

SOWING
A GREENER
TOMORROW,
TODAY

GUIDELINES
TO USEK'S CLIMATE
ACTION PLAN



ACHIEVING USEK'S
CARBON NEUTRALITY
IS A FORMIDABLE CHALLENGE –
BUT IT IS A CHALLENGE
WE ARE UP TO.

MRS. CLAUDE KHOURY AZAR
DIRECTOR OF THE USEK DEVELOPMENT OFFICE

UNIVERSITIES ARE
THE IDEAL PLACES TO
LAUNCH INNOVATION,
ENCOURAGE
DEVELOPMENT AND
SUPPORT PROGRESS.
CARBON NEUTRALITY
IS THE BRIGHTEST
IDEA FOR OUR
FUTURE. WE NEED TO
START IT NOW.

DR. ANTOINE DAHDAH
PHD ARCHITECT AND LEED GREEN
ASSOCIATE

PROJECT DESCRIPTION:

- **Project Name:** USEK Sustainable Carbon Neutral University
- **Owner:** Holy Spirit University of Kaslik
- **Project Contact:** Mrs. Claude Khoury Azar,
Director of the Development Office
- **Project Architect:** Dr. Antoine Dahdah
- **Project Location:**
 - City: Kaslik, Jounieh
 - Caza: Keserwan
 - Mouhafaza: Mount Lebanon
 - Country: Lebanon
- **Campus Area (m²):** 67,000
- **Project Type:** New Construction-Transformation
- **Institution Type:** Educational
- **Delivery Method:** Design - Bid - Build
- **Total Project Costs for New Constructions:** 81,251,133 USD
- **Estimated Year for Carbon Neutrality:** 2025

Project Estimation Cost for New Buildings
DRAFT 01 - 19.07.2010

Building Name	m2	Estimated Cost
Francois Bassil Medical Building	7,981	10,805,251
Administration Building	800	1,335,840
Students Lounge Room	480	667,920
Business School	3,840	6,082,120
Auditorium	1,000	2,960,606
Sport Complex	7,050	13,649,350
Multipurpose Area	8,000	8,925,840
Eco Garden	13,517	6,583,117
Underground Parking	46,000	26,709,210
General Works	51,457	3,531,880
Total	140,125	81,251,133

NOTES:

- Please note that those are estimated preliminary budgets of the project new construction buildings. After thorough study the prices might be subject to small variations

- The following projects are not included in the project estimated cost:
 - o Renovation of the existing buildings
 - o Shuttles, Buses and TRAMs
 - o Renewable Energies and related equipment
 - o Green, Plants, and Flowers



FR. ELIAS KHALIFE HACHEM
 USEK CHANCELLOR AND SUPERIOR GENERAL
 OF THE LEBANESE MARONITE ORDER



It is hard to look at our country and not be moved by the sight that greets us: forests destroyed routinely, technology used as a weapon to bring down mountains, and the air we breathe clouded in smoke. All is not well with our land.

And yet, for the first time in many generations, the eyes of the world are on the planet. It is as if we are suddenly rediscovering our God-given heritage, and remembering the responsibility we have towards the environment. Governments, organizations, individuals... we are all turning a new page. More than ever, we are trying to reverse the changes we have caused to nature. Maybe we are finally beginning to remember deep down the fundamental human right for our descendants to inherit an unspoiled land.

Our own university has a responsibility in all this, since what we do today will have a major impact on the future. We can start thinking about the kind of people we graduate from our classes. We can introduce policies that ensure every student from USEK takes courses about environmental awareness, especially those who are in the technological sectors where there is a direct relationship with nature. Most of all, we can change our behavior.

The university is a human and geographical ecosystem, and we, the inhabitants, should start by safeguarding its environment. We can be role models and seek to solve problems rather than shifting the blame on others. We can reconsider how we treat our campus and our landscape, and, finally, we can change our definition of progress to include respect towards nature.

That is why the Let's Go Green for a Sustainable Future project is such a good idea: it puts these ideas into practice. I greatly encourage USEK to take this step, from my position as Chancellor, Superior General, and as a concerned human being. Only then will USEK truly become an example for the rest of our peers. Only then, with both a Biblical understanding of man's dignified role towards creation, and a humanistic respect towards nature, we will be able to affirm, together with one voice, the human right to love our living planet.

