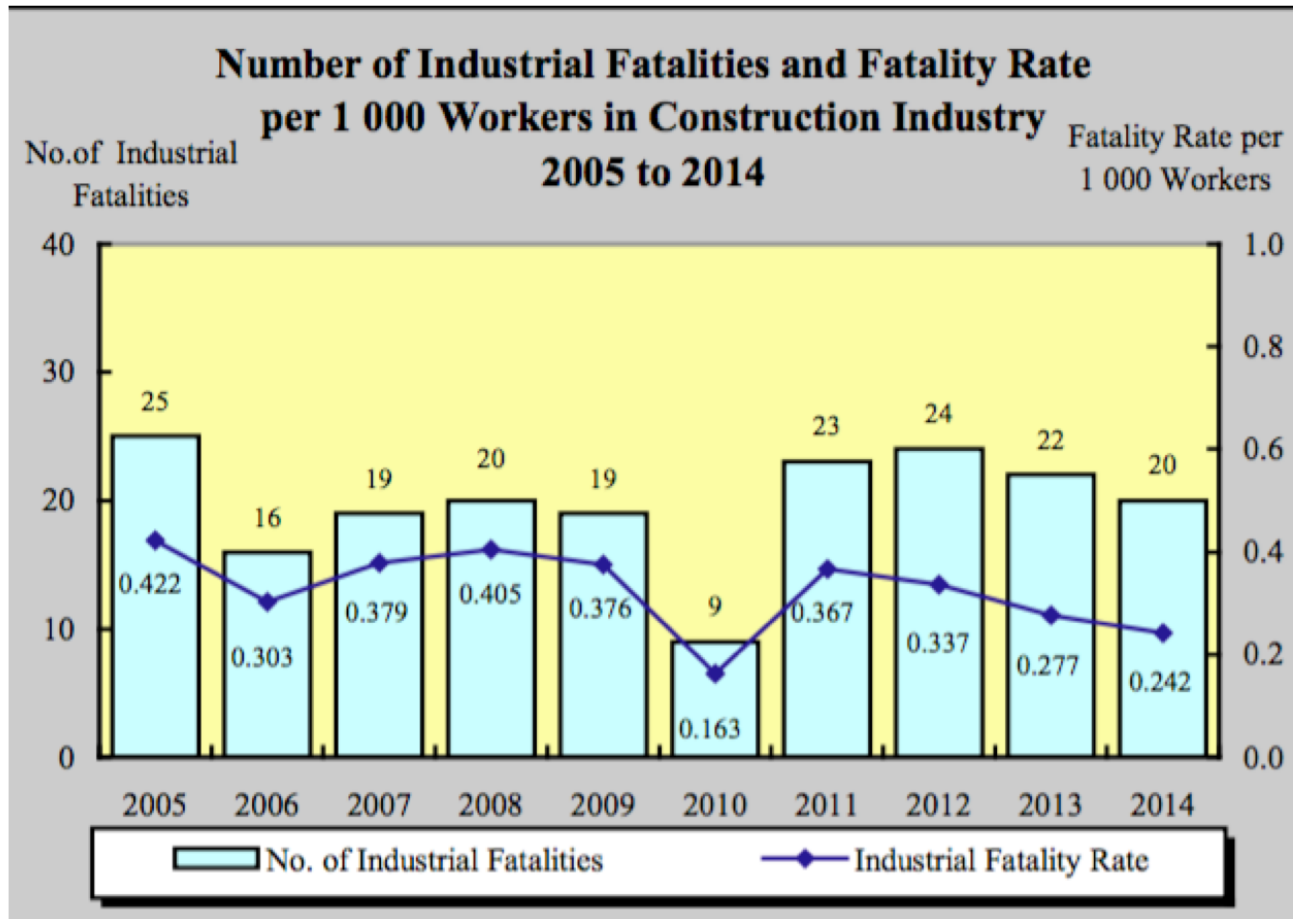


Fig. 5. Fatal accidents in Hong Kong construction industry (2005-2014)

