Republic of Iraq
Engineers Union-Architectural Department
Green Building Team

مباني خضراء
GREEN BUILDINGS

جمهورية العراق
نقابة المهندسين - قسم الهندسة المعمارية
فريق المباني الخضراء

العدد: 9 التاريخ 2022/03/1

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مباني خضراء هي ديوان مفتوح للجميع. للراغبين بالمشاركة مراسلتنا على البريد الالكتروني اسفل الصفحة.

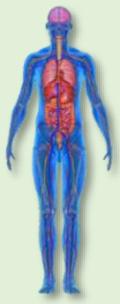
Integrated Design for Sustainable Buildings

Arch. Suhair Adnan / Sustainability Consultant

An approach that involves people, systems, and business structures (contractual and legal agreements) and practices. The process harnesses the talents and insights of all participants to improve results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction.

The successful design of buildings requires the integration of many types of information and prespectives into an elegant,useful,and durable whole.An integrated design process includes the active and continuing participation of a wide range of people,to construct buildings that are healthier for occupants, have a lower impact on the environment, and protect public welfare.

It considers relationships among building systems at a variety of scales, the whole and does not separate one thing from another ,for example, the human body is reliant upon all its organs and systems to be healthy and perform optimally.



Integrated Design Criteria

The goal of integrated design is to create a high-performance building,one that optimizes form ,function,time ,economics,and environmenteal resources over time. Traditional Building design typically treats environmental considerations as incidental rather than integral components. Integrated design criteria are :

- Form: Aesthetics should represent project values over the life cycle.
- Function: A building`s life expectancy,location,and layout should meet the needs of building occupants.Improved occupant health and productivity should be considered pat of the building`s function.
-Time: Scheduling of design and construction should allow time for additional team interaction.Building technologies should reflect those available during design.
- Economics: Finincial analysis should consider life–cycle costs.Opportunities to “tunnel through the cost barrier” should be exploited.
- Environment :Water,energy,and additional resource consumption should be minimized.Proximity to transportation and amenities should be considered. The ecological footprint should be analyzed.

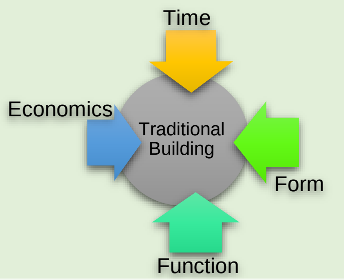


Fig. 1 Traditional design criteria

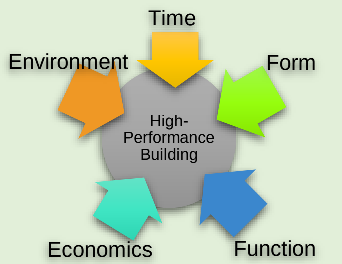


Fig. 2 Integrated design criteria

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Integrated Design Team Participants

The integrated design team must include a variety of disciplines appropriate for the scope, goals, and requirements of the project,including architects, engineers, consultants, construction managers, contractors, owners, sustainability consultants, and facilitators are all good examples of who should participate. It is important to include the general contractor or construction manager if at all possible. As the cost and constructability expert, the builder can provide vital strategic feedback during the integrated design process, and his or her buy-in is crucial to ensure the project goals are realized as the building moves into construction. Another way to look at is "Everyone Engaging Everything Early."

It is also useful to identify a project **champion** someone who acts as both a facilitator and a sustainability advocate. The champion may be from any profession and serve additional roles on the project team. Pinpointing one team member to guide the integrated design process is a key to success.

Integrated Design Charrette

A key step in the process is an integrated design charrette. A charrette is an intensive workshop in which various stakeholders and experts are brought together to address a particular design issue, from a single building to an entire campus. Charrettes can transform a project from a static, complex problem into a successful, buildable set of plans.
It is typically an intensely focused, multi-day session that uses a collaborative approach to create realistic and achievable design ideas that respond successfully to the issues at hand.