FR. HADY MAHFOUZ
 USEK PRESIDENT



The best definition for sustainability I have ever seen is this one: Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own.

For too long in this country, our future has taken a backseat to political interests, business interests, petty interests... all sorts of interests except the greater interest. Under USEK's plan towards sustainability, everyone from students to staff, and from the strategic council to the wider campus community, will have to be more aware about our sustainable future.

The truth is we can no longer be complacent: our responsibility is to participate in one of the most important issues of our time. What is more, we believe we can inspire others by our example. Not only will we be the first university in Lebanon, and one of the first in the region to take this green step, but it will hopefully encourage other universities, organizations, and individuals to take similar steps. If other institutions surpass us in this area, we will proudly pass the torch!

As universities we are celebrated for our research, for our teaching, for promoting excellence. Isn't it time we start taking a more active role in the society? That, my friends, is why USEK is leading in such a pioneering way on environmental matters. And we are leading not simply by words, but by actions.



CLAUDE KHOURY AZAR

DIRECTOR - USEK DEVELOPMENT OFFICE



"Sustainability", "carbon-neutrality", "GHG emissions"... we hear so many big words nowadays about the environment that it's difficult to keep up. No wonder people feel confused.

When it comes to the environment, I notice that people are often intimidated by the scientific aura which surrounds it. Yet most of us are already participating in the environmental cause without even knowing it. Even better, we can make our unique contribution:

In the same way an architect can build LEED buildings, everyday citizens can save water and turn off lights. In the same way a scientist can measure CO2 levels in the atmosphere, a 5-year old can help recycle paper. In the same way a university can transform its future, students can transform society's outlook towards earth.

Our goal with Let's Go Green for a Sustainable Future is not an easy one. I will not be surprised if some people say I am being delusional, over-confident, or a dreamer to think this kind of ambition will ever materialize in Lebanon. And I expect a fair share of resistance. After all, we are undergoing an environmental renaissance which involves a revolution in the way we think, even about the most ordinary things. We might encounter skepticism and a lot of challenges. But they are challenges that the Development Office has decided to tackle head-on. With the full support and backing of the Head Office and every department from top to bottom, we will go for nothing less than success.

Teachers, students, politicians, administrators, citizens... we are all in this together, and we can all be citizens of a sustainable planet. One way in which USEK's green initiative will put this revolutionary idea into practice is by creating USEK **Green Fingerprints**, a plan that lets everyone from companies to individuals, students to farmers, give their special and unique contribution to the mission. And it will be the first plan to work on such a grassroots level, by offering green incentives from a Lebanese institution. This is what is called local partnership.

Have I mentioned yet what I believe are the two greatest factors motivating me to make this project succeed? These would be my passion and my faith. My passion burns for my university and for my work; it is what keeps me going. My faith is my biggest driver: I believe in Lebanon, and in this project, in its importance for as a noble cause everyone can support.

I would like to extend my thanks to all who believe with me that we can make a difference, and who share my faith in our dream for a more sustainable future.

A GREEN MASTERPLAN

Universities are the candles of progress and in an ideal position to halt the current trend that is harming the environment because of often irresponsible development. The USEK's Carbon Neutral Challenge Project encompasses different initiatives and strategies aimed to improve the quality of life inside its campus and spread a green message to the wider community.

By assuming such a leadership role in Lebanon, USEK will become a model institution and show by example how the wider community can move towards a more sustainable way of living.

As part of the challenge the new Campus Masterplan has been designed to optimize the external spaces and improve the quality of life inside the University's campus. This will be by sustainable strategies that have been integrated to maximize the environmental benefits using the highest standards of sustainable design and focusing specifically on daylight, solar access, wind environment, energy reduction and thermal comfort.

