

Investigation on Government Financial Incentives to Simulate Green Homes Purchase

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Abstract: The number of green home projects has increased across Malaysia during recent years. Even there is no doubt on the necessity of green housing development and its benefits for the home owners, developers as well as government, but green housing market still is not attractive for majority of home buyers. Higher price compared with conventional homes and lacks of government incentives for green home buyers are the main causes of the current situation in the green home market. Introducing the new financial incentives for green home buyers not only can attract more potential home buyers to this market but also promote green housing development by increasing demand for this concept of homes. This research aims to investigate current financial incentives for green home buyers and to exposure the new financial incentives for green home buyers. The methodology for conducting the study involved literature review, data collection and analysis data. The process of data collection involved obtaining data from the respondents by conducting questionnaires survey. Collected data has been analysed by SPSS version 19. As a result, the new financial incentives for green home buyers have been evaluated to stimulate potential home buyers to purchase green homes instead of non-green conventional homes.

Key words: Green homes • Incentive • Home buyers • Government rules • Malaysia

INTRODUCTION

Construction activities are responding for high energy consumption, global greenhouse gas emissions (GHS), solid waste generation, internal and external pollution and environmental damage [1]. According to Environmental Protection Agency, buildings consume 39% of total energy use, 12% of the total used water, 68% of entire electricity consumption and emit 38% of the carbon dioxide emissions in the United State [2].

Since the early 1990s, the implementation of green housing concept was often taken into national debates across the globe. However the gap between the developed and developing countries has resulted in the recognition of different degrees of sustainability of housing development, from strong forms that completely embraces an extensive understanding and implementation of green houses, to weak forms which are still far away from taking the necessary steps needed in green houses.

In January 2009, Malaysia Green Building Index (GBI) was started at the Green Design Forum and organized by

the Architectural Association of Malaysia (PAM). The Malaysian construction industry identified the necessity of green rating tool to improve and adapt itself to the tropical climate. GBI has been designed based on another international rating system such as BREEAM (Building Research Establishment Environmental Assessment Method); USA's LEED (Leadership in Energy and Environmental Design) and has been evaluated to be adopted with Malaysia climate conditions. It is an extensive rating system and environmental assessment to appraise the environmental design and the performance of Malaysian buildings [3].

The role of governments in promoting green building is undeniable and effective [4]. In order to achieve the sustainable development, each country has designed and launched appropriate policies and standards. In addition, rules and regulations should be replaced with an enforcing new one in support of green building development [5]. Governments can facilitate green building development by variation of instruments. But there is argument about the most effective and efficient

instrument among the specialists and researchers. Some studies stated that market base intensives are both effective and efficient tools to address market failure together with non-market problems to improve the situation for green buildings development [6].

Government Instruments to Promote Green Building Market: As mentioned above, each country applies specific instruments to promote green construction based on the social, financial and political features. Below strategies have been used in public sector in Europe [7].

- Regulation of how buildings can be constructed and managed, through building codes and standards or by requiring the owners to provide environmental performance scores.
- Taxation and environmental regulations that alert market dynamics by raising the cost of inefficiency in term of using resources by taxes, an emission trade system or subsidizing moves to more sustainable buildings.
- 8Occupancy and construction of their own facilities, which can make set market standards since in the majority of Europe countries governments are the largest tenant and developers.

It must be noted that, forcing market by applying strict regulations will lead to increase the costs of construction as well as reduce the construction development because of the diminished profitability and higher price for final users [8].

Reviewing other resources clarify governments' roles to promote green building development. Law and policy maker, incentive motivator, financing hub and advocator are the main roles of governments to develop and support green development [9, 10, 8].

- Law and Policy Maker- governments have direct control on market by set legislations, mandatory standards and regulations. These instruments can be applied in order to make sure that the provided green and energy efficient building perform as expected level or not. For instance setting mandatory minimum energy efficiency standards, enforcing financial penalties [10].
- Incentive Motivator- governments mostly launch several of economic incentives to who are willing to invest in green buildings field and stimulate green building market by accepting partially of pay off or compensating of extra expenses caused by green building [8].

- Financing Hub- government's role is to offer financial support directly or indirectly green building developers and buyers through investment incentives and low-cost loans and special funding for green building programmes [9].
- Advocator-governments can promote sustainable development by increasing public awareness about environmental issues and providing accurate rating system to show level of environmentally friendly of buildings as reference of decision making for their buyers [9].