Integrated Design Process

Integrated design is nonlinear and continuous, and thus is composed mostly of strategies rather than defined phases. Two key differences between conventional and integrated design processes are the perceived duration of the project and the level of team commitment required. While a conventional building is considered complete upon occupancy, a high-performance building is ideally never finished. By definition, a high-performing structure must remain high performing!
This insight implies a need for thoughtful planning and continued building monitoring and updating. Integrated design strategies must cover the entire lifetime of the building and account for activities that help the building adapt to environmental or programmatic changes. Integrated design process activities are:

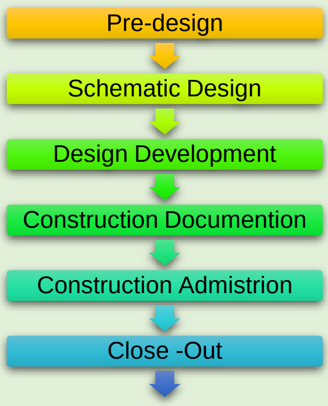


Fig. – 3 The Traditional design process

1. Define the Issues

The first step in integrated design is to understand and define the critical issues. An initial analysis of the project requirements: site conditions, massing , orientation, building envelope attributes, lighting levels, thermal comfort ranges, plug and process load needs programmatic, and operational parameters, together with site, ecological, and climatic conditions, provides a necessary starting point from which to begin integrated design.

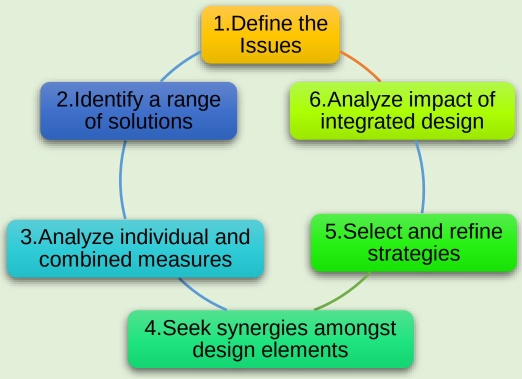


Fig. 4 The Integrated design process

2. Identify a Range of Solutions

After identifying the key issues, the design team should conduct a charrette or other collaborative brainstorming session to generate design alternatives. The five design criteria form, function, cost, time, and environment should drive the discussion.
All these strategies involve cost and performance trade-offs that can cost-effectively reduce the overall environmental impact.

3. Analyze individual and combined measures

Identify and use opportunities to achieve synergies across disciplines and building systems.
“Simple box” energy modeling during SD phase, Water budget analysis during SD phase, Use early energy modeling and water budget to inform the owner`s project requirements OPR, basis of design BOD, design documents, and construction documents.
Selecting the right metric to compare design alternatives is important. Sometimes one strategy can be evaluated using several different metrics. The way to compare design measures is to list the cost, savings, and simple payback period.

4. Seek synergies amongst design elements

A key concept of integrated design is that looking at individual components does not reveal the whole story. To reduce costs and improve whole building performance, it is imperative to look for synergies among systems.Optimizing individual components in isolation often has unintended consequences. If the systems are not designed to work together, they can end up working against each other. “The greater degree to which the components of a system are optimized together, the more the trade-offs and compromises that seem inevitable at the individual component level become unnecessary.”
The goal of integrated design is not just to optimize system components, but to also seek ways to reduce the reliance on them through natural methods such as optimal orientation and daylighting, as well as regenerative design elements, smart building systems, and building management practices.

