

The Cream of BEAM Plus (2017)

A General Review of BEAM Plus Green Buildings

(This paper provides a **gist** of the HKGBC BEAM Pro/BEAM Affiliate Mandatory CPD Event “Cream of BEAM Plus cum Skill Enhancement Seminar” held on 18.4.2017. For further details, readers are advised to view the video on HKGBC On-line Training Portal.)

INTRODUCTION

“The Cream of BEAM Plus” is a paper published regularly to disseminate the performance of Platinum-rated buildings. The first paper published in 2013 analysed the performance of 12 Platinum projects generated between scheme commencement in 2010 and the end of 2012. In the second paper published in 2014, the total number of Platinum projects rose to 23 when the analysis was extended to the end of 2013. In the third paper, the analysis period was extended to the end of Q1 2015, with the number of Platinum projects increased to 34. In this paper, the study period is further extended to the end of 2016, providing readers more updated analysis results.

STUDY SAMPLES

The NB project samples of this study are summarised in Table 1. For readers’ reference, the grading distribution of all BEAM Plus projects is given in Figure 1.

Table 1 NB project samples in this study

Study period	2010- 2016
Sample Size - All projects	452
Sample Size - Platinum projects	60

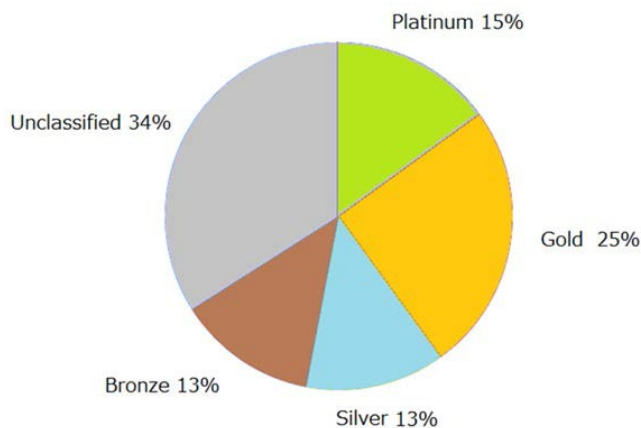


Figure 1 Grading distribution of all BEAM Plus projects

ENERGY REDUCTION TREND

The mean energy reduction (EU1) achieved by projects from Bronze to Gold is on the rise, although the energy saving for Platinum projects has declined slightly. Further details are given in Table 2. For residential projects, higher credit achievements in energy reduction for common area lighting and vertical transportation are observed in EU1 Option 2, i.e. the passive design route. However, slightly lower achievements are observed in passive design items within the route, such as OTTV and permeability.

Table 2 Trend of energy saving in NB projects

Grade	2013 study * ¹	2015 study * ²	Current study * ³
Platinum	30%	29%	27%
Gold	19%	20%	21%
Silver	17%	17%	18%
Bronze	13%	15%	16%

*1 2013 study: Based on 110 assessed projects generated between 1 Apr 2010 and 31 Dec 2013.

*2 2015 study: Based on 248 assessed projects generated between 1 Apr 2010 and 31 Mar 2015.

*3 Current study: Based on 452 assessed projects generated between 1 Apr 2010 and 31 Dec 2016.

WATER REDUCTION TREND

The mean potable water saving under WU1 is on the rise in general, as shown in Table 3.

Table 3 Trend of potable water saving in NB projects

Grade	2013 study * ¹	2015 study * ²	Current study * ³
Platinum	39%	39%	40%
Gold	34%	33%	36%
Silver	32%	33%	35%
Bronze	30%	32%	36%

*1 2013 study: Based on 110 assessed projects generated between 1 Apr 2010 and 31 Dec 2013.

*2 2015 study: Based on 248 assessed projects generated between 1 Apr 2010 and 31 Mar 2015.

*3 Current study: Based on 452 assessed projects generated between 1 Apr 2010 and 31 Dec 2016.

MEAN CATEGORY SCORES

BEAM Plus scores are calculated in five performance categories, namely Site Aspects (SA), Materials Aspects (MA), Energy Use (EU), Water Use (WU) and Indoor Environmental Quality (IEQ). The number of credits received in each category is divided by the number of applicable credits to obtain a percentage score for that category. The average score (among all Platinum projects) achieved in each category, and the average total score, are illustrated in Figure 2 together with the portion of scores that were attempted but failed (shown in orange).