This classification provides an insight and clear perception of governments' rule in order to promote green building. The level of government's interventions is exactly related with the market capability. Developed countries have mature and successful experiences on promoting green building [8]. For example in developed countries governments have supportive role. In contrast, in developing countries governments need to have more practical roles and sometimes force market appropriately way in order to achieve sustainable green building development in their countries. In 2002, Yung and Chan had divided governments' instruments for promoting green building into two sub-groups [11]:

- Regulatory instruments
- Incentive instruments

Regulatory instruments have been designed to provide specific measurements to exercise direct control over the activities. Although, idea was to set up tailor-made control measure to suite control situations, very often, a set of requirements would apply uniformly to all those subjects to the same type of control. As each project is unique with specific features, therefore regulatory incentives with general solutions cannot be efficient as expected even some times may cause increasing project costs. From economic point of view, this approach does not necessarily allow environmental policies to achieve their goals by the lowest possible cost [12]. At the opposite side, incentive instruments designed and set up specific measures which encourage positive environmental activities. This instrument is more performance-base, therefore affected party has more flexibility to choose the way to modify his behaviour in order to comply with management measures. Incentive instruments are known to be more cost effective, because it is more flexible for parties; they can be more innovative and can it can be adopted by different economic and technical conditions [8].

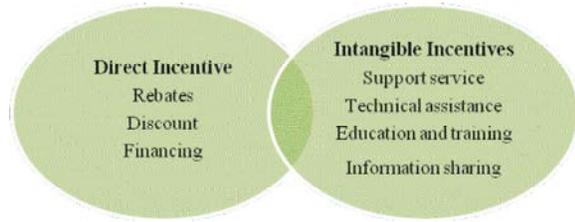


Fig. 1: Government Incentive Instruments

Customer Incentives: In order to promote energy efficient building in general and green building specifically, governments provide different kind of incentives to encourage customers to step in this field. “Customer energy efficient incentive” refers to an efficient program administrator to encourage or motivate customers to reduce the total amount of energy that they consume for a given level of energy service provided, without compromising the quality and level of service [13]. These actions lead to investment in new technologies and effort to modify customers’ behaviour to more environmentally friendly behaviour. In some circumstances the best approach is to create an incentives structure, where the green home purchasers and developers are given something of value to offset to their premium costs. Depend on customers’ condition; incentives can be divided to two main groups, direct incentives and intangible incentives[14].

Direct Incentives: Direct incentives provide direct payment, tax incentives or other subsidies to the customers who purchased green homes or implement energy efficient products which match with current standards [14][15].

Cash payments typically take the form of rebate checks returned to customers following the approval of a submitted rebate application. Utility bills credits will be reduced from customer energy bills, therefore energy efficient product users not only enjoy saving energy but also using extra benefit by the reduction of their utility bills.

Subsidized financing might include reduced loan interest rate or extended loan terms. These two items are more applicable for high cost products such as: green building or rebuild current homes. Briefly, the advantages of financial incentives are: the ease of administration and direct economic benefit for customers. Disadvantage, financial incentives are considered as high cost program for sponsors especially if market needs a high level of incentives (developing countries need high level of incentives compared with developed countries with mature green market), potential failing to address key market barriers [6]. There might be short term or mid-term strategy, in order to achieve sustainable development for green market. Governments must combine other kinds of incentives with financial incentives in order to make them more effective and attractive for green building buyers and developers [13].

Selecting the Appropriate Incentive Scheme

Incentive Impacts: In order to achieve stated goals, having holistic view of incentives’ impacts on customers is essential. Understanding these impacts can help strategists to design appropriate incentives for different situations and different customers.

Incentive Design Process: The main purpose of green home incentives is to encourage potential homebuyers to buy green homes and stimulate developers to use sustainable approach in their projects. Following steps must be applied in order to achieve the effective and efficient incentive instruments. Otherwise, if the incentive design process has ignored by strategist and planners, the incentive instruments cannot be successful to stimulate home buyers and developers to step in green market.