Source: <http://www.labour.gov.hk/eng/osh/pdf/Bulletin2014.pdf>

1. Main issues (3/5) : Technology

- Conventional in-situ construction methods (Jaillon & Poon, 2010):
 - Labour intensive
 - Generate large quantities of construction wastes
- Prefabrication
 - Implemented in Hong Kong since the 1980s
 - Largely applied to public housing projects
 - Private sector: largely traditional construction methods
- Increasing use of prefabrication
 - Joint Practices Notes No.1 (2001)
 - Green and Innovative Buildings
 - Joint Practices Notes No.2 (2002)
 - Second Package of Incentives to Promote Green and Innovative Buildings

1. Main issues (3/5) : Technology (cont'd)

- Contractors
 - Emphasis on supply chain management
 - Less motivation to improve production process
 - Innovative technologies
 - prefabrication & mechanization
- The above phenomena largely attributed to:
 - Construction industry: cyclical & highly competitive
 - Subcontracting system in Hong Kong
 - Multi-layers of sub-contractors

1. Main issues (4/5) : Space

- Hong Kong
 - Compact city
 - Dense & high-rise urban environment
 - The 4th most densely populated
- Area
 - Total area: 2,754 km² (including sea area)
 - Steep slopes: around 84%
 - Developed territory: < 25%
 - Country parks & nature reserves: about 40% of the remaining land

1. Main issues (4/5) : Space (cont'd)

- Constraint to large scale of industrialization
 - Limited space on a typical site
 - Especially the private sector
- Insufficient space for
 - Production: prefabricated components & elements
 - Implementation: volumetric prefabrication
 - Transportation
 - Site access
 - Onsite storage area

1. Main issues (5/5) : Environment

- Construction industry
 - Plays a significant role in sustainable development
 - A large contributor to waste generation
- Buildings
 - Contribute nearly 1/2 of the total primary energy use in Hong Kong
- Construction waste
 - Surplus materials from site clearance, excavation, construction, refurbishment, renovation, demolition and road works.
 - Inert wastes
 - Non-inert wastes

1. Main issues (5/5) : Environment (cont'd)

- Inert wastes (public fill)
 - Debris, rubble, earth & concrete
 - Suitable for land reclamation & site formation
 - Reused or recycled
- Non-inert wastes
 - Bamboo, timber, vegetation, packaging waste & other organic materials
 - Go to landfills

Total (tpd)	38,791	29,890	22,973	24,686	42,289	39,202	51,452	67,127	65,971	57,547
y-o-y change (%)	(23.7%)	(-22.9%)	(-23.1%)	(7.5%)	(71.3%)	(-7.3%)	(31.2%)	(30.5%)	(-1.7%)	(-12.8%)