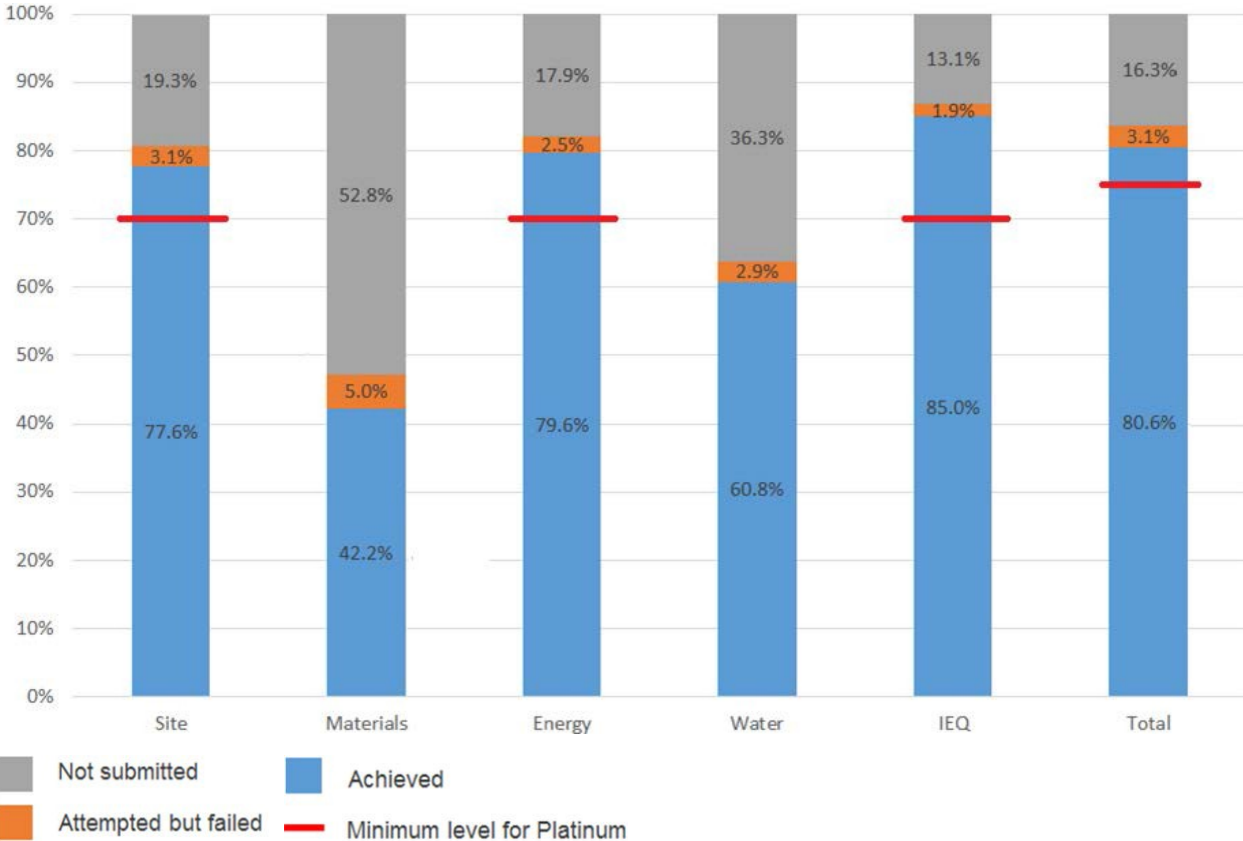


Figure 2 Mean category scores of Platinum NB projects

CREDIT ACHIEVEMENT RATES

The credit achievement rates of all NB projects have been analysed. Commonly achieved credits are identified by picking up those items with achievement rates at or above 66%. These are shown in Table 4.

Table 5 gives a similar analysis except that the sample is restricted to the Platinum grade only. Besides, Table 5 has deliberately excluded those items shown in Table 4 in order to provide a view about the *unique* strength of Platinum projects.

