

The Book of Abstracts

Session A: Livable & Sustainable communities and cities

Aptitude of Kuwait to 3rd industrial revolution

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Senior MEP coordinator and architect engineer
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American social thinker Jeremie Rifkin proposes a new economic, social and industrial model for the future, that he refers “The Third Industrial Revolution”, which is an energy oriented categorization of industrial revolutions, to be distinguished from Klaus Schwab’s “Fourth Industrial Revolution”.

The first two objectives to be discussed during presentation:

- The determinants which converged and led to emergence of the 1st, 2nd and 3rd industrial revolutions
- The five pillars of the 3rd industrial revolution (with examples):
 - 1- Using renewable energy sources
 - 2- Converting buildings into green mini-power generation plants
 - 3- Deploying energy storage technologies in buildings and throughout infrastructure to store intermittent energies for later use
 - 4- Using internet technology to transform the power grid of every continent into an 'energy internet' that shares energy
 - 5- Transforming all transportation means to electricity plug-in and fuel cell vehicles

The second half of the presentation will investigate Kuwait’s aptitude to 3rd industrial revolution by focusing on laying the foundation for the 2nd pillar in the residential sector in the state of Kuwait through installing Building Integrated Photovoltaic system BIPV on the roofs of all residential buildings and villas to increase their energy self-sufficiency.

Objectives of this investigation:

- Investigating the potential of saving carbon emission by comparing Kuwait national carbon footprints before and after BIPV installation
- Calculating the overall cost saving of public power generation from applying BIPV on residential sector.

The reason behind focusing on the residential sector is because it has the largest contribution to carbon and ecological national footprints in Kuwait.

The methodology used to evaluate the potential of BIPV system on building roofs considers a number of residential buildings and villas that are representative to all residential building typologies in Kuwait.

The figures resulted from this investigation clearly illustrates the necessity to increase social responsibility in consuming the precious clean energy; otherwise the potentials of the 3rd industrial revolution will not be fully grasped.

UN-Habitat’s housing studios UN Habitat for better urban future

Dr Ameera Al-Hassan

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The New LEED v4.1 Cities and Communities : Diverse, Bold and Accessible.

Rania Metwalli Shields

Head of Sustainability,

USGBC Faculty, LEED AP BD+C. CEM.

Al Hamra Kuwait, Kuwait ,

This session provides an overview of key aspects of sustainable urban design and green infrastructure and how the latest LEED v4.1 addresses them at the community, city and regional level.

The session analyzes and considers viable solutions to issues including:

What role does city planning and infrastructure play in promoting or limiting efforts to go green at the individual home or building level? What metrics are used by International Green Rating Systems such as LEED v4.1 to quantify the “greenness” of a city or community? What are some of the sustainability strategies from LEED v4.1 Cities and Communities that should be considered in Kuwait’s existing cities and in future planning efforts?

At the end of this session, participants should be able to:

Understand the broadness and diversity of LEED v4.1 Cities and Communities. Clearly identify the range of project types both in phase (urban planning phase as well as existing communities and cities) and scalability (applicable at the community, city and country level) that the rating system may be applied to. Understand the importance of Green Infrastructure in Sustainable Cities and Communities and identify some of the synergies with other USGBC rating systems such as PEER in areas such as smart grids. Understand how Green Cities can help improve social equity, quality of life and standard of living for people residing there.

Identify some of the key sustainability metrics that work for neighborhood developments, sustainable districts and mega-urban projects, all the way through the city, county and regional levels as utilized in the latest LEED Rating system.

Sustainable Communities and Modern Method of Construction

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Sustainable Communities. The economic crisis in 1990's created an increased awareness of importance to protect our environment, resulting in arrival of different programs like BREEAM in 1990 in UK, LEED in 1993 in USA and ESTIDAMA in 2010 in UAE, with objective to help build more efficient, more sustainable buildings and communities. The success around the world was mixed as these programs were influenced by many factors such as: local economy, legal frameworks, demographic and cultural factors, business practices, procurement routes and projects delivery, resources and commodities availability, skilled labor force and the status of the construction industry.