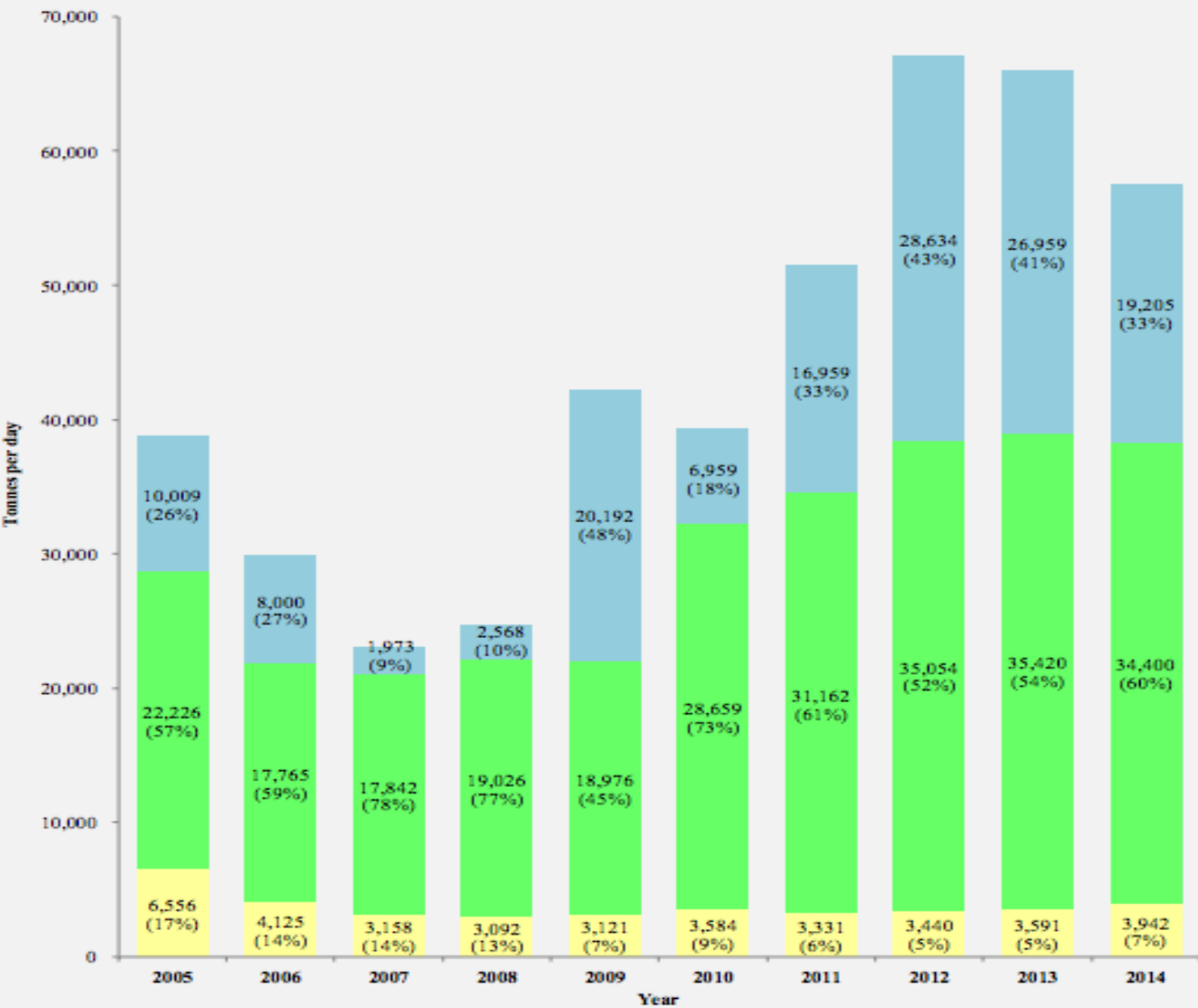


Fig. 6. Daily disposal and reuse of overall construction waste (2005 - 2014) (Unit: tonnes)

Source: Waste statistics for 2014, <https://www.wastereduction.gov.hk/sites/default/files/msw2014.pdf>

Total (tpd)	17,679	15,039	13,901	13,503	13,326	13,817	13,458	13,844	14,311	14,859
y-o-y change (%)	(1.0)	(-14.9)	(-7.6)	(-2.9)	(-1.3)	(3.7)	(-2.6)	(2.9)	(3.4)	(3.8)