On the contrary, there are credits that are less achieved by projects, even those achieving Platinum grade. They are listed in Table 6. Possible reasons are also given in the rightmost column of the table.

Figure 3 shows the “Top Ten” contested credits among Platinum projects. These represent challenging items that applicants attempted but failed. For further details on how to avoid these failures, readers can find a comprehensive list of “Dos and Don’ts” tips in Part Two of the on-line seminar video.

Table 4 Credits commonly achieved by all projects

Credits	Achievement Rate (All Projects) %
SA4a Site Design Appraisal	66%
SA10 Construction Environmental Management Plan	68%
SA11 Air Pollution Control During Construction	66%
SA13 Water Pollution Control During Construction	66%
MA8a Avoid Ozone Depleting Refrigerants	67%
EU10a-d Commissioning (except ICxA)	71%
EU11a-b O&M Manual, Energy Management Manual	70%
EU12 Metering	66%
WU6 Reduce Sewage Discharge	67%
IEQ2 Drainage Design to Avoid Transmitting Bacteria	67%
IEQ4 Refuse Room De-odourising Equipment	68%

Table 5 Unique strengths of Platinum projects

Credits		Achievement Rate (Platinum Projects) %
SA2b	Convenient Access to Public Transport	94%
SA3a	Neighbourhood Basic Services	82%
SA3b	Neighbourhood Recreational Facilities	100%
SA6	Conservation of Cultural Heritage	100%
SA8a	Wind Amplification	78%
SA12	Noise Control During Construction	93%
SA14	Noise from Building Equipment	90%
SA15	Light Pollution	83%
MA8b	Avoid Ozone Depleting Building Materials	95%
MA9	Regionally Manufactured Materials	78%
EU5	Carpark Lighting	87%
EU11c	Training and O&M Facilities	77%
WU1	Reduce Potable Water Use	77%
WU5	Water Efficient Appliances	79%
IEQ1	Security Design	93%
IEQ3	Legionnaires' Disease Prevention	79%
IEQ5a	Construction IAQ Plan	79%
IEQ6	Outdoor Sources of Air Pollutants	92%
IEQ7	Indoor Sources of Air Pollutants	90%
IEQ8	Carpark IAQ	81%
IEQ11a	Localized Ventilation	95%
IEQ13a	AC Premises – Temperature when AC is in use	86%
IEQ14b	NV Premises – Temperature when AC is in use	83%
IEQ16a	Interior Lighting in Normally Occupied Areas	76%
IEQ17	Interior Lighting in Common Areas and Plant Rooms	83%
IEQ21	Indoor Vibration	83%
IEQ22	Universal Access	88%
IEQ23a	Amenities for the Benefit of Building Users	96%
IEQ23b	Amenities for Improved O&M	90%

Table 6 Less Achieved Credits (even for Platinum projects)

Credit	Description	Achievement Rate (Platinum Projects)	Possible Reasons / Discussion
SA1	Site contamination	4%	Already included in land lease?
SA2a	Elimination of car parking spaces	23%	Commercial considerations?
SA8b	Microclimate – elevated temperatures	15%	Difficult to shade 50% non-roof areas ?
MA1	Building reuse (90% structures reused)	0%	Is 90% too high?
MA3	Prefabrication	13%	Difficult for non-residential buildings?
MA5	Rapidly renewable materials	2%	Not practical for structural use?
MA7b-c	Recycled materials (structure, interior)	12%	Available products limited?
EU13	Energy efficient building layout	7%	Too difficult to substantiate?
WU2	Water leakage monitoring	12%	Extent of monitoring too large?
WU4b	Grey water recycling	7%	Space and cost considerations?
IEQ11b	General exhaust for future tenants	22%	Space and cost considerations?
IEQ19b	Impact noise isolation between floors	5%	Cost /finish considerations?