The important question to discuss is: Are sustainable communities a mere collection of individual houses that are sustainable as a unit, or are they part of comprehensive sustainable framework in which houses interact between each other's and with the end users? What are the key drivers, how they can be implemented, and can they be addressed in isolation? State of Construction Industry. In the last 20 years the development of the mobile technologies and the computer analytics capabilities have helped some of the industries to progress at astonishing pace. Medicine and healthcare, hospitality, retail, aviation, car industries, telecommunications and many other industries have embraced and invested in new technologies which resulted in innovations, operational improvements, higher productivity and better offerings.

Construction Industry has not progressed at the same pace. It has not embraced and invested in new technologies as other industries. The preference was to lower the construction cost instead of improving the efficiency through innovation. This resulted in the poor-quality structures and buildings that were inefficient and expensive to maintain, hence becoming in a long run a heavy burden to the economy of a country where the project was located. Quite often under the pretext of reducing the cost and achieving better profits, the important components of sustainability were deleted from the projects.

The materials cost is increasing at 5-6% per annum and access to the skilled labor is more difficult and more expensive. It is therefore urgent to reinvent the project deliveries and revisit the current construction practices and change the project delivery models to more collaborative framework and rely more on the offsite prefabrication.

The question we attempt to answer is whether the new ideas and new technology also require a new fresh project delivery route, redefinition of the regulatory framework, to achieve the proclaimed goals and what that model may look like.

New Technologies and Proposed Way Forward. New technologies are not expensive any more, and are

readily available. Their availability should improve construction innovation resulting in ‘smarter’ more cost effective and sustainable buildings. Technological innovations must be accompanied with corresponding project delivery strategy encouraging more collaborative framework and rely more on the offsite prefabrication.

Our Masdar project was a success. We want to explore and present a case study proposing a novel approach of prefabricated construction that would incorporate the new technologies to create a house that would interact with the community and end users.

Technology will play a significant role in how our homes are built, data exchanged, neighborhoods established & cities developed, and houses interact with the end users and wider community. Modern cities are expected to improve people’s wellbeing and happiness, which on a long run has a positive social and economic impact on any society. Future proofing cities (future flexibility, resource consumption, technology, legislations, behavior change, after use value) and establish resilience-based risk management. In turn a smart master planning scheme can benefit from high demand density, economies of scale and market attractiveness which make it an attractive proposition for investors.

Session B: Sustainability in practice: delivering sustainability through projects and initiatives

EDGE for Affordable Green Homes: Optimization of Water use and Solar heat gain

Nenada Nenadic Tanasic
MSc Struc. Eng., LEED AP., EDGE Expert

EDGE is a green buildings platform that includes a green building standard, a software application and a certification program. EDGE standard for homes and EDGE software can be utilized in the analysis of technical solutions to reduce operational expenses and environmental impacts with some of the water and energy saving measures discussed in this presentation.

The sun is a powerful source of light and heat which can be used to our advantage, but only if we adopt certain design principles to mitigate unwanted heat transfer. Careful planning, resulting in a proper balance of transparent and opaque surfaces in the external façades, well positioned window shades, effective wall insulation and use of reflective paints ultimately bring about considerable savings in energy consumption. The building’s performance and energy consumption can be analyzed through EDGE software, resulting in sustainable solutions to guard homes from excessive heat gain. According to the Water Resource Institute (WRI), Kuwait’s water consumption is among the highest in the world. EDGE software is designed to calculate water consumption when different water saving measures are implemented in the project. Some of the measures that can be implemented in residential projects include installation of low flow showers, water saving faucets and water closets, rain water harvesting and gray water treatment.

On the example, one multifamily low-rise Kuwaiti building, water and energy savings are calculated as well as pay back periods for each of the recommended measure.

A Novel Code for Sustainable Kuwaiti Homes

Dr. Esam Elsarrag
CEO and Founder of BeGreen Global, London

Homes are the core of economic and cultural that strengthens our societies. They are considered sustainable when they are affordable, practical in design and must create an environment which attracts people to live in and enjoy life. It is essential to use sustainable architecture and designs that improve quality of life and deliver affordable homes with best quality for existing and future communities.

Several assessment tools and standards have been available for energy and environmental performance of commercial and residential buildings. However, the use of non-engineered energy and environmental standards or benchmarks may lead to an adverse impact on buildings’ performance; e.g. more energy consumption or money drain in the region.