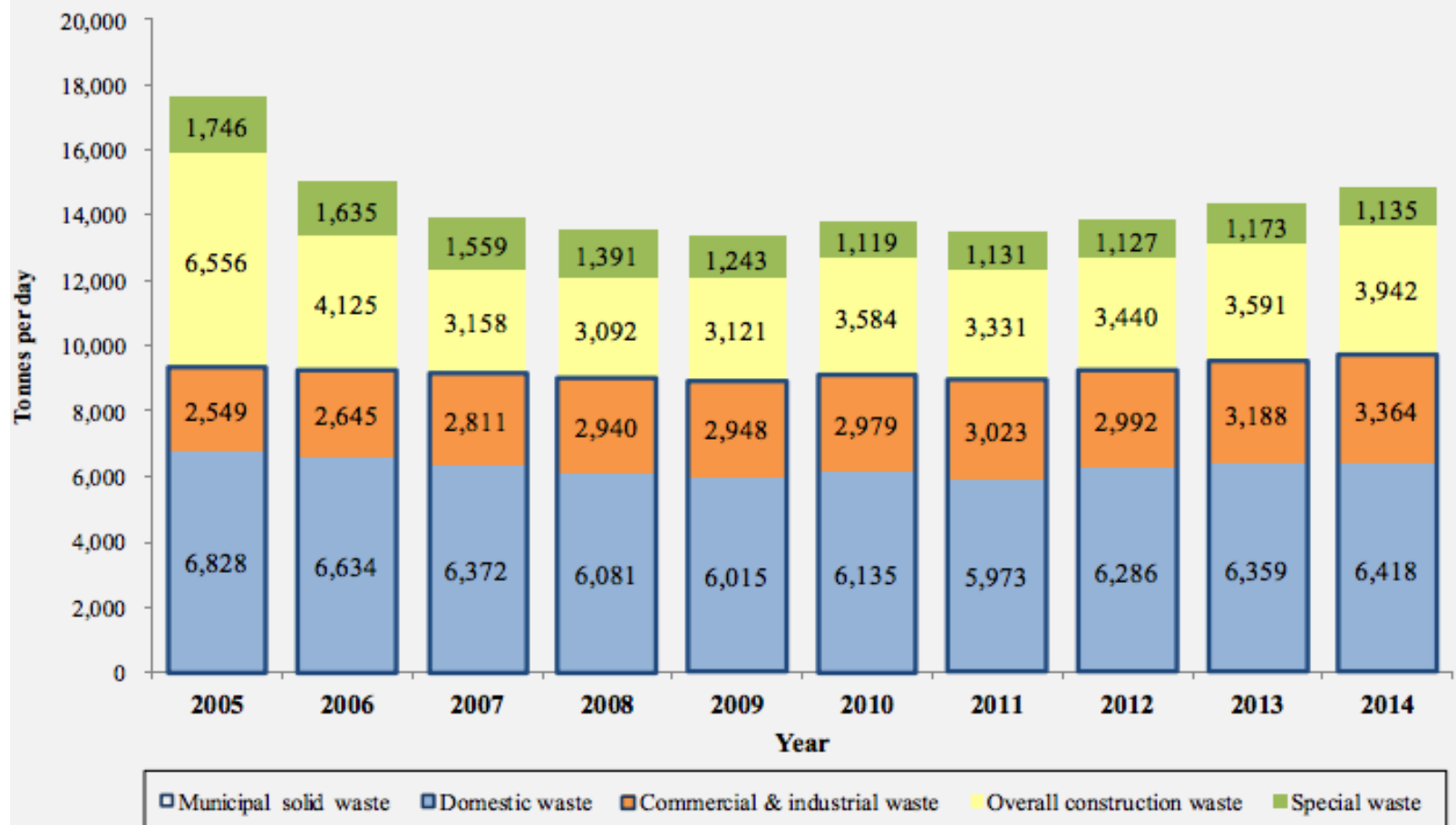


Fig. 7. Daily disposal of solid waste at landfills in Hong Kong (2005-2014) (Unit: tonnes)

Source: Waste statistics for 2014, <https://www.wastereduction.gov.hk/sites/default/files/msw2014.pdf>

1. Main issues (5/5) : Environment (cont'd)

- Reduce wastes by:
 - Prefabrication
 - Reduce construction wastes by 52% in Hong Kong (Jaillon, Poon & Chiang, 2009)
 - Cost-effective approach
 - Integrate waste minimization at the tender stage
 - Integrating waste control as part of site management functions
 - Different sub-contracting arrangements
 - Different levels of construction wastes (Tam, Shen & Tam, 2007)
 - Waste reduction training

2. Efforts made (1/3) : Economic dimension

- Technology with economic efficiency
 - Prefabrication has been proved to (Jaillon & Poon, 2009)
 - Improve quality control
 - Foster higher productivity
 - Save construction time
 - Reduce construction waste, dust & noise on-site
 - Improve site safety
 - Decrease the dependency on labour on-site

2. Efforts made (1/3): Economic dimension (cont'd)

- Infrastructure development
 - Facilitate continual economic growth
 - Increase local employment
- Public spending on infrastructure
 - Maintained at high levels
 - About 60% of the HKD 370 billion on approved Capital Works Programme projects
 - In the past 5 years
 - Related to the 10 mega infrastructure projects