Methodology: A literature review was conducted to develop some knowledge of the study topic. It was done to get the general view of the investigation that was conducted by the author that are related to the study

Table 1: Incentives impacts

Key Impact	Direct financial Incentives	Information Services	Technical services	Bundled Incentives
Impact on Capital Investment	***	*	**	***
Impact on Behaviour change	*	***	**	**
Impact on Customer Decision	***	**	**	***
Impact on Third Party Decision	*	**	*	**
Impact on Participation	***	*	**	***
Impact on Energy Saving	**	*	**	***
Impact on Measurement and Verification Complex or Cost	*	***	**	**
Impact on Regulatory Approval	*	*	**	**

Source: Customer Incentive, 2010 (Low: *, Medium: **, High: ***)

as well as to help researchers reach the objectives which were highlighted. In the literature review, the primary data were gained, sourced and collected in different ways; from the published books and magazines, data from the internet articles in journals and papers.

As this study concentrated on the potential home buyers in Malaysia, using the interview for collecting data was not possible because of large scope and shortage of time, manpower as well as financial resources. Hence questionnaire survey as an effective method had been selected to collect data for this study. All the questionnaires were sent out to the respondents by hand and E-mail. A total of 857 sets of questionnaire were sent out and 213 (24.85%) questionnaires were received. Quantitative method has been used for analyzing data through SPSS version 19.

Research Sample: The scope of study is potential home buyers in Malaysia. According to the Malaysia Statistics Department, Malaysia population is 24,400,000. Almost 56 percent of Malaysia population are 25 years old and above, this group normally can be considered as potential home buyers as they have jobs and monthly income and qualified for applying loan to buy accommodation [16].

Questionnaire Structure: The main feature of this study is to determine potential green home buyers' needs, expectations and preferences in terms of financial incentives for buying green homes. However there are many studies on green buildings incentives and role of the government incentives for promoting green building development [7][8][17][15], there are very less studies which focus on green homes customers. To stimulate potential home buyers to purchase green homes instead of conventional homes, it is necessary to look at the topic from their point of view. The questionnaire was designed to find out potential green home buyers' satisfaction with current financial incentives and determine the most preferred financial incentives from their point of view.

Data Analysis: According to 10th Malaysia Environmentally Friendly Townships and Neighbourhoods will be encouraged through the introduction of green guidelines and a Green Rating System. Government will review tax incentives such as tax breaks to promote green building development and applying environmentally friendly practice in the construction sector. One of the main strategies that may apply for promoting energy efficiency housing is

Table 2: Likert Scale

Section A	Section B
1= Strongly Disagree	1=Not Important at All
2= Disagree	2= Not Important
3= Somewhat Agree	3= Somewhat Important
4= Agree	4= Important
5= Strongly Agree	5= Very Important

Table 3: Question part1

Code	Item
A1	Current financial incentives are efficient and effective in order to make green homes affordable for their potential buyers.
A2	Current financial incentives are easily accessible for potential green home customers.
A3	Current loan system can cover higher cost of green homes for their purchasers affordably.
A4	There are variations of financial incentives for green house buyers, to choose them based on their financial conditions.
A5	Current financial schemes are enough attractive to push house buyers to buy green homes instead of normal homes.
A6	Current green home financial incentives can satisfy you.

Table 4: Question part2

Code	Item
B1	Longer payback period compared to normal homes' mortgages.
B2	Lower interest loans.
B3	Lower down payment.
B4	Using potential saving on utility bills as monthly income to provide higher credit in order to apply higher amount mortgages.
B5	Tax income exemption (from potential utility bill saving).
B6	Government rebate on green home purchase (fix amount).
B7	Government subsidy on green home purchase (certain percentage of price).

Table 5: Current incentive schemes

Incentives	UK	US	Canada	Malaysia
Structural Incentives		•		
Subsidy and Rebate programme	•	•	•	
Tax Incentive Scheme	•	•	•	•
Low interest/ mortgage loan	•	•	•	
Voluntary Rating System	•	•	•	•
Market and Technology Assistance		•		

