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Implementation of The Method Breeam Ecohomes For Social Housing In The Algerian Urban Context

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Abstract:- Thinking on the approaches and indicators of sustainable development is a recent activity. These are needed to evaluate urban designs at different scales. Therefore, we can predict future logic developments of the urban texture. This thought came to substitute modernism. The modern social housing programs are realized as nonfunctional neighborhoods. This quantitative modern approach has lead to a strong socio-urban segregation without taking into consideration the social practices. Faced with this failure, a challenge is needed to establish a new policy of collective housing that takes into account the sustainable approach.
In Algeria, since the 1970s, entire social neighborhoods are thus exposed to exclusion. This evokes the search for a balanced urban system. After 2000, new urban projects have established a functioning urban logic, based on consulting residents and a new steering mode. In addition, to make the new interventions more successful, social housing will be studied through a transposition of appropriate methods and tools, which are internationally successful and based on indicators, such as BREEAM EcoHomes. The concerned neighborhoods start challenging under this approach of urban project.

Keywords:- *urban project, social housing, adaptation, sustainable development, evaluation method, BREEAM*.

I. INTRODUCTION AND BACKGROUND

The zoning of the modern trend caused the separation of the population compared to their aspirations and expectations. Discontent climate towards this modern housing is related to the impossibility of finding a Man Machine for a housing machine. That is why; sustainable development is presented as alternative and unavoidable solution. In this context, Antoine Loubière said: "The main trends of the world, as they exist, are negative trends, Trends towards insecurity, violence, global change, growing mobility, expressions of materials and energy flows [...] the world works unsustainably, socially and environmentally. By contrast, morally speaking sustainable development is a concept that aims at reminding us of our duties towards future generations and natural persons" (Antoine Loubière, 2002). This result is also taken from the typo morphological studies of the Italian schools of the 1970s including Aldo Rossi, Carlo Aymonino Vittorio Spigai. It is also inspired from American urban studies (advocacy planning 1960). These studies are done in order to prevent all forms of social segregation after an unsatisfactory result of monofunctional modern social housing neighborhoods. An alternative project appeared according to François Thomas as "the expression of the political will of society" (François Thomas, 1995). It was about a concept and an action process for the formation of the urban texture. It is a sustainable flexible approach, less rigid and open to changes and debate. This approach is seen as "a guide of the act to adapt the city to societal demand and play as social and economic support" (Ignalina Patrizia, 2001).

II. THE NEED TO ASSESSMENT METHODS FOR A SUSTAINABLE PROJECT

A new sustainability approach automatically means a change of the urban image of the housing system. It suggests every time a suitable methodology for its realization. The new form of this housing system given by sustainability has to start from the study of the current state and the processes which lead to them. We give importance to the knowledge archeology of Foucault M (Hans-Jörg Rheinberger, 2014). In this respect, it is important to know which model is suitable to transform the negative elements and keep the efficient ones, "That is to say what form should be given to them so that they can work properly" (Malisz Boleslav, 1972). The thing which guides us towards selecting an evaluation method that suits the objective of our study. We want to use the most advanced methods in the field of sustainable urban development intended for housing. There is currently a lot of assessment tools available for measuring, evaluating and managing the sustainable development criteria and consequently their impact on the environment, with a different level of use from a county to a another.

III. SELECTION AND TARGET AN APPROPRIATE METHOD

Sustainable housing in the context of sustainable development implies the sustainability systems of indicators for a new systemic imagibility. Being necessary to take into consideration the target areas of sustainability, it is essential to have a comprehensive approach to the livability of the collective social housing.

As it is said above, there are several ways of assessment available for the design of a sustainable project. BREEAM is the pioneer labeling method widely recognized at the international scale especially for the housing. It was introduced in 1990 by the main organization of research in the field of construction in the UK. The evaluation is based on ratings assigned by a set of performance criteria. It is also valid to specific building types. It is really a sustainable vision qualified to define and apply the principles of DDU. But in order to put it into practice "It is necessary to [...] develop indicators to contribute to the self-regulating sustainability of integrated systems for the environment and development" (Agenda 21, 2002). BREEAM has experienced equivalent versions developed in Canada, Hong Kong and New Zealand; including: LEED (Leadership in Energy and Environmental Design in THE USA), GB Tool (Green Building Tool to CANADA) NABERS (National Australian Building Environmental Rating System AUSTRALIA), CASBEE (Comprehensive Assessment Sustainable Building Environmental Efficiency in JAPAN). It is valid for specific types of buildings:

Office	Design and Facilities
	Operation and Management
	Inside
houses	EcoHomes
Local activities Tertiary Economic	Design and Facilities
	Equipment for hire
	Operation and Management
Other	Bespoke BREEAM Version

Table 1. Construction fields of BREEAM method; Source: www. durabuild.org

In addition, BRE believes that all housing transactions may meet common characteristics and may be subject to the same assessment, applicable to the fields of housing operations in collective buildings. So this approach is applicable in our context. BREEAM EcoHomes aims at preserving the environment through the collective housing lifecycle.

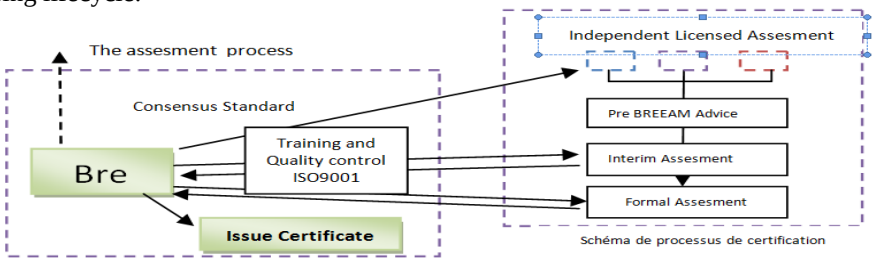

Figure 1. Process BREEAM assessment method, Source: BREEAM (redesigned by the authors)

The building is assessed according to these performance criteria where the environmental quality is evaluated according to a rating system, estimated by BREEAM as "pass", "good", "very good" or "excellent" (Gauzin- Dominique Müller, 2001). In 2000, 500 buildings were made following this way of evaluation. BREEAM projects simultaneously insist to make its people aware of the role that their neighborhood has to play in the future of the city. So, our social housing areas in Algeria are fertile lands and require an evaluation and implementation of a similar approach. Its implementation will allow us to tackle environmental problems as a whole. It enables developers and designers to prove to town planners and their clients the environmental characteristics of their buildings. The issuance of the certification BREEAM EcoHomes depends on the sum of points obtained in the eight following topics: Energy (Ene), Transport (Tra), pollution (Pol) materials (Mat), water (Wat), Ecology (Eco), health and well-being (Hwb), and management (Man).

Topics	Maximum Notes
Energy	22
Transport	8
Pollution	10
Materials	14
Water	10
Ecology	12
Health and well being	10
Management	10
Total	**100**

Table 2. weighting the scales in the BREEAM method; source: BREEAM.

The evaluation stages were summarized as follows:

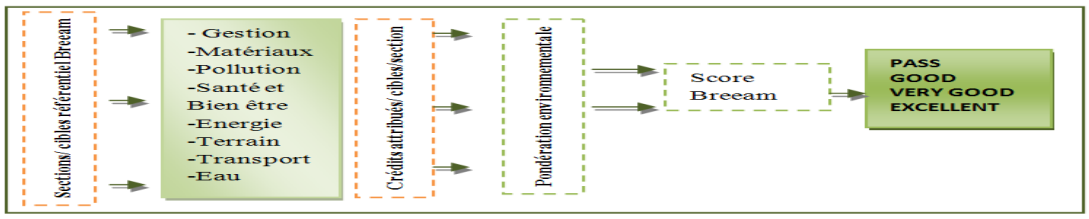

Figure 2. BREEAM assessment stages. Site: BREEAM

IV. PRESENTATION OF THE CASE STUDY: SELECTION AND REPRESENTATIVENESS

The analysis of the housing crisis in Algeria is one of the essential elements of the country's development. It means understanding the problems of the current period on all plans for a revival of the sustainable development. The housing issue is truly a challenge (HAMIDOU, R, 1989). Algeria has renewed the French example of the 1950s . The formula NUHA (New Urban Housing Area), which was introduced in the late 1970s thanks to the adoption of a new housing policy, aimed to achieve the housing projects 'types'. It focused on the realization of hundreds of thousands of social collective housing. It represented a dramatic failure for citizens. It becomes therefore more urgent than ever to find an effective and daring policy of the city. Going towards the sustainable housing is essential in the Algerian context. A passage is written in the *Wilaya* (region) of Medea Development Plan (WDP): To fight against the proliferation of neighborhoods in crisis, poorly integrated into the city, the absorption and eradication of the precarious housing to ensure social and territorial equity . (WDP, 2011). The transition to the empirical systems is consolidated by the theoretical underpinnings of Gaston Bachelard and Ludowick Fleck by giving primacy to experimentation in scientific research to find the best possible answers to our questions (Hans-Jörg Rheinberger, 2014). The case study is located in a landlocked region with a high degree of poverty in areas like the Highlands (NTPA- National Territory Planning in Algeria, 2030).In our area, the social housing neighborhoods of the 1970s face the problem of the management and design of the buildings and the outside spaces. Indeed, it is unclear who owns what (Tamani, M, 1996). In reality, they have the same image "big housing estates without amenities" (Le Saout, D et al, 1998), where there is the "economic recession and many effects: increase of unemployment rate and poverty" (Wildlife , A, 1996).
In this respect, for a suitable representation, we have chosen two neighborhoods of the two periods: Thniet El Hdjer (TEH) neighborhood, which represents the period of the 1970s and the urban center of Ksar el Boukhari (KEB) launched in 2007. KEB is the result of ambitious thinking for better treatment of the deficiencies found after the adoption of the sustainable development since the Rio conference 92 till today. This adoption is marked since 2000 by the enactment of several laws. Is the positioning in a sustainable approach is only a matter of time? In this sense, the two neighborhoods have been made on the basis of the procedure NUHA 1975. TEH neighborhood is monofunctional that consists of five hundred and ten landlocked collective social housing. KEB consists of seven hundred seventy-five flat and twenty four nearby facilities. Unlike TEH neighborhood, the center of KEB attempts to deal with the social and functional diversity.


Figure 3 and 4: Thniet El Hdjar neighborhood and the buildings in red. The outdoor space in this NUHA (source OPGI Medea)


Figure 5 and 6: The urban center of Ksar Boukhari, the buildinds in brown, View on the Neighborhood (source DUC Medea 1/10000.)

V. APPLICATION OF BREEAM APPROACH ON THE CASE STUDIES

For a deep understanding and better application of this method, the following table explains the targets in the building scale and those at the neighborhood level, with the knowledge that the housing neighborhood may be composed of two parts: interior to live and external for ownership:

target	Sub- target	weiting	Point of variation	unit	NUH of TEH	neighberhood KEB
Energy	**emission Percentage of CO2**[1]	13,75	D	kg CO2/m2/year	6	6
	energetic Performance of the building	1,83	C	clew		
	Drying spaces	0,92	C		0,92	0,92
	appliances	1,83	C		/	/
	Interior lighting	1,83	C	%, W	0	1,83
	Outside lighting	1,83	C	%, W	0,91	1,83
		Max 22			**7,83**	**10,58**
Transport	**Proximity of public transport**	2	D	%, LM, H	1	2
	Bicycle deposit	2	C	%, ratio (room/N)	0	0
	local Service	3	C	%, Ml,	1[2]	3 [3]
	Workspace	1	C	/	1	1
		Max			**3**	**5**

[1] This sub-target is calculated by the SAP 2005 method, the conversion table extracted from this method is used to get an idea of the CO2 emission related to the energy used and its duration, in our zone we use gas and electricity (Gas notably in winter, electricity in the evening). Gas = 0.194 * 180 days * 24 / 74m2 = 11.97Kg CO2 / M2 / year. Electricity = 0.422 * 365 * 6/70 = 13.82 Kg CO2 / M2 / yr. So the gas + electricity = 25.80 Kg CO2 / M2 / year.

[2] A mark awarded for this NUHA so that 80% of the dwellings benefit from a grocery store and mailboxes within 500 m.

[3] The three points are obtained because collective social housing neighborhoods fulfill the conditions of allocation of the three points.