10 mega infrastructure projects

Project	Description	Estimated cost (US\$ mln)	Commencement	Target completion
1. South Island Line East	<ul style="list-style-type: none"> Linking Admiralty to the Southern District on Hong Kong Island 	1,590	2011	2016
2. The Shatin to Central Link (SCL)	<ul style="list-style-type: none"> Connecting the northeast New Territories and Hong Kong Island 	10,300	2012	2019-2021
3. The Tuen Mun Western Bypass and Tuen Mun Chek Lap Kok Link	<ul style="list-style-type: none"> Linking up Deep Bay in Shenzhen, the northwest New Territories and Hong Kong International Airport. 	6,030	2013	2016-2018
4. The Guangzhou-Shenzhen-Hong Kong Express Rail Link (Hong Kong Section)	<ul style="list-style-type: none"> Linking up the national rail network of the Chinese mainland Connecting West Kowloon to Shenzhen, Guangzhou 	8,050	2010	2017
5. Hong Kong-Zhuhai-Macau Bridge	<ul style="list-style-type: none"> 29.6 km-Bridge with 6 lanes Linking up Hong Kong, Zhuhai and Macau. 	2,740	2010	2016
6. Hong Kong-Shenzhen Airport Cooperation	<ul style="list-style-type: none"> A dedicated rail link between Shenzhen Airport and Hong Kong International Airport 	N.A.	N.A.	N.A.
7. Hong Kong-Shenzhen Joint Development of the Lok Ma Chau Loop	<ul style="list-style-type: none"> Lok Ma Chau Loop, an area near the Hong Kong-Shenzhen border Working with Shenzhen authorities to develop the area 	N.A.	N.A. (Environmental Impact Assessment Report completed in 2013)	N.A.
8. West Kowloon Cultural District (WKCD)	<ul style="list-style-type: none"> The flagship art and culture development in Hong Kong with aims to provide a platform to enhance arts education and cultural exchange and cooperation. 	Over 6,000	2013	2015 (first phase)
9. Kai Tak Development	<ul style="list-style-type: none"> An area consisting of former Hong Kong airport and its adjoining parts, To be developed into an area for commercial, residential, recreational, tourism and community uses together with supporting infrastructure 	Over 16,700	2009	2013 / 2016 / 2021 (In 3 phases)
10. New Development Areas (NDAs)	<ul style="list-style-type: none"> In the Northern New Territories Purposes of land use include housing, commercial, recreation and cultural facilities 	N.A.	N.A. (Environmental Impact Assessment Report approved in 2013)	2019 (first phase)

Fig. 8. Ten mega infrastructure projects in Hong Kong

Source: "Building and Construction Industry in Hong Kong" by HKTDC Research, <http://hong-kong-economy-research.hktdc.com/business-news/article/Hong-Kong-Industry-Profiles/Building-and-Construction-Industry-in-Hong-Kong/hkip/en/1/1X000000/1X003UNV.htm>

2. Efforts made (1/3): Economic dimension (cont'd)

- Procurement system
 - The Development Bureau
 - Facilitate new contractors & consultants to undertake public projects (without compromising quality)
 - Ensure sufficient market participants
 - Market competitiveness
 - Encourage new technologies & ideas
 - Intend to split large public projects into smaller ones
 - Facilitate more contractors' participation

2. Efforts made (1/3): Economic dimension (cont'd)

- Market extension
 - The Development Bureau
 - Sign “Mainland and Hong Kong Closer Economic Partnership Arrangement” in 2003
 - Implement 51 market liberalization measures
 - Facilitate stakeholders of the Hong Kong construction industry to practice and develop business in the Mainland
 - Will further liaise with the Ministry of Commerce
 - Explore more business opportunities

2. Efforts made (2/3): Environmental dimension

- Polluter Pays Principle
 - Landfill Charging Scheme (1999)
 - Trip Ticket System (TTS) (1999, 2004)
 - prevent illegal dumping
 - easily track & monitor transportation routes & destinations of construction wastes generated by a particular construction project
 - Construction Waste Disposal Charging Scheme (2005)
 - Encourage producers to reduce, sort & recycle construction wastes