Thus, there is an urgent need for appropriate sustainability quantitative, semi-quantitative and qualitative performance indicators especially for residential areas. Performance indicators must be engineered and customised to the region’s context. The proposed Code for Sustainable Kuwaiti Homes will address several sustainability issues based on sound, practical and affordable solutions and methods. The Kuwaiti Code will also focus on the health impact, human comfort and the environment of the housing area.

The result would be a building that could last longer, healthy and productive occupants, more economical, energy efficient as well as will have low carbon emissions

Assessment of the First Low-Energy House in the State of Kuwait

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Dr. Ali Alajmi

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A low-energy house has been constructed in Kuwait as a collaborated work between government and private sectors with an aim to reduce the average current house consumption of electricity and water by 50%. Since it is the first of its kind to design a house with high energy and water efficiencies concerns, many measures have been taken. At first, an efficient envelope of the house with continuous insulation, a high-performance air-conditioning system, high thermal and optical windows performance are chosen. In addition, efficient lighting system (light-emitting diode, LED) with proper lighting control, efficient of electrical and mechanical systems for the domestic use are considered.

The proposed design has been preliminarily evaluated using a building simulation program DesignBuilder™ against conventional design (based on local energy conservation code). The simulations results showed that a significant reduction in the house energy consumption from 83, conventional design, to 29 MWh/annual of the proposed design, 65% reduction. In another term, the Energy Use Intensity (EUI), has fallen from 184 to 65 kWh/m².year. The energy reduction can be attributed to the highly insulated envelope, high-efficient windows, and high-performance air-conditioning system.

Furthermore, renewable energy of solar heater which will reduce the consumption by 333 kWh/annual and photovoltaic (PV) which going to produce 8,412 kWh/annual is integrated to the house, this makes the house even more efficient and sustainable. Ultimately, the proposed design will be validated by extensive instrumentation (dry and wet-bulb temperatures sensors and energy meters) that are installed in the house for data collection and monitoring.

Session F: Green entrepreneurship in the Gulf: Business cases

Commissioning your way to High Performance Buildings – The Value of Independent Commissioning

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Senior Commissioning Authority, Alpin Limited

In many fields, the benefit of involving independent specialists is universal, and despite the initial investment involved, the positive factors typically far outweigh the financial costs. The presentation analyses and highlights the real value and importance of independent commissioning; beyond simply saving you time and money, it ultimately helps shape a more sustainable and efficient built asset that stands up to the test of time and the demands of the ever-evolving environmental parameters.

While the overall cost and aesthetics of a building are important, it is vital that an asset performs well in the long-term, with as little maintenance as possible. Take the example of buying a car. Despite taking the time to consider a variety of options, you may still end up having to replace the vehicle after only a short time due to poor design or manufacturing issues. These hidden design or operational flaws may be issues that only an expert or specialist could detect.

Therefore, to help you make a fully informed decision regarding quality (especially if it is a pre-owned vehicle), it would be better to seek the assurance of an objective external reviewer or certifier. The word of a member of the car’s production or sales team may be biased towards his or her own personal offerings, potentially leaving you open to problems in the future.

Building Commissioning is not unlike this vehicle analogy, but of course it is much more complex. While building systems become increasingly more complex (especially given the ongoing integration of information technology with MEP), some lower tier developers are still biased against the important process of building commissioning (Cx) viewing it simply as a “box-ticking” exercise rather than a vital, value-add on service that serves both their immediate and long-term interests.

Some developers might also opt for the lowest cost option regardless of quality, independence or expertise, simply to fulfil a statutory requirement. The commissioning process is even sometimes passed on to the contractor or designer which creates a conflict of interest and completely contradicts the intent of the commissioning process. We will highlight this in the presentation and demonstrate that commissioning must be independent in order to fully maximize its benefits.

We will also discuss and explain in detail the value of independent commissioning for developers, FM teams, project designers, and end users. We believe its inherent value lies in having an optimal, independent advisor with extensive expertise and specialist knowledge who can ultimately help fulfil an owner’s exact vision for a project. To get the full benefits of commissioning and to ensure Cx is properly implemented, it is important to first understand this meticulous process. We will cover this in detail, along with the various types of commissioning, before analyzing its cost and benefits. We will also outline the intrinsic values it can add, and how the initial cost may be gradually covered through independent, certified and early-implemented Whole Building Commissioning.