Table 6: Reliability Statistics 1

Cronbach's Alpha	N of Items
.879	6

Table 7: Reliability Statistics 2

Cronbach's Alpha	N of Items
.863	7

Table 8: Current incentives1

	Statistics					
	A1	A2	A3	A4	A5	A6
N Valid	213	213	213	213	213	213
Missing	0	0	0	0	0	0
Mean	2.13	2.11	2.17	2.37	2.19	2.25
Mode	2	2	2	2	2	2
Std. Deviation	.947	1.087	.858	1.180	1.061	.715
Skewness	.574	1.296	.301	.715	.983	.758
Std. Error of Skewness	.167	.167	.167	.167	.167	.167
Sum	454	449	462	504	466	480

introducing variation of financial incentives for green homes buyers [13, 15]. Successful experiments which were achieved in other developed countries such as U.S, U.K and Canada proof applicability of the strategy as well Table 5 shows comparison between Malaysia and some developed countries in terms of lunching incentives for promoting green housing. Moreover, real estate market is based on demand and supply, therefore lunching effective and financially attractive incentives for environmentally friendly homes will motivate demand side to this field.

The reliability of each part of the questionnaire was investigated to ensure that date is reliable. (☉Cronbach) is between zero and one. If (☉-Cronbach) is less than 0.5 data are not reliable, therefore the results which were gained through the data analysis are not applicable. In opposite, when (☉-Cronbach) is near one data are reliable. The mean of (☉-Cronbach) for this study is 0.871 and changes the result into one decimal point that will be approximately 0.9 which is considered as reliable. The results achieved through the SPSS software version 19.

Green homes are generally perceived to be a lot expensive than conventional homes [18]. In addition majority of green homes customers are middle income families [19]. Therefore affordability is critical issue for them in the decision making process for buying a new home. Financial incentives can stimulate people to purchase green homes through increasing affordability of the purchase. The study attempts to find out whether current financial incentives can make green home purchase more affordable for their potential clients or not?

In Malaysia, 44.8% of respondents the disagreed that current financial incentives are efficient and effective to make green homes more affordable for them. In addition, 26% of respondents stated that, they strongly disagreed with the mentioned statement. Only 12.5% agreed with the statement and believed that the current financial incentives are effective and efficient to make green homes purchase affordable for potential green home buyers.

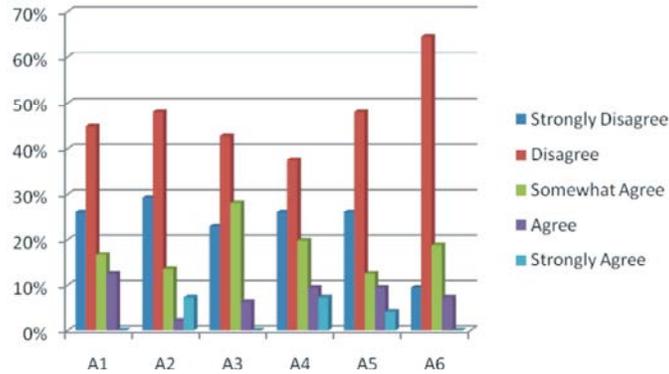


Fig. 2: Client satisfaction about current incentive 1

In terms of the accessibility of incentives, majority of respondents (77.1%) stated that, current financial incentives for green homes are accessible for potential home buyers. However some limited financial incentives have been launched in Malaysia to stimulate green home purchase and development, still these schemes are not generally accessible for all applicants in different parts of countries. The lack of availability can be considered as an obstacle to attract potential home buyers to green housing. In addition, long application process and bureaucracy are the other obstacles against the public accessibility.

Malaysia's house price rises have continued, but at a slower pace, due to a slight GDP growth slowdown to 5.1% in 2011, from 7.2% in 2010 [20]. Average house price was about RM 200,000 in 2010, however in Kuala Lumpur the average price is about RM403,163 [21]. According to Department Statistics Malaysia (2009), average household income was RM 4,025. Hence, majority of home buyers need to apply loan for buying homes [22]. Simply each person is qualified for applying loan equal 50% his monthly income. Therefore based on average income and average house prices, current loan system is effective to make buying houses affordable for people.

In the opposite side, green buildings are 3%-15% more expensive [23]. The ability of current loan system to the recoup higher costs of green housing is still questionable. According to results, 42.7% and 22.9% of

respondents disagreed and strongly disagreed respectively, that current loan system which applied for buying properties can recoup the higher price of green homes affordably. They mentioned that higher down payment and higher monthly instalments for green homes make this concept of homes non affordable for them. In addition current loan system failed to provide special offer to be matched with current green home market.