2. Efforts made (2/3): Environmental dimension (cont'd)

- Based on “reduce, reuse and recycle” principles
 - Construction Industry Review Committee (2001)
 - Encourage greener & energy efficient design
 - Propose to use information technology, prefabrication, standardized & modular components
 - Urge to place emphasis on life-cycle benefits (instead of short-term efficiency)
 - Recommend more extensive use of recycled materials
 - Joint Practice Note No.1 (JPN1) & Joint Practice Note No. 2 (JPN2) (2001, 2002)
 - Financial incentive
 - Site coverage & gross floor area (GFA) exemption

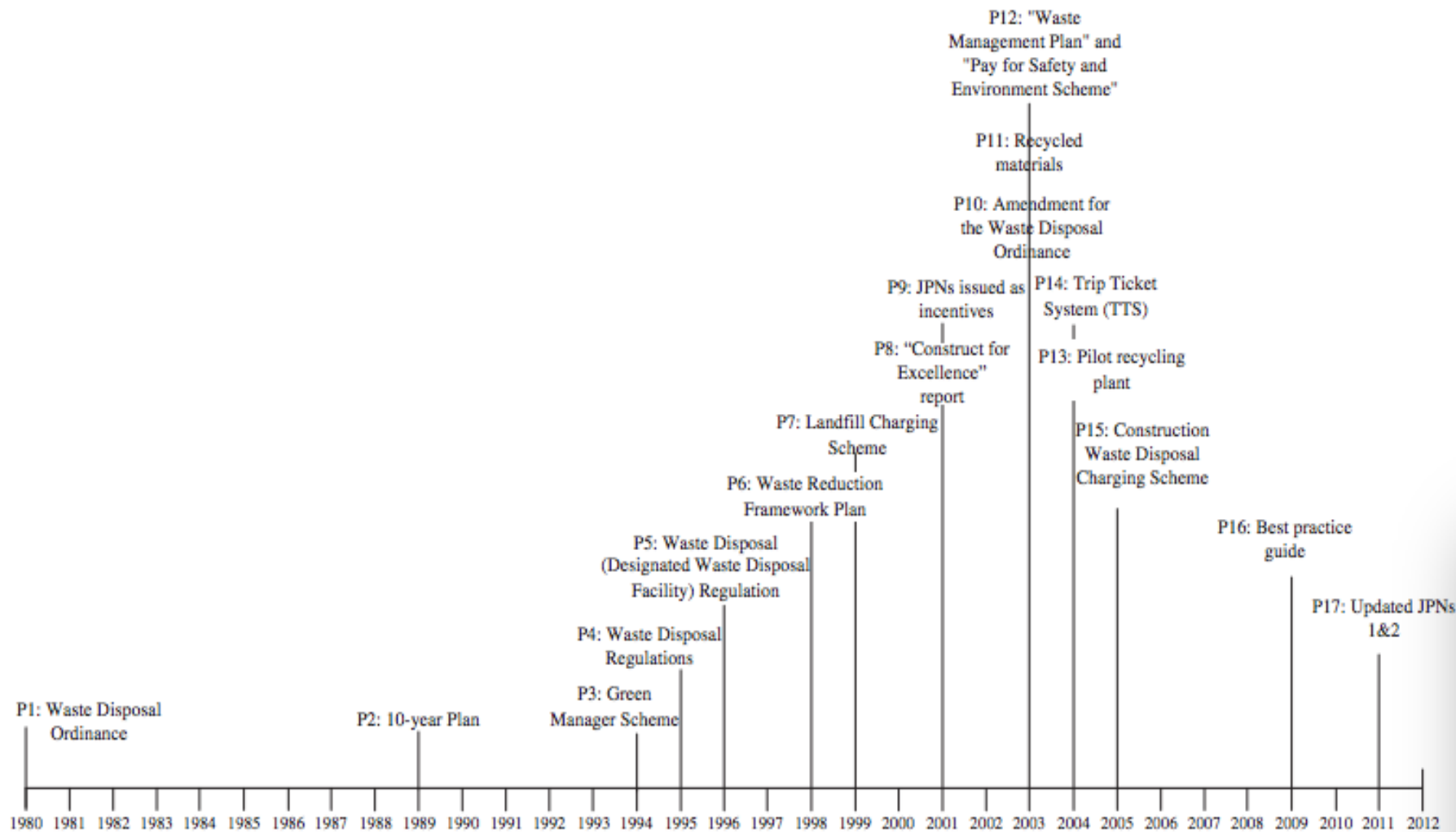


Fig. 9. Series of policies concerning construction waste management in Hong Kong

Source: "Construction waste management policies and their effectiveness in Hong Kong: A longitudinal review" by W. Lu & V.W. Tam, 2013, *Renewable and sustainable energy reviews*, 23, 214-223.

2. Efforts made (2/3): Environmental dimension (cont'd)

- Embed sustainable principles into the whole life cycle
 - Design stage
 - Incorporate green procurement principles
 - Specify environment-friendly building materials
 - Tender stage
 - Emphasize long-term performance
 - “Formula Approach”: tender price & past performance
 - Quality
 - Programme
 - Safety
 - Environmental management
 - PPP
 - Private partner: design, construct, finance & operate

2. Efforts made (2/3): Environmental dimension (cont'd)

- Construction stage
 - Environmental management
 - Regularly monitored
 - Results considered for future tender assessment
 - Pay for site cleanliness
 - Pay for waste management
 - Prefabrication & low-waste technologies
- Operation stage
 - Energy efficient installations
 - Environment-friendly materials
- Post-operation stage
 - Adaptive reuse, alteration & addition methods

2. Efforts made (3/3): Social dimension

- Safety
 - Shared responsibility of regulators, employers & employees
 - Safety culture, safety promotion & training
 - “Pay for Safety Scheme” (PFSS) (1996)
 - Currently, under the Pay for Safety and Environment Scheme (PFSES) for public works contracts
 - Remove site safety items from the scope of competitive tendering
 - Include safety-related tasks into Bills of Quantities
 - Employers pay contractors for safety-related tasks (after successful completion & have it certificated)