Boosting the Green Market of the MENA region through a sustainable and dynamic Platform”

Yasmeen Al Kandari

COO & CO-founder, SEEDS Platform, Kuwait

Yuser Al Mutawa

CEO & CO-founder, SEEDS Platform, Kuwait

SEEDS is an integrated web-based platform that can benefit and connect interested individuals, skillful SMEs (Small to Medium Enterprises), and companies in the industry to deliver contemporary low carbon design. SEEDS stand for Sustainable, Environmental and Energy Design Solutions.

As Co-founders, Yuser and Yasmeen met during their Modern Building Design (MBD) Masters course at the University of Bath. They were very interested in the sustainable design of buildings. They learnt about smart buildings, low carbon design, building regulations, green building certification systems, BIM and energy modeling. They realized that adopting sustainable design globally is critical and should be mandatory. Sustainable design should not be an optional solution. It should be the only solution.

After completing research and observations for almost two years, four conclusions were established. The first conclusion was that there is difficulty in accessing information related to sustainable design in the MENA region. Secondly, people of expertise and specialized organizations are not exposed. The third conclusion was that the demand for sustainable buildings is observed to be very low. Finally, it was also concluded that there is a lack of awareness and a common misconception among the general public.

The platform developed based on the belief that knowledge is the foundation to produce innovative sustainable buildings solutions. The features of the platform were created to address the conclusions that were made during the research period. The platform therefore dynamically connects individuals, organizations and experts.

The process of transforming this concept into a concrete product required advanced technology and IT involvement. To provide the features required to cater for all target audience, intricate and complex coding systems were developed.

Therefore, SEEDS platform offers different membership types for interested individuals, organizations and experts who we call leaders. Members can read, publish and share articles related to various topics within the sustainable built environment. This marks the start of achieving our vision of transforming conventional built environments.

Session C: Lessons about sustainability from vernacular architecture in the Gulf

Researching Past Architecture for a Sustainable Future

Eng. Nicolas SADDI

Founder and Director of ARCADE or Arab Research Center for Architecture and Design of the Environment

The vision behind ARCADE www.arcaderesearch.net is to “Research our Past and Present for a better Future” and its mission is to “record, document, research and communicate the wealth of solutions embedded in past architectures as a base to create meaningful and innovative architectural approaches for contemporary living”.

This research mission has been on-going since 1975, focusing on Africa and the Arab World and has a number of objectives: The first is to record what Rudofsky called *Architectures Without Architects* and that are threatened by wars, conflicts and new developments. The second is to research in-depth the vernacular, the third is to draw lessons for a sustainable future from what was a sustainable past and the fourth is to use this research to trigger innovation in urban and architectural design.

Session D: Innovative Solutions for Green Homes

Factual benefits of sustainable buildings: How value-added green living is integrated into design of residential projects

Dr. Ioannis Spanos

Regional Manager – Building Services

KEO - Sustainability and Environmental Services Division

Many residential projects, in the GCC region, have been certified under Sustainability and Green Certification systems. This is part of initiatives for good governance practices and a response to the global need for action related to limiting climate change. Applying sustainability systems can have a broader positive impact with strong socio-economic aspects.

Examined projects were assessed to identify which socio-environmental-economic aspects of certification assessment can be achieved. The fundamentals of Certification systems were examined to better understand the positive impacts that can be provided by achieving a formal Certification scheme. The assessment included reducing energy and water consumption, as these schemes have a higher weighting for energy and water reduction measures.

Sustainable, green, residential buildings have significantly more benefits than, just, supporting the environment. Well-designed, sustainable, residential projects improve the livability of the project and the well-being of all who will interact with it in the future. Such improvements can have financial benefits for the life time of the buildings; benefits which can well surpass the early costs associated with sustainability elements of design during the construction development of a project. The presentation will provide a highlight, based on two examples, on how such value-added decisions can improve green living.