As green housing market is still immature in Malaysia compared to developed countries; therefore, there is an urgent need for further government's actions to promote green housing development. Introducing a variation of incentives to redirect property market to green concept is an accepted and effective strategy in immature markets like Malaysia. But unfortunately the number and variation of incentives in Malaysia is very less compared to other developed countries (Table 1). Moreover introduced incentives must be financially attractive for potential home buyers to stimulate them to buy green homes instead of non-green homes. Almost (63.5%) of respondents believed that, there are not so many options for green home buyer to choose financial incentives based on their financial conditions due to the lack of incentives variation which were introduced by government. In addition, a majority of potential home buyers (74%) did not believe that current incentive schemes can stimulate them to purchase green homes.

Table 9: Maximum loan amount

Monthly Income	Loan amount (50× monthly income)	Monthly Instalment (33% monthly income)
< RM2000	x < 100,000	x < 660
RM2000-4999	100,000 <x < 250,000	660 <x < 1650
RM5000-7999	250,000 <x < 400,000	1650 <x < 2640
RM8000-10999	400,000 <x < 550,000	2640 <x < 3630
> RM11000	550,000 <x	3630 <x

Source Citi Bank, 2012 (terms and conditions)

Table 10: Current incentive example

Code	Incentive	Reference
B1	Energy Efficient Mortgages(EEM), ENERGY STAR Mortgages	[24, 25]
B2	Canada Mortgage and Housing Corporation (CMHC), FHA Energy Efficient Mortgages	[24]
B3	Energy Efficient Mortgages(EEM), FHA Energy Efficient Mortgages	[24]
B4	Green Deal Plan	[26]
B5	U.S Tax Credit for green homes, Canada Tax Exemption, VAT Reduction UK, Malaysia Tax Exemption,	[27, 14, 28, 29, 30]
B6 & B7	U.S Grant, CBIP Grant Canada, Landlord’s Energy Saving Allowance (LESA) U.K	[31, 28, 32]

Table 11: Current incentives2

	Statistics						
	B1	B2	B3	B4	B5	B6	B7
N Valid	213	213	213	213	213	213	213
Missing	0	0	0	0	0	0	0
Mean	3.91	4.33	4.14	3.67	4.02	4.00	4.10
Mode	4	5	5	4	5	4	5
Std. Deviation	.769	.698	.844	.816	.942	.810	.914
Skewness	.154	-.563	-.596	-.592	-.380	-.583	-.684
Std. Error of Skewness	.167	.167	.167	.167	.167	.167	.167
Sum	833	923	881	782	856	851	873

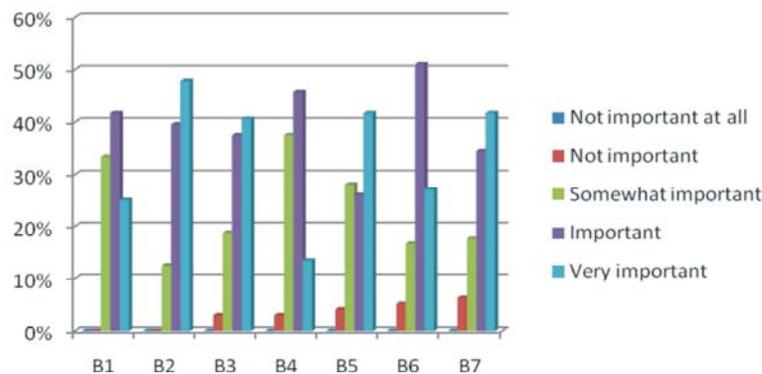


Fig. 3: Client satisfaction about current incentives

As financial incentives have been designed and launched to stimulate home buyers to purchase green homes instead of normal homes, therefore the level of their satisfaction is the most important success indicator. Only 7.3% of respondents stated that current incentive schemes for green home buyers satisfy them and can meet their needs. In the opposite side (83.4%) of respondents believed that current incentives cannot satisfy them and they are so far from their expectations. This result proves that current situation failed to stimulate potential home buyers to purchase green homes and shows the need of fundamental review in incentive strategies. Making current incentives more flexible to be match with wide range of public needs or designing new incentives based on other countries successful

experiments and modifying them to be match with the local financial, social and political conditions are alternatives which can be applied to make incentives more applicable.