In fact, the Masterplan has created opportunities with the natural environment, deferring to contextual issues such as climate, site conditions, hardscape areas, orientation. It also promotes measures such as reducing emissions associated with transportation, protecting surrounding habitats, providing and maintaining open spaces, managing storm water runoff, reducing the heat island effect and eliminating light pollution. As designed, the new sustainable layout of the campus will enable its students and staff to adopt a more ecologically aware, lower carbon lifestyle. The wide Eco-garden will encourage students to spontaneously walk around the campus and enjoy different facilities and panoramic views.

The objective of the Masterplan designs is to build High-Performance Green Buildings with the aim to satisfy the LEED protocol requirements in its six categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation in Design.

The inspired Green Buildings will have both direct and indirect benefits. The immediate and most direct benefit is in the reduction of energy use and water costs right from the first day and during the entire life cycle of the building. Indirect benefits of the Green Building include increasing productivity and improving the learning environment for students. As an example, the double-envelope facade of the new Medical Building is designed to maximize daylight while controlling solar gain - a condition typical of medical faculties dominated by internal heat gains. The interstitial space is used as a protected enclosure for operable vertical shading devices that might otherwise suffer from wind damage and weather exposure. Solar energy absorbed by the shading devices is returned to the exterior environment by stack ventilation of the entire facade.

In parallel, the optimized passive design strategy is adapted to greatly reduce the energy costs of heating, cooling, ventilation and lighting. For example in the new Medical Building, the saved energy obtained just from the passive design is estimated to be around 30% of the building's total needs.

The passive design has two major aspects:

1. The use of the building's location and site to reduce the building's energy profile.
2. The design of the building itself - its orientation, aspect ratio, massing, fenestration, ventilation paths, and others measures and factors, including latitude, altitude, solar insulation, heating and cooling degree days, humidity patterns, annual wind strength and direction, the presence of trees and vegetation, and the presence of other buildings.

Central to the Masterplan is the aim to implement renewable energy options to meet the University's Carbon Neutral Challenge Project.

The Masterplan employs a variety of renewable power resources, including wind power, solar energy, geothermal & other alternate energy sources like biomass energy. The use of mini

wind turbines in the park area will provide a source of clean and renewable energy for the entire campus without disturbance. Photovoltaic panels will be used as another alternative source of energy; modules will be placed on rooftops where possible to provide supplemental clean solar energy resulting in a significant contribution to energy production efficiency and reductions in CO2 emissions.

To comply with LEED requirements for the recycling programme under its «Materials and Resources» category, the Masterplan allocates a specific wide area within the campus which will be dedicated to the recycling programme where general collection, sorting and storage of materials can take place. In addition there will be educational programmes to create awareness and understanding about the linkage between lifestyle, consumption, waste and environment. The idea is to spread a sense of responsibility among the students by raising awareness of such practices.

A major aspect of the Masterplan is to integrate part of the campus with the neighbouring community by sharing its park, the entertainment area and the multipurpose spaces. The new design will help the University to foster a positive relationship with the community and play a role as a provider of cultural events and facilities within the community.

Lastly, I would like to praise the University's Rector Fr. Hady Mahfouz, the Administration and its Development Office for their vision in undertaking and launching the USEK's Carbon Neutral Challenge Project. I am proud to be part of it and believe it will become a shining example for others in Lebanon and the region.

Dr. Antoine Dahdah
Project Architect





WORDS OF SUPPORT
WORDS OF SUPPORT

1

SAAD HARIRI
PRESIDENT OF THE COUNCIL OF MINISTERS



The launching of “Let’s Go Green for a Sustainable Future” project represents the first ambitious initiative of its kind on a scientifically advanced level in Lebanon and the region to face environmental dangers and problems resulting from increasing climate changes. It also provides the opportunity to spread this unique model among all other sectors and organizations in order to minimize environmental pollution and raising hopes to find a safe and healthy environment away from the dangers threatening the future of human beings and other living creatures all over the globe.

This distinctive environmental project which required strong will, diligent efforts and hard work, deserves special attention and careful follow up, since it effectively embodies the success of individual initiative and civil society in being aware of the impact of environmental dangers on the life of people and the future of mankind as a whole. It is essential that the project constitutes an important incentive for the government to be used in approaching and treating environmental problems which are increasing day after day in Lebanon. It is required to accelerate the establishment of necessary legal and practical frameworks to solve these problems based on what is stated in the ministerial declaration of the government in order to reduce dangers and losses threatening the health of Lebanese citizens and at the same time warning of severe repercussions affecting the natural wealth of Lebanon.