The first green certification example is a high-end residential development which has received two national awards for its sustainability integration. Wafra Residential Tower is a development by Wafra Real Estate designed by UNStudio with supporting services by KEO inclusive of Sustainability. Wafra Residential Tower, Lusail City - Qatar, has received in August 2017 the Letter of Conformance for 5 Stars under GSAS.

The second example is a staff housing complex of nine residential buildings, which recently has received its green certification design compliance certificate. The development consists of 9 staff accommodation buildings each comprising 8 floors located at Zone RA in Yas Island, Abu Dhabi. The project received in 2018 a 2-Pearls rating under the Estidama certification standard.

Following Sustainability and Green Certification standards does not only provide something that can be labeled as “green”, it also provides a product, of better quality and higher value than the norm.

Building Simulation Modelling – How it can unlock Kuwait’s sustainable future

Scott Farrar

Chartered Architectural Technologist, CIAT, RIBA & LEED GA,
Heriot Watt University (MSc, Sustainable Building Design)

The presentation will provide an introduction of the key concepts of building modelling for sustainable design highlighting the importance of understanding the application of a range of introduced models and tools. It will demonstrate the application of building modelling for residential design including:

Generating Energy Performance Certificates (EPCs) for compliance tools such as the UKs SAP Rating calculations for cooling and ventilation

Providing detailed operational simulations of energy performance in buildings through Integrated Energy Systems – Virtual Environment (IES-VE), demonstrating how this tool will improve the accuracy of the energy predictions in buildings

The presentation will also uncover how application of policy such as the UK's Standard Assessment Procedure (SAP) for building modelling of domestic buildings could be applied in Kuwait to improve energy performance, whilst demonstrating the software used to run SAP. This discussion will also highlight different measures for reducing energy consumption. It will also highlight the benefits and limitations of this method.

In conclusion, the presentation will seek to provide delegates with knowledge of the use and application of software to integrate and optimise sustainable features within Kuwait’s current and future housing assets. It will present the application of building modelling for residential buildings in Kuwait and outline the key measures for Kuwait when designing sustainable, low-energy consuming buildings.

After attending the presentation, delegates would have been demonstrated the:

- Applications of building models to residential buildings in Kuwait
- Differences between a compliance tool and design model
- Key measures for designing towards sustainable, low-energy buildings and the basic principles of modelling these
- Benefits and limitations of featured modelling tools for sustainable building design
- Difference between steady state and dynamic models and how apply them appropriately.

Smart Buildings: Enhancing Building Performance and Creating Perfect Places

Herbert Klausner
CEO & General Manager, SIEMENS, Kuwait

Recent research shows that buildings perceived as energy efficient sell at a 2 to 17 percent premium over less advanced properties, attract 8 to 35 percent higher rents, and achieve 9 to 18 percent higher occupancy rates. Clearly, tenants are increasingly willing to pay a premium for modern, efficient facilities. SMART and Green TECHNOLOGY leads to: Unique building position in the market, allow you to differentiate, improve the ten-ants experience, Improve and Increase productivity for building user and operator.

Organizations can focus on their core business by: Improved productivity of employees, eliminating distractions, optimize conditions for individual occupants, enhance revenue generating opportunities. Technology plays a very important roll and depending on your strategy and objectives you will be more successful when you select the right partners to implement the right technology.

Towards a new era in sustainable construction with dynamic glass

Anoop Sreekumar

Specification Manager- Middle East Markets

Alain Garnier

Manager- Sales & Business Development ME, SageGlass® by Saint-Gobain

Buildings are responsible for approximately 36% of total energy consumptions and 40% of CO₂ emissions globally, according to the International Energy Agency. The construction sector hence provides a major opportunity to meet the global energy efficiency and environment preservation targets. On the other hand, we spend today 90% of our time inside buildings.

According to the World Green Building Council, there is “overwhelming evidence” that demonstrates the design of a building impacts the health and well-being of its occupants. In particular, daylighting and views to outdoors have been the subject of a large body of research, revealing their key role in creating more comfortable and healthy spaces. While glazing constitute the ideal material for bringing daylight and connection to the outside indoors, they can also have unwanted counter effects such as overheating and glare, thus impacting both the energy and comfort performances of the building.