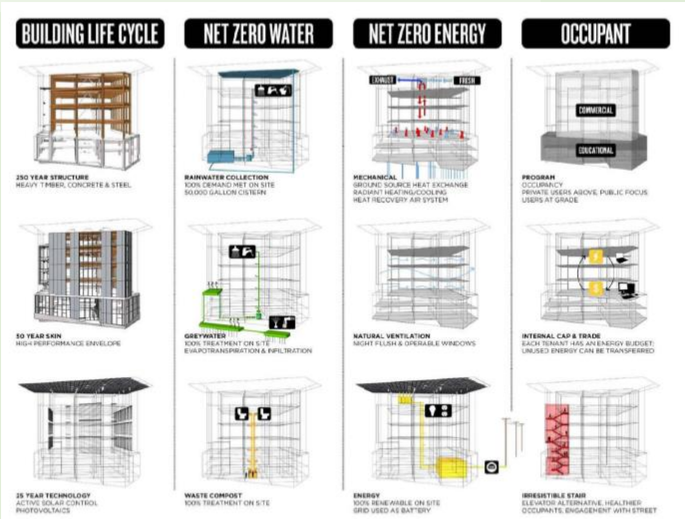
5. Select and Refine Strategies

Once the team has analyzed individual strategies and identified the synergies of selected combinations, the choice of design strategies and components is easier.
Systems that best fit the five design criteria should be selected. Making these decisions may require updating energy models and further optimizing the various combinations of systems.
The notion recognizes that in whole-system design, it is often possible to move past the standard”cost effectiveness limit” of incremental improvements and realize bigger energy savings with less expensive first costs.

6. Analyze impact of integrated design

Once strategies have been selected, the new "design case "building can be compared to the "base case" to evaluate the performance with respect to the project goals.
Integrated design, like whole-system engineering, is iterative and elaborate. Not formulaic, the process forces the design team to rethink the purpose of building components. As a constantly evolving process, it is an opportunity to improve on traditional design development.

Fig. 5 Sustainability Strategies for the Bullitt Center



Conclusions and Recommendations

Moving towards Integrative design, innovative building concepts are further challenging the traditional building paradigm and even today`s standards for sustainable integrated design by introducing the idea of buildings as more dynamic and interactive structures.
These buildings differ in their innovative strategies and technologies that seek to integrate and restore the natural environment rather than just address the building design itself. These strategies aim to move more quickly than traditional design strategies to achieve truly sustainable outcomes that heal and enhance the environment, society, and the economy.

Reference: Sustainable Design Part 2/National Council of Architectural Registration Boards, LEED V4 BD +C/USGBC

الأخبار

عقدت ندوة حفل إطلاق نتائج مشروع الوصولية لحيادية الكربون المباني (Advancing Net Zero)، بتاريخ 12/02/2022، تم تطوير اللجنة التوجيهية Net Zero استجابة لمشروع Advancing Net Zero العالمي، وعمل أكثر من 20 متطوعًا من مختلف القطاعات بدءًا من الطلاب إلى الخبراء على تحقيق الأهداف العالمية وتنفيذ المباني المتعادلة (Net Zero) في الأردن. تكونت من ثلاث لجان فرعية؛ دليل مباني متعادلة الطاقة وحالة تطبيقية لمشروع مبنى متعادل الطاقة واللجنة الفرعية لتطوير مادة تدريبية وتعريفة.

أسبوع عُمان للاستدامة سيعقد بتاريخ 13- 17 آذار 2022 في مركز عمان للمؤتمرات والمعارض ، مسقط، سلطنة عُمان. هو منصة وطنية تهدف إلى تسليط الضوء على التزام عُمان بتحقيق الريادة في مجال الاستدامة من خلال إعداد استراتيجيات مبتكرة تتماشى مع أهداف التنمية المستدامة للأمم المتحدة وإشراك الجهات الفاعلة في التنمية الوطنية لتقديم عُمان كنموذج جديد للتنمية المستدامة. يجمع الحدث الجهات الفاعلة الرئيسية - واضعي السياسات وخبراء الاستدامة وقادة الصناعة، للتركيز على الرسالة الأساسية للاستدامة بصفتها هدفا وطني.