Introducing New Incentives: As mentioned before, a wide range of incentives have been applied in some developed countries. The main purpose of launching financial incentives is to encourage people to buy green homes and consequently, promoting green housing development at higher levels. Designed incentives must be attractive from buyers’ point of view. In this part of study, based on literature review, several incentives have been introduced to potential home buyers and asked them to rank the items. It provides unique resource about the home

buyers' needs, expectations and preferences. As result, new suggested incentives will be more effective and efficient to stimulate home buyers to green housing concept.

Identification the most acceptable and favourable incentives for stimulating potential home buyers to purchase green homes is the essential issue during incentive design stage. It helps strategists and planners to design financial schemes which are more adopted with customers' preferences and financial conditions. According to the results, the most favourable incentive which might stimulate home buyers to purchase green home instead non-green homes is lower interest loan. As most of housing loans are managed to payback during 30 years, therefore lower interest rate allows green home buyers to enjoy more saving through this method in the long term. Therefore the majority of home buyers rank it as the most effective incentives. Lower down payment compared with normal mortgages and government subsidy for purchasing green homes are the second and the third favourable incentives from potential home buyers' point of view.

CONCLUSION

Insufficient government incentives were the main obstacles for buying green homes from home buyers' point of view. As a result, study found out that current financial incentives for green home buyers are not sufficient and effective enough from their point of view. In addition, the incentives are not accessible for those who are going to purchase green houses too.

It is well known that buying home in Malaysia is more based on the loan. Therefore loan system is the important item for home purchasing process. Although current loan system is quite effective for buying conventional houses, it could not meet the special requirements of green home buyers. The Majority of respondents believed that current loan system was not success to make green home purchase affordable for them. In general, current financial incentives for green home purchase were failed to meet the minimum of green home clients' requirements and could not be adopted with green building market segments in Malaysia. As a result, current financial incentives were not success to stimulate potential home buyers to buy green homes instead of non-green homes. Results prove an urgent need to revise current financial incentives in order to encourage people to green homes market and promote green home development in Malaysia.

The main objective of this study is to evaluate new financial incentives for green home buyers. The new incentives must be effective, efficient as well as financially attractive and affordable to potential home buyers. According to the results, loans with lower interest compared with normal loans for purchasing the green homes is the most preferred financial incentives from potential green home buyers' point of view. Accordingly, by introducing new special loan design for green homes, it would be possible to stimulate more home buyers to buy green homes. As green homes are more expensive than similar homes without green features, therefore another item which widely accepted by potential home buyers, is loans with lower down payment. Lower down payment may enter more home buyers to green home market circle. It would be more effective, when it mixes with other incentives such as longer payback period or lower interest rate. Therefore the combination of incentives will stretch green home clients' purchase power without additional costs.

In addition, study found out that government subsidy on green home purchase is another preferable financial incentive which can be applied to stimulate home buyers to buy green homes. Government subsidies not only are stimulator but also make green home purchase more affordable for lower income families too.

Tax income exemption resulted from utility bills saving is the next approach to make green home purchasing more attractive for the home buyers. Through this approach, green home owners will enjoy tax income exemptions. The majority of respondents believed that tax exemption is the factor that stimulates them to buy green home even with higher price, because they will enjoy a higher amount of saving during their homes life cycle and paying lower tax income. Moreover, increasing monthly income resulted from utility saving and lower tax payment can stretch green home buyers' debt to income ratio and qualify them for higher amount of loan, which is another tax exemption benefit.

Recommendation: However, promoting green home development through financial incentives is a costly approach and squeezes government budget in short term. It must be noted that green home development will not be achieved without strong support from government, as the green home market is still immature in Malaysia. Government financial incentives as a strategic approach not only makes green home market more attractive for home buyers and investors but also increases developers' investments and activities in this field of construction.

Applying incentive instruments by government is an effective approach to promote green homes development [8, 12, 9, 14]. In order to design the financial incentives for green home buyers, it is important that their preferences and needs to be taken in to consideration, otherwise designed financial incentives which ignore home buyers' point of views cannot be useful to stimulate them to purchase green homes. Therefore, there is an essential need for the strategic revision on current laws and legislations with regard to promoting green home development associated with close contribution with banks and financial firms to provide more credits for both green home developers and purchasers in order to achieve sustainable construction development in country.

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