Electronically tintable glass, also known as electrochromic (EC) glass, allows the building façade to become dynamic, changing the transmission of the solar heat and light in response to the exterior environment and the needs of the building’s occupants, while always remaining transparent. It thus offers an innovative and elegant solution to address the design challenge of creating both energy efficient and comfortable well daylight spaces. New developments in the EC technology will be presented, as well as a range of case studies of retrofit and new construction, where dynamic glass allowed to achieve sustainable design goals, without compromising on aesthetics choices.

Session E: Sustainable behavior& post-construction operations

Insulation: From Immediate vital needs to long term sustainability goals

Dr. Nada Chami

Business development manager, SaintGobain, Middle-East

The topics discussed during the presentation are:

- Buildings are big consumers of energy in Kuwait. Insulation is key for energy efficiency
- How do we properly insulate buildings?
- The impact of insulation on energy saving: Kuwait experimental case study
- How important is the building science approach when designing a green building or retrofitting?
- Other important benefits of using mineral wool insulation: IAQ, acoustics, fire safety

Towards Sustainable Homes in Kuwait - With a Focus on Energy Efficiency

Zeinab Abdmouleh

Energy Consultant, Kuwait

Over the last 30 years, the GCC region has experienced an unparalleled construction boom; more particularly in the last 10 years. This has led to a swift expansion in the size of cities as well as in a growth in energy consumption per capita that currently exceeds most parts of the world. This also has resulted to a high stress on vital resources such as water, energy, and food. Since the launch of the climate change talks, Kuwait has spared no effort to contribute to mitigating the impacts of climate change on the local, regional or international scales, such as prioritizing the initiatives to tap into the resources of renewable energies, which are expected to cover 15 percent of the country's needs by 2020. However, in terms of buildings construction and operation there is still much work to do towards achieving a green growth and sustainable development strategies. In fact, despite the improvement in well-being, Kuwait continues to face major challenges that pose a threat to sustaining its rapid prosperity. The most important challenge is that economic growth is majorly driven by hydrocarbon resources, at the same time the oil production and use are considered as major contributors to the deterioration of the environment.

This article discusses the main environmental, social, and economic impact issues that lead to long term, sustainable growth in Kuwait. The analysis emphasizes not only on the different green home solutions and technologies, but also on green buildings sustainability tools to establish an encouraging regulatory framework for sustainable building construction industry in Kuwait. This survey examines also various examples of energy efficiency solutions among GCC countries along with the potential of savings for each. The main objectives through the provision of this overview are to help policy implementers in Kuwait learn from each other's experiences and encourage developers and home users to implement these solutions and standards and help to meet indicative targets. The methodology applied in this document is to collect all applied green building codes and tools with a comparison study between the main two available green building certificates in the GCC which are LEED and GSAS.

This constructive comparison is followed by a list of recommendations focusing on the importance of sustain-able design and the active participation of multiple stakeholders including decision makers from the public sector, private companies and associations, and more importantly citizens.

Renewable Energy & Green Housing Perspective – Support Mechanisms

Dr Hassan Qassem

General Manager, Alternative Energy Project Company

Macroeconomic benefits of Thermally Efficient Building Envelopes – A Case Study

Arvind Kumar

Manager-architectural advisory for the Middle East, Technal, Dubai, UAE

Purpose of the study was to study the impact of using thermally efficient windows in government buildings. It is a known fact that in the middle east, the energy requirement for buildings is catered by converting oil. Furthermore, the electricity and water authorities highly subsidize the energy bills for the occupants in the government buildings. It was important to study the energy consumption of these government buildings and to analyze how improving the thermal efficiency of the windows could contribute to energy savings, lesser carbon emissions and lesser oil burnt for energy production.

Umm Al Hassan was a large-scale residential mass housing project in Bahrain which will be built over a period of 3 years and house more than 2000 apartments. Technal Middle East had the opportunity to work alongside MSCEB consultants to understand the energy consumption of the buildings by using various non-thermal and various models of thermally efficient windows. A detailed energy modelling was conducted by Technal middle east and the overall energy consumptions were calculated.