ريادي من بلادي

(لالمزيد من الكربون من أجل مستقبل أجيالنا) شعار رافق **السيد الأستاذ محمد شاكر** منذ مشاركته سنة 2012 في مؤتمر قمة الأرض Rio20 العشرين/ ريو دي جانيرو, ومن هنا ولدت فكرة تأسيس مركز بغداد للطاقة المتجددة والأستدامة BRESC كمبادرة مجتمعية ضمن المسؤولية الاجتماعية وهو مركز غير ربحي، فانطلق في عام 2018 بعد أن استقطب كل الكفاءات العراقية كي تبدع وتعمل تحت سقف واحد، كأول مركز متكامل الخدمات في العراق يعمل بالكامل على الطاقة الشمسية ويصدر الفائض من الطاقة الكهربائية الى الشبكة الوطنية, يراعي المركز جوانب الأستدامة في كل أركانه لرفع كفاءة المبنى عن طريق استخدام العزل الحراري وأستخدام أجهزة كهربائية عالية الكفاءة ومكيفات تعمل على الطاقة الشمسية، وكذلك استخدام مضخات شمسية لاستخراج المياه من باطن الأرض لري حدائق المركز.

حصل على الماجستير في التخطيط الاعلامي سنة 1999 وحاليا في المراحل النهائية لمناقشة الدكتوراه في الجامعة الأوروبية للدارسات السياسية والأقتصادية في موضوع (المدن الذكية المستدامة وأثرها في جودة الحياة).

مؤسس ورئيس مركز بغداد للطاقة المتجددة والأستدامة, عضو الفريق الوطني لتقليل الأنبعاثات ودعم الطاقة والذي تحت مظلته فريق التوعية، الأعلام وفريق أيزو طاقة الذي ينتشر في دائرة من دوائر الدولة في العراق, عضو اللجنة التنفيذية للمركز الأقليمي للطاقة المتجددة وكفاءة الطاقة في الجامعة العربية,RCREEE, حاصل على حماية حقوق الملكية الفكرية للخطة الوطنية للطاقة المتجددة في العراق 2030.

مصمم برنامج دعم القطاع الخاص في عام 2011 مع توفير 100 ألف فرصة عمل , أحد مؤسسي الشبكة الوطنية لميثاق الأمم المتحدة في العراق ورئيس مجلس الامناء المنتخب UNGC – IRAQ , أحد مؤسسي مركز المسؤولية الاجتماعية والتنمية المستدامة ورئيس مجلس الامناء فيه, امين عام أتحاد رجال الاعمال العراقيين 2009 – 2018, عضو المجلس العلمي لدعم استدامة الطاقة في وزارة التعليم العالي والبحث العلمي, عضو اللجنة العلمية لمركز بحوث الطاقة المتجددة والبيئة – هيئة البحث والتطوير الصناعي/ وزارة الصناعة, عضو في لجنة الابتكار ونقل التكنولوجيا في الجهاز المركزي للتقييس والسيطرة النوعية – وزارة التخطيط.

شارك في العديد من المؤتمرات الدولية والإقليمية والمحلية كمتحدث رئيسي وقدم عشرات المحاضرات في الجامعات وفي دوائر الدولة حول الطاقة المتجددة والأستدامة وتطبيقاتها.

ناقش أهداف التنمية المستدامة مع فريق الأمم المتحدة مع ممثلي دول عدة قبل اطلاقها وحضر حفل اطلاقها في الشرق الأوسط وتبنى تطبيقها من خلال أنشطة المركز والمشاريع التي يتبناها.
أستثمر في اول مكيف هجين يدخل الشرق الأوسط يعمل على الطاقة الشمسية بالكامل ويوفر أكثر من 90% من الطاقة الكهربائية في الاستخدام النهاري ولكن التحديات كانت في عدم وجود دراية أو فهم لهذه المنتج وأقترانه مع الفكرة الخاطئة تشكلت لدى العراقيين بسبب الأنارة الشمسية التي لم تنجح بغض النظر عن الأسباب لكنها كانت عائق امام أي حديث جديد عن الطاقة الشمسية في العراق.

Question & Answer /Eng. Hardy Zangana, LEED AP BD+C

What is an Impervious & Pervious Surfaces?

Impervious surfaces are mainly artificial structures such as pavements (roads, sidewalks, driveways and parking lots that are covered by water-resistant materials such as asphalt, concrete, brick, stone—and rooftops. Soils compacted by urban development are also highly impervious. It promotes water runoff instead of infiltration into the subsurface. This term is mostly used when discussing hardscape surfaces, (Fig.1).