		08				
POLLUTION		0,91	D	/		
	Mastery of pollution due to heating	2,73	C	NOx mg/kWh	/	/
	Flow stormwater	1,82	C	% M^2	0,91	1,82
	Energy source	2,73	C	% KW	0	1
	Flood risk	1,82	C	% mm/ M^2	0,91	1,82
		Max 10			**1,82**	**4,64**
Materials	**Enviromental impact of materials**[4]	7,23	/	scale ABC	/	/
	Certification of the origin of materials[5] **2 et 3**	4,06	C	%	3	3
	Sorting of household waste	2,71	C	L	2	2
		Max14			**5**	**5**
water	**Water management in domestic drinking water**[6]	8,33	C	M^3/hab/year	7	7
	Managing rainwater [7]	1,67	C	L/M2	0	1,67
		Max 10			**7**	**8,67**
ecology	**ecological value of the site**	1,33	C	/	1,33	1,33
	Ecosystem Analysis	1,33	C	/	0	1,33
	Protection of natural spaces[8]	1,33	C	/	0	1,33

[4] The classification of materials according to Breeam:

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	Summary Rating	Climate Change	Fossil Fuel Depletion	Ozone Depletion	Human Toxicity to Air	Waste Disposal	Water Extraction	Acid Deposition	Ecotoxicity	Eutrophication	Summer Smog	Minerals Extraction	Cost £/M2	Typical Replacement Interval	Recycled Input	Recyclability	Recycled Currenty	Energy Saved by
Beam and blockwark floor with screed	A	A	A	A	A	A	A	A	A	A	A	A	47-73	60	A	C	C	A
Hollow precast reinforced slab and screed	A	A	A	A	A	A	A	A	A	A	A	A	47-73	60	C	A	C	A
Hollow precast reinforced slab with structural topping	B	B	B	A	B	B	B	B	A	B	A	B	50-80	60	C	A	C	A

[5] In this sub-target there are materials that are certified and standardized by international standards, there are others that were made by craftsmen such as: windows, doors, cinder blocks ... and others Certified: cements, plinths, glass, tiles, plastics, metal ...

[6] An average of 37 M3 / person / year on the scale of the wilaya (town) (statistics of the direction of hydraulics in 2008).

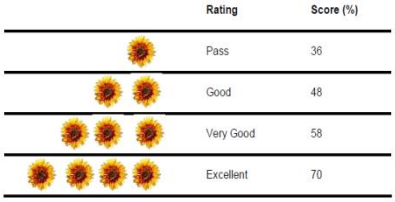
[7] A settling basin is provided for watering green areas in the urban pole of Ksar el boukhari (directives the prefect).

[8] The natural species that exist in these areas are: the floristic inventory (Aleppo pine, gilded pine, tamarix, pink laurel, Juggler, retame, white wormwood, red wormwood, asphodel, alfa, Spathe ... daphne ...) Vegetables (eucalyptus, forage plantations, ...), main fodder species (atriplex numalaria, atriplex halimus, medicago, alfa, sparth ...).

	biodiversity change Rating of site	5,33	C	L/M2	0	1,5
	Building density	2,67		clew	0	1,33 (the soil hold less than 3.5 according to BREEAM [9])
		Max 12			**0**	**4,5**
Health and Wellbeing	**Sound isolation**	7,00	D	db	/	/
	Private space					
	Dayligh[10]	5,33	C	%	5,33	5,33
		Max 14			**5,33**	**5,33**
management	**Housing Management User Guide**	3	/	/	0	0
	Construction company [11]	2	C	Grid	0	1
	Contruction impact on the environment[12]	3	C	/	0	1
	security	2				
		Max 10			**0**	**2**
		Max 100			**29,98**	**42,05**

Table 3. Evaluation of two case studies by BREEAM EcoHomes method.

The sustainability of results will be made on the base of the following classification:



[9] It varies in the urban pole of Ksar El Boukhari between 3.2 and 0.6.

[10] By applying the Breeam method of the daylight factor: DF = M * W * θ * T / A (1-R2) (%)

W = total glazed area, A = total area of the room studied, R = average weighted average reflectivity, M: correction factor for light losses (dust), T = glass transmission, θ = Visible sky angle. R = 0.5, (M, T, appended). kitchen Example DF = 1 * 1.1 * 0.65 * 0.6 / 7.51 * (1-0.5) 2 = 2.2% ≥ 2% (NUHA).

[11] According to the people who worked at the NUHA (retired) site, it was found that:

fields	NUHA	Poles	fields	NUHA	poles
Environnemental politcy,	0	0	Commitment	5	5
Clean construction,	0	5	Staff training	5	1
Respect for neighborhood	1	5	Responsibilities	5	5
security	0	4	sums	16	25
			The weighting	0	1

[12] Waste from construction yardss in the new urban poles is treated differently from the English method: the materials are recycled and the remainder is disposed of in public waste dumps without being left in the yards to ensure clean work yards.

Figure 7: The classification method of sustainability BREEAM; source: BREEAM

The result of the radar diagram:

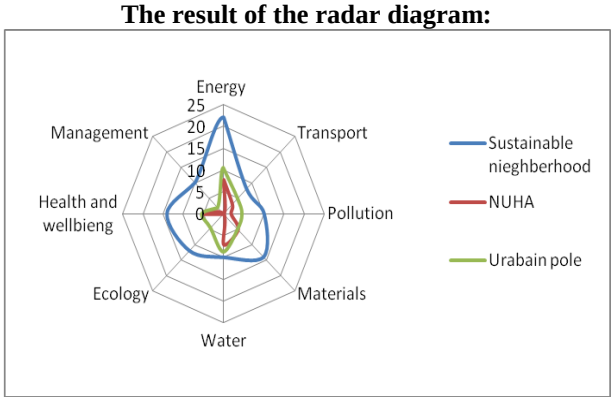


Figure 8. Radar representation of the result of the application of BREEAM method

VI. THE RESULTS OBTAINED WITH THE BREEAM METHOD

The result obtained shows that the cities of the collective housing in urban centers (19 centers in the province of Medea according to UCD), are partially oriented towards sustainability. In the regulatory framework, there are indicators on the largest scales, but the action scale is still not well treated. After a concerted effort at the regular meetings every two weeks, led by the first person in charge in the local authorities, the result seems encouraging. This result shows that the NUHA is unclassifiable according to this method while the new social housing neighborhood of the new urban center has obtained at least 40 points. So this neighborhood was ranked passable.BREEAM EcoHomes assesses the team's design approach and certifies the housing for future residents and users. An attempt to apply this method of valuation, in the two case studies of collective social housing , illustrates in a concrete way that the existence of sub-targets taken by the two modes of planning. In parallel to this, there are other sub-targets that are only found in the new urban centers. This will allow us to admit that there is a possibility to go to the dreamed sustainability. In this new desired context, BREEAM approach encourages us to make some recommendations for our social housing such as: evaluating the energy performance of the operation through its CO2 production according to the award grid BREAM EcoHomes. The aim is to manage the energy which is calculated according to the method SAP in 2005; setting a studied drying area, a household equipment certified by the European (EU energy Efficiency Labelling Scheme); inside and outside lighting where the fixed lighting equipment is certified thrifty; a workspace receiving adequate equipment. It is also supposed to think of a specific isolation that avoids the use of substances depleting the ozone layer and having a global warming potential (GWP), the mastery of pollution from heating to reduce air pollution of nitrogen oxides emissions (NOx) of the heat generating system (air and water). It is recommended to think about the flow of rain water, the use of permeable surfaces and green roofs, as well as the environmental impact of the materials published by BRE "Green Guide for Housing Specification ". we also examine the change in biodiversity of the site and the average number of plant and animal species living on the site before and after construction. Good natural lighting will contribute to the comfort inside the houses and reduce the energy requested by artificial lighting. The calculation of daylight factor is given according to the British Standard BS 8206-2 Lighting building; and sound isolation with (Building Regulations for England and Wales, Approved Document E-2003 Edition). BRE Certification is based on encouraging the environmental management in construction companies, "The Considerate Constructors scheme" (CCS), the management of impacts of projects including waste management. The sorting management must integrate an independent certification service EcoHomes: the "Smartwaste".

In addition to what we have discussed, the repository set up by BRE requires special attention of all stakeholders of the project: project owner, prime contractor, Construction Company, suppliers, etc. However the project owner, is free to choose the topics that it wants to develop and can master its budget. It is enough to choose two topics to talk about a BREEAM assessment, which gives us twenty eight (28) possible scenarios. Each scenario can be presented in a radar diagram according to the vision of the project owner. The limitation of this method is that it does not always guarantee high environmental performance every time. A certified operation Ecohome "Pass" and "Excellent" does not have the same profile. The interpretation of these performance levels is difficult, from another point of view, freedom of such a protocol encourages different levels of budgets to freely invest in environmental projects since the financial aspect is of particular importance in this such operations.

	Ene	Tra	Pol	Mat	Wat	Eco	Hea	Man
Ene	/	**o**	**o**	**o**	**o**	**o**	**o**	**o**
Tra	/	/	**o**	**o**	**o**	**o**	**o**	**o**
Pol	/	/	/	**o**	**o**	**o**	**o**	**o**
Mat	/	/	/	/	**o**	**o**	**o**	**o**
Wat	/	/	/	/	/	**o**	**o**	**o**
Eco	/	/	/	/	/	/	**o**	**o**
Hea	/	/	/	/	/	/	/	**o**
Man	/	/	/	/	/	/	/	/

Table 4. 28 possible scenarios for a BREEAM approach. Source: authors.

In Algeria, thinking of the sustainable urban project is underway: This is a concept and a way of training acting that mark a moment of transition between the traditional way of thinking and a new urbanism approach, less rigid and more open to the changes and debates (Ignalina Patrizia; 2001). It is also a guide for action to adapt the city to societal demand and play as economic and social lever (Masboungi, A et al, 2002).

VII. CONCLUSION

We share the same vision of A.Avitabile who predicted that 'the logic of a specific urban project is found in ' the nature of that object, the project field, i.e the type of content related to the context or its environment, and the method of production, linked to the previous two aspects, with the inclusion of the time factor '.The purpose of implementing the approach BREEAM EcoHomes is to produce collective social housing projects where there exist a climate of solidarity in space and time. At the dawn of the third millennium, sustainable urban project, such as systemic approach has become a major choice in urban development, and as a carrier element of a message of hope. But at the action scale, this project is not yet recognized in Algeria. It now occupies an important place on the international stage, and seeks to achieve a dynamic and open to the urben life. The adoption of this approach spreads the so-called pseudo-modern techniques reproducing the same housing model boilerplate. Thinking on a collective social housing project is to adopt a guide to carry out urban actions by responding to each situation appropriately.This urban project approach could presage another future face for cities and housing. The realization of such an approach is related to the specifications of goals.

BREEAM approach of sustainability encourages the adoption of a specification of different objectives compared to design contest in our context. Its presentation is the result of a thorough thought of several specialists in sustainable development in order to realize a sustainable project on land. According to Alain Avitabile, 2005: this specifications objectives specify particularly the issues tied to the concerned changing area or sector, the expected and desired axes in terms of the kind of program to enroll in ambition General urban '. In the same line of thought A, Loubière, 2002 presaged: "The beginnings of a sustainable urban development are apprehended through the techniques of urban engineering, or through a register of architectural and environmental requirements for developers' . The search for a collective social housing neighborhood project pushes us towards the proposed scenarios and therefore the choice of an urban project reconciling all specialists and urban stakeholders including residents. Thus, a sustainability approach for collective social housing areas is needed.

BREEAM EcoHomes looks for innovative solutions that minimize the impacts on the environment. Algeria is a signatory to all international protocols and conventions for the protection of the environment since 1992. So a staging indicators grid to the image of BREEAM is necessary to solve the shortcomings in these neighborhoods where a large part of the urban population lives. It is a simple and pedagogical system of final rating of the building that is transparent, easily understood and developed on the bases of proven scientific research. The choice of indicators is the result of consultation and basic design reviews. Each criterion is reviewed to see if it is in tune with the objectives launched by the project owner. Some measures require detailed advice as CO2 emissions, material selection ...The examples of leading sustainable housing neighborhoods worldwide are initially an attempt to achieve balanced housing systems. The objective is to show the aspirations and the expectations of residents and users by creating an atmosphere of sociability, liveliness and friendliness. These examples will be taken as a foundation on which other designs and sketches can rely. Now, the register of economic indicators should not take the front of the urban scene. It is the social register and confidence that must prevail for a design of dreamed urban system.

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