Using the energy and daylight simulation at the building level, we compared the impact of the thermal insulation level of the framing on the overall energy demand. Here the total energy savings, which are also converted into saving of CO₂ and Savings on Barrels of oil. The thermally efficient windows were able to bring in savings of 138,217 kWh of energy and 46,072 Kgs of CO₂ eq saved for each building per year. These savings equated to 6.1% more energy savings than a building with poorly insulated windows. The outcome of the study clearly demonstrated the benefits of using thermally insulated windows

In order to study the macroeconomic impact of this study, we assumed, that every 1 kWh of energy used in a building must be generated at a power station, operating at an efficiency level of ~ 29 %. Which means that for every 1 kWh energy in a building, 3.5 kWh production is required at the power plant which is equivalent to 0.35 liter of oil needed in the power plant. This means that if thermally efficient windows are used, 230 barrels of oil can be saved for every building. This oil saved can be further used to strengthen the wealth of the nation and also used for further petrochemical downstream uses. Energy efficient buildings play such a critical role in helping the governments to achieve its economic and global sustainable position.

Methods Used

Masterplan and models were created in Sketchup. Archiwizard was used for Energy and Daylight simulation

Session G: Green Lifestyle & Wellbeing

Fostering Smart Building Culture

Eng. Hamad J. AL Kulaib

Specialized trainer, High Institute of energy, PAAET.

Founder Biohydro A.G

Smart Built environments have been a necessary trend in all walks of design, Starting from Biophilic inspired spaces, biomimetics and subsequently best use of resource facilities. Including smart grids, hvac, water use systems and Efficient equipment in all services provided, yet many see the light of day being labeled as smart without full utilization of their potential. Although some are based on ineffective operation, others operate the equipment perfectly yet lack and miss out on the main component that sustains these so called systems namely: smart people or facility patrons on all levels. The Culture of the entity.

The lecture highlights the importance of creating smart facilities that foster and empower a sustainable culture of people to thrive.

The main learning objectives

The Facility and its services – efficient people outperform efficient equipment.

The people and culture. The who, what, why and the how.

Tips for Smart buildings operations that empower and create sustainable cultures

Making Logic of love in facility operations.

localization and relations of multiple cultures and education levels: No one left behind

The Viability of TAM as a Passivehaus Solution for Temporary Accommodation

Eng. Yuser Al Mutawa

The number of homeless households is increasing worldwide due to fuel poverty, costly living expenses and bankruptcy. Particularly in the UK, where households spend more than 10% of their total income on utility bills. A solution to tackle this problem is required. It was vital to create a solution that is relatively low in cost to build, offers excellent indoor user comfort and is a low energy design.

TAM is a Temporary Accommodation Module designed innovatively with Modcell, a Passivhaus certified renewable material, and provides its users a healthy living life. TAM’s architecture is presented in different dimensions aiming to accommodate different occupancy levels. The module selected for this study is a 2 bed module with external length 14.5m and external width 4.6m. In order to test the viability of TAM in terms of its indoor thermal comfort and energy consumption, this study assesses the thermal performance and energy demands of TAM and compares them to the Passivhaus standards principle criteria. This study also examines the embodied carbon of the construction materials used for the Module.

The assessment of thermal performance and energy demands were undertaken and examined with IES-VE virtual environment software assuming the Module is occupied with a family of 5 persons. Climate data were based on the potential location of TAM, Bristol, UK. Different building envelopes were examined to have a comparison between conventional building envelopes and Passivhaus certified building components like Modcell. Modcell is a Passivhaus certified component that mainly uses straw as an insulating material. Entry of results in the Passivhaus Planning Package (PHPP) was also required for this study. This was then followed by an embodied carbon (EC) and embodied energy (EE) assessment using the RICS methodology to examine the embodied carbon levels of the construction materials used for the module.

The results showed that using the Modcell construction for TAM achieves a low indoor overheating frequency compared to other construction build-ups. Modcell also showed the lowest results for EE and EC values.

The findings of the study conclude that TAM has a stupendous potential to achieve Passivhaus criteria and provide an energy efficient temporary accommodation with optimum indoor comfort levels. Therefore, it has a promising potential to be the first flexible certified Passivhaus building. In Sep 2017, TAM has been constructed and it is now built and launched as Pilot project located in Bristol.