 - The cost of safety items (0.5% ~ 2.0% of the total project sum)

2. Efforts made (3/3): Social dimension (cont'd)

- Employment
 - Labor Department
 - Construction Industry Recruitment Centre (CIRC) (January 2016)
 - Soothe the manpower shortage
 - Offer a one-stop job search & recruitment service
 - Labor importation
 - Permitted on an appropriate, limited & targeted basis
 - Prioritize employment of local labor

2. Efforts made (3/3): Social dimension (cont'd)

- Labor welfare
 - Standard Working Hours Committee (SWHC)
 - Based on first-stage consultation & survey (2014)
 - Recommend writing working hours & overtime compensation in employment contracts (mandatory manner)
 - Further protect grass-roots employees (lower income, lower skills & less bargaining power)
 - Will soon launch the second-stage consultation (working hours policies)

2. Efforts made (3/3): Social dimension (cont'd)

- Development Bureau

- Proposed Security of Payment Legislation (SOPL) for the construction industry (June 2015)
- Encourage
 - Fair payment, rapid dispute resolution & increasing cash flow
- Government works
 - All construction contracts, consultancy appointments, supply contracts and sub-contracts will be covered regardless of value.
- Private sector
 - Cover procured new buildings (cost > HKD 5 million)
 - Or related consultancy services (cost > HKD 0.5 million)
 - Not cover repair, maintenance & renovation

3. Future development

- Industrialization (5 degrees)
 - Prefabrication
 - Mechanization
 - Automation
 - Robotics
 - Reproduction
- Green featured construction
 - Further encourage green-featured construction
 - More incentive measures (similar to GFA exemption) & restrictive measures (similar to waste charges)
 - Minimize construction waste
 - Promulgate policies & legislation

3. Future development (cont'd)

- Construction safety
 - Safety culture
 - Relevant initiatives
 - Especially for those working for lower-tiered sub-contractors
- Labor welfare
 - Specify reasonable working hours in contracts
 - Further secure payment (including overtime compensation)
 - Especially for those with lower income, lower skills & less bargaining power
- External collaboration
 - Further promote external collaboration
 - Facilitate exportation of local professional services



Q & A

Thank you