GEBRAN BASSIL MINISTER OF ENERGY AND WATER



With all the progress taking place in the world in terms of climate changes and with the development of important initiatives representing the importance of interaction between energy, water and environment, a very ambitious initiative launched by USEK catches our attention and takes us away from the traditional mysteries towards the sun horizons.

And it is not strange that higher education institutions have undertaken before other parties to keep abreast with the growing developments, since they recognize the principles of open partnership, unlimited in certain traditional frameworks, and rapidly take shape giving birth to a new trend in several socio-economic and environmental fields.

The concept of sustainability is comprehensive, broad and can be applied in several areas and issues. It also tackles all aspects of life and has as well many standards.

The increasing rates of socio-economic growth and the development of economic elements constitute the main challenges facing our work; we are extremely keen on preserving resources and maintaining their systems, and consequently rationalizing its consumption and searching for elements which do not deplete.

These strategic issues could be approached from several perspectives; they first need a political determination and contentment of the decision-makers and we are today in the process of a scientific approach confirming the pioneering role of Lebanon and its leading academic institutions.

The importance of the project launched by the University lies in its inclusion of 4 strategic elements of sustainability and in the principles which it seeks to consolidate, specially the integration between the internal environment of the University and its external surroundings.

Accordingly, any plan proposed to develop and modernize similar institutions, whether related to design, to the system of relationships or to, vertical and horizontal means of communication, will draw from the achievements of the university, considering it as a model and not as a private experience, and that it affects the whole before the part in the expected consequences, taking into consideration harmony among the different components of the eco-friendly educational structure.

The successful implementation of these steps imposes on the public sector institutions meeting them half way and ensuring healthy legislative, legal and technical infrastructures which attract further investments seeking the standards of economic and environmental feasibility.

We have given a major importance in electricity sector plan to issues like energy conservation and sufficiency as well as renewable energies, in a way that ensures the achievement of the objectives adopted by the government. And your investment today might confirm our optimism relying on objective factors, on the basis of trusting partnership between institutions of the public and private sectors, at the forefront of which come the academic institutions which guarantee this optimism.

I congratulate the administration of the university, the concerned faculties and all who contributed to the launching of this qualitative project and wish them more success.

MOHAMMAD RAHAL MINISTER OF ENVIRONMENT



The Holy Spirit University of Kaslik did not surprise us with its promising project to "go green for a sustainable future", since this University has been a pioneer in enlightening the students academically and today a pioneer in enlightening them ecologically. We had the chance to pay a visit to the University and get to know about a series of projects and studies conducted by experts, using the latest scientific and technical tools to measure air pollution or to restore national manuscripts and conserving them to remain in the memory of history.

The project of the University takes into consideration the various dangers threatening the human being because of climate change and seeks within the available potential to minimize the sources of CO2 emissions in order to reach a totally Carbon Neutral University. Accordingly, USEK will be one of the few universities in the Middle East to set up strategies to achieve sustainability, establish LEED certified buildings, repair the transportation system inside the campus, and expand the green zones through establishing a park on the roof of a multi-storey parking lot.

Such a huge project conducted today by the University complements the activities of the Ministry of Environment for the three coming years, and aims at tackling the various ecological issues throughout coordination and partnership with the concerned parties in both public and private sectors and abiding by international environmental conventions and agreements, in order to serve the environment throughout forestation, reducing the use of breakers in our mountains, reducing pollution in our towns and cities, supporting ecofriendly activities in order to slow down the dramatic environmental changes, reducing the greenhouse effect and encouraging the use of solar energy and clean energy in order to adapt with the negative consequences of climate change.

DR. HASSAN MNEIMNEH MINISTER OF EDUCATION AND HIGHER EDUCATION



I am delighted to be present among you in this special event in Lebanon which is going to launch the project "Let's Go Green for a Sustainable Future", a new kind of projects in Lebanon expressing an advanced way of thinking in terms of content and reflecting a future vision which does not only consider things in their current status but also with its long term outcomes. Present generations will not therefore harvest by themselves the fruits of efforts or monopolize the resources and wealth of earth, but rather the future generations will become an efficient partner in what

the earth generates and they will have the right to benefit from and enjoy what we do and plan for.