Re:cycle, Re:imagine

Sara Okasha and Abrar Asrawi
Architects, Kuwait University

Nowadays people are not aware of neither the huge amount of waste they are producing nor how the recycling process is going on. Unfortunately, when architecture tries to solve such issue there is always a missing link between architecture and waste that is neglecting the ability for design to positively impact the relationship people could have with waste. Subconsciously, people think that any built environment that hosts the recycling process is meant to be unnoticed and unpleasant. Throughout the years and

since the industrial revolution 1920s, the recycling built environment is still has the same ugliness, metal using materials and the same un-inviting shapes. According to the emergence of pop art and how they re-imagined the art to be appropriate to their time and how they advocated a radical new relationship with seemingly unimportant everyday subject matters, what is the pop version of our current recycling built environment? Applying sustainable design concepts along with architectural facilities could offer hybrid solutions to generate economical growth, clean energy, as well as better social and cultural activities. Moreover, being within the public eyes in an attractive way and being part of the process with a closely interaction will help people to be aware and to understand and embrace the advances in the recycling process of wastes. This could be achieved by creating a center that will be re-designed, re-programmed, and re-located. It will be an educating recycling center that will offer diverse industrial, educational and commercial opportunities. So how to challenge the public awareness by reimagining the recycling built environment?

This research started with a questionnaire that has been distributed to a sample of people with different ages and education levels and living in different areas and dwelling units in Kuwait. The objective of this questionnaire was to measure the level of awareness in society regarding waste and environmental issues and to take into consideration the types of actions and programs that should be established to raise people’s awareness. The questionnaire showed that most of the respondents had lack knowledge about recycling. This research also corresponds to theories related to increasing the public awareness by the using of different senses. In addition to the theory of Novelty and the Brain that answers the question of *why new things make us feel so good*, by bunzeck and düzel.

In conclusion , the research and throughout its development focused on re-awaring the public and motivating them to recycle. Re-imagining the factory by re-locating, re-programing and re-designing was the key factor to reach this desired intention. This recycling center is meant to be more popular and close to the public. The center has a multi functional program, it is manufacturing, exhibiting and educating. Creating fun moments through the process meant to attract the visitors and meet their interests. Recycling and hosting the waste in an architectural built environment went beyond that typical ugly form. This recycling center is the pop version of the factory for our current days.

This abstract follow the theme of Suitability in practice : new and retrofitting projects and initiatives.

Self-Sufficiency in Residential Arid Zone

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Living in a commodity-based and material economy life have prograded behavior of the masses towards monoculturous mode of thinking to drive benefit or profit. Establishments and owned assets have become fo-cused to raise in economical (monitory) value, until the intrinsic benefits are almost forgotten. The same have reached the basic security needs, namely the residential property sector

which is supposed to be valued for the ability to provide support for a household though now it's more valued for the ability to be converted into a rental project which provides money in turn using that money buy the securities the family needs (food and health for example). Our fathers relay to us stories of how the house used to provide self-sufficiency needs for the household in the not so far days, this project (THATI) is one that focuses on getting this option of reliable security back in the hands of both the public and the government to harvest the benefits. Self-sufficiency can be expanded and/or tightened according to the implementing party, starting from individual household ex-panding to whole nation reaching to even more regional inclusiveness. Self-sufficiency needs are outlined us-ing a holistic understanding for Health from personal background and research, by measuring health as the parameter of function and participation.

Health is divided into 5 elements of focus Physical Health, Mental Health, Social Health, Material Health and Spiritual Health to help evaluate and implement different solutions. The objectives of the project are 1) to define the elements that need to be satisfied to provide a holistic Regen-erative Health Solution (RHS) to achieve intended self-sufficiency, 2) to showcase what could be possible for landowners in Kuwait, 3) to showcase to the government the potential costs effectiveness and reduction when implementing similar solutions and 4) to laying another brick in the foundation for sustainable development to become a mainstream for the construction market in our region.

THATI model is expected to achieve 80% self-sufficiency after 5 years of system establishment until the living elements get towards maturity and the ability to reach balance. The project utilizes different solutions available to the targeted region using Perma-culture design science and some new elements specific to the site design solutions.