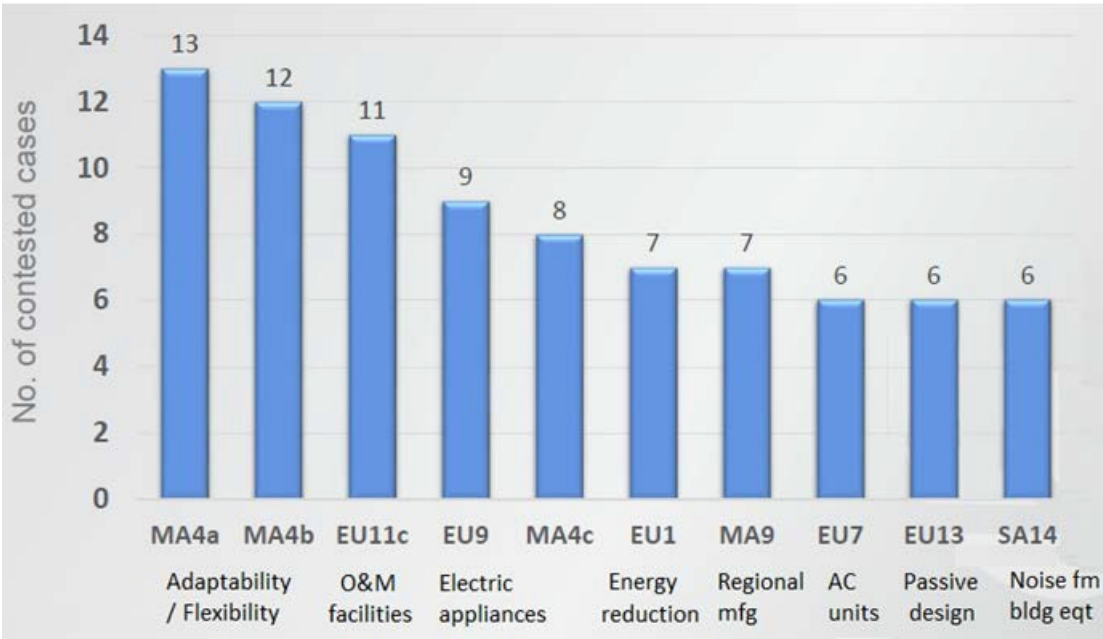


Figure 3 Top ten contested credits among Platinum NB projects

IA CREDITS

The IA1 (innovative techniques) items proposed by this particular batch of Platinum projects include:

- Creative re-use of historical industrial building (by converting it into residential building);
- Openable acoustic windows in a tertiary institution;
- Chilled ceiling AC system;
- Smart meters and mobile apps for hostel residents to induce behavioural changes;
- Smart panel for home control to track energy consumption; and
- Other items as detailed in the training video.

The IA2 (performance enhancement) items proposed by the projects include:

- Community engagement (as per BEAM Plus NB Manual – IA2 Section);
- EV charging for more than 50% of car parking spaces (as per BEAM Circular 2014.118);
- Twin-tank system for fresh and flushing water;
- Two-level lighting system in residential building corridors and staircases;
- Hard-paved construction sites;
- Demolition waste recycling (e.g. 90% recycling ratio);
- Use of sustainable timber (e.g. 100% use);
- Renewable energy (e.g. accounting for more than 10% of building energy);
- Regionally manufactured materials (e.g. accounting for 80% of all materials); and
- Other items as detailed in the training video.

OTHER AREAS OF INTEREST

The study has also briefly analysed the performance of EB, BI and ND (pilot) Platinum projects, their innovative practices, and identified a list of “Dos and Don’ts” for BEAM Practitioners when carrying out BEAM submissions. The future way forward, including NB Version 2.0 and new HKGBC guidebooks, has also been discussed. Details of these can be found in the training video.

CONCLUSION

This study has analysed 60 Platinum New Building projects that emerged from scheme commencement to the end of 2016. It has also studied 452 assessed projects of all grades. It is found that there is a slight increase in energy saving and a moderate increase in water saving for projects from Bronze to Gold. Greeneries and C&D waste recycling have become more popular among Platinum projects. Nevertheless, the achievements in specific passive design items have slightly decreased. There is a need to keep up effort in this area as well as a number of others including building adaptability, noise isolation, prefabrication, water recycling and water efficient irrigation.

ACKNOWLEDGEMENTS

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<http://onlinecpdtraining.hkgbc.org.hk/>