The title "sustainable future", meaning sustainable development, is intended as a kind of development which meets the present needs without compromising the ability of future generations to meet their own. And this means a process of achieving a link between the present and the future, ensuring continuity between short term and long term goals in order to improve the living conditions of everybody without the need to increase the use of natural resources beyond the potentials of the earth.

It is a process of change in performance requiring the exploitation of resources, orientation of investments, adaption of technical development and institutional advancement in a homogeneous way that enhances current and future abilities in meeting people's present and future needs and ambitions. Human activities are no longer hazardous; they are rather restrained by natural processes on the one hand, and by meeting objective needs on the other. This implicitly means the necessity to restrict human activities within a carefully established system avoiding any additional burden on the dynamic pattern of earth and future generations.

Accordingly, development does not merely imply uplifting the present; it is rather a historical course for a harmonious and coherent public life, wherein a three dimensional development becomes concrete: first, economic development seeking to increase the welfare of society to the limit. Second, social development aiming at boosting people's well-being and improving access to health services and basic education, ensuring the minimum standards of security and respect of human rights, besides developing different cultures, diversity, pluralism and active participation of grass-roots in decision making. Third, environmental development concerning the conservation and promotion of physical and biological resources and eco-systems; and this doubles the scale of challenges in our country, especially as economic investment, social institutions and the logic of political competition do not adjust their performance upon the signs which predict the future or according to long-term visions. This led to limiting

the space of the coming future since environmental infringements and destruction are taking place with high frequency without any kind of accountability, and decent living conditions for future generations are decreasing due to the skyrocketing prices of real estates and apartments as well as the aggravation of nepotism, the expansion of sectarian behavior in all fields, and the shrinking of democratic climate which favors pluralism and diversity.

Rectifying this situation is no longer a mere political issue; it is rather a lifestyle, a behavioral approach, which starts by reducing our selfishness, lessening the concern with our own worries and problems, and giving the future, which is going to be the present of our children and future generations, a lot of attention, planning and investment. This of course cannot be achieved without developing our national companies, supporting and facilitating the work of the civil society institutions, promoting the practice of true democracy, consolidating internal stability, and integrating the issue of sustainable development, with its various aspects, within our national plans and annual budget.

Dear audience,

We really appreciate the initiative taken by USEK. That University which does not surprise us with its spirit that embraces the world and its brain with which it seeks to race time, which explores the mysteries of the past while planning for future predictions, and whose current concerns do not prevent it from building bridges across life, rich with resources and human being's happiness.

That University wherein education is not sought for itself, but rather serves as a power of support and disciplined guidance to deal with the phenomena of existence and the universe, and technology is no longer a means of entertainment and comfort but rather a means serving the continuity of life with its prettiest shapes and richest contents.

That University wherein identity is no longer fed by memory and by the icon texts of the institution, but it is rather the picture of a future which we hold in our minds and seek to achieve that defines our identity, character and nature. The future which we design and build becomes the answer for the question: who are we?

We appreciate this level of advanced thinking in the Holy Spirit University of Kaslik, which is an auspicious beginning that we hope to witness in all other universities in order to make sustainable development one of our priorities on both formal and community levels, for the sake of a Lebanon rich with resources, love, justice and wealth.

Long live Lebanon

AKRAM CHEHAYEB MINISTER OF THE DISPLACED



The fact that a university is seeking to be green reflects part of the environmental role of our academic institutions in general and our universities in particular.

And the fact that USEK is launching its project entitled "Let's Go Green for a Sustainable Future" to become a carbon neutral university in the time of climate change and environmental, economic and life threats, reflects an emphasis on the pioneering role of our universities which are asked to plan for a sustainable future and contribute in its creation.

And the fact that USEK will be one of the first sustainable universities in the Middle East reflects a determination to restore the pioneering role of Lebanon and the typical Lebanon in the process of development and prosperity.

I highly appreciate the university's ambition and its quest to implement its model plan based on shifting behavior towards our environment, establishing LEED (leadership in energy and environmental design) certified buildings, creating a car-free campus, turning 17000 meter square on campus into a green area, adopting recycling programs, harvesting rainwater, treating used water, producing renewable and clean energy, rationalizing energy use and adopting sustainable procedures in the field of food production and consumption.

I see in the several objectives sought by the green university a practical model to be established in the university in order to have a generation of graduates endowed with scientific knowledge and environmental behavior and create, outside the university, a sustainable approach to be hopefully adopted by all institutions, whether public or private, offering products or services. We hope that USEK's project will reach its target within the established timeline and will constitute an incentive to the voluntary adoption of sustainable standards and a model to the mandatory adoption of these standards ensuring the conservation of the environment in Lebanon and its resources, this environment – fortune whose resources are being hazardedly abused, depleted, vandalized and threatened by air, water, soil and food pollution jeopardizing the human being and all the living creatures.

Many thanks to USEK for launching its pioneering project. Many thanks to the sustainability team who matured the idea and turned it into a comprehensive action plan. I also record the university's pioneering role in developing and promoting sustainable practices and in disseminating a practical environmental culture which we need in order to ensure the safety of our environment, the basis of development and its sustainability.

MARWAN HAMADE
DEPUTY, HEAD OF ENVIRONMENT
PARLIAMENTARY COMMITTEE



With this project of "Let's Go Green for a Sustainable Future", the Holy Spirit University of Kaslik, is taking the lead to stir Lebanon into a green future. We are not only referring to a color but to a symbol for a sustainable development, a neutral environment in a more prosperous and independent Country.

In my capacity as Chairman of the Parliament's Environment Committee, I want to express not only the support but also the enthusiasm of my Colleagues and myself for this new course provided by USEK, a course we should all embrace.

This is not the first time the University of Kaslik endeavors into a pioneering experience. Since 1961, we have witnessed formidable development of the University at the hand of the Lebanese Maronite Order always with its creativity and ingenuity.

The young and dynamic team dedicated to this project represents all what the new Lebanese generation should aim for achieving a desperately needed revolution in environmental uses and practices. A revolution, Lebanon is in critical need of achieving if it wants to survive as a modern and progressive country at the dawn of this 21st century.

My heartiest congratulations from someone ready to go "green" with you for a sustainable future.

DR. FRANCOIS BASSIL
CHAIRMAN - BYBLOS BANK



A Pioneer Initiative in a Leading University

The project of turning the Holy Spirit University of Kaslik into "the first carbon neutral university in the Middle East" is a pioneer project in Lebanon and the region. The importance of this project is double: first, it is a university initiative, and a university, as it is well known, represents an educational and cultural authority with high influence on society, not only in terms of spreading different kinds of sciences, literatures, information and arts, but also more particularly in terms of achieving positive change in the mentalities of citizens in a way that could be reflected in their ways of thinking and behavioral patterns. Second, because the university deals with youth, in educating and guiding them, as it is in a daily contact with them; youth represent hope for creating a better future and they are held responsible for this creation.

Accordingly, throughout this pioneer project, USEK seeks to underline the importance of environment in the life of individuals and community, to make youth aware of environmental risks and motivate them to mobilize their efforts in order to avoid them. Within this context comes the huge investment in establishing this academic institution wherein green areas are available, renewable, solar and wind energies are used, and causes of pollution do not exist (banning smoking and car exhausts, etc.), while ensuring to the university community, administrators, instructors and students, access to healthy food, pure water and clean air... shortly, the opportunity of living in a healthy university climate that develops the mind and maintains the body at once.

We are sure that this climate will in turn contribute not only in making youth more aware about environmental problems with its different dimensions and divergences, but also encouraging them to give environmental issues the importance it deserves in their private and public affairs, knowing that the Lebanese public opinion has become more positioned to accept modern environmental requirements in the life of families and organizations and to bear the sacrifices imposed by those requirements.

From this perspective, monetary authorities in Lebanon issued a special circular facilitating the granting of bank loans for investment in eco-friendly projects. This procedure is enjoying a huge consent from the bank sector in general and from