Per "Sustainable site" impact category in LEED rating system, the extensive use of impervious surfaces has many effects on the project site and the environment such as rain water runoff, (Fig.2) that leads to floods and land erosion (Fig.3), as well as increase of the heat island effect (Fig.4) through reflecting the heat into the space.

Fig.1

Fig.2

Fig.3

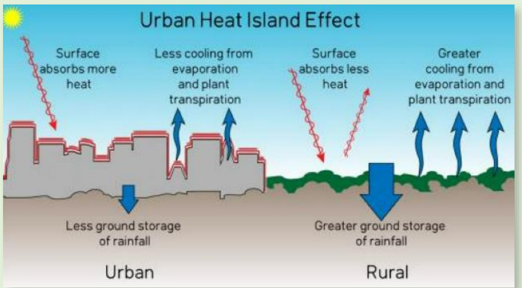


Fig.4

There is no doubt that impervious surfaces have some advantages such as maintaining the cleanness and the tidiness of the project sit, improving the air quality through reducing the carried dust in the air and some other decorative aspects but its disadvantages the caused damages should not be neglected.

LEED has set some strategies and alternate solutions for optimum solutions that enables the use of both impervious and pervious surfaces with minimum unwanted results and environmental damages.
Techniques to manage runoff are:

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- Vegetated roofs
- Bioretention areas
- Porous paving
- Rain gardens
- Rainwater harvesting
- Pervious decking
- Reduce hardscape
- Restore natural landscape

Pervious pavement is paving systems that are open and allow moisture to soak into the ground below; it is using to reduce runoff by allowing runoff to filter through the pervious material.

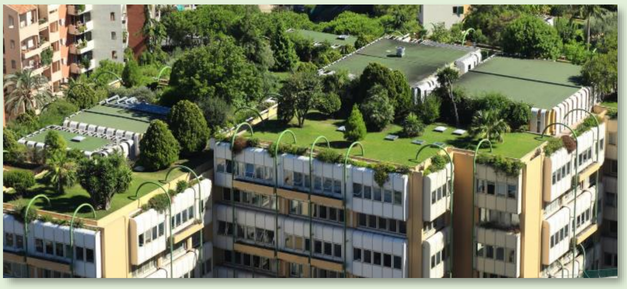
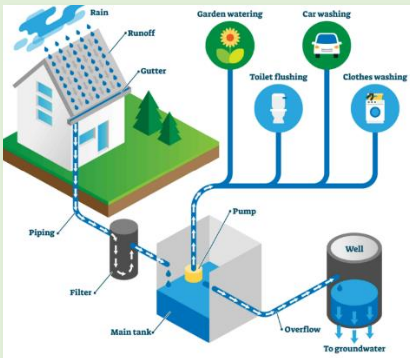


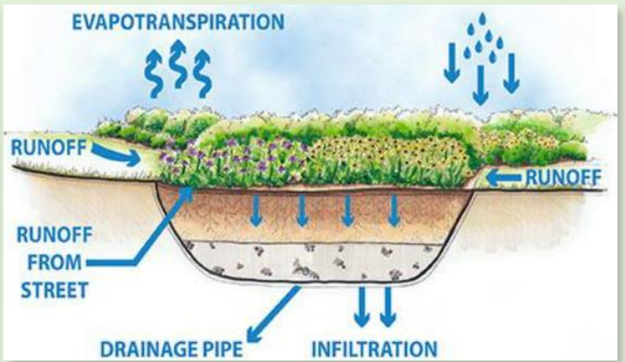
Fig.6

Fig.7

Vegetated roofs or Green roofs (Fig.6) will help to retain some of the rainwater on the roof and helps in reducing the heat island effect.

Rainwater Harvesting Systems (Fig.7) are used to diverting and re-directing rainwater into special storages to be used later for irrigation and some other processes (Not Drinking).





The recent floods in Erbil/Iraq might be a good life example of the extensive use of impervious surfaces and the above mentioned strategies could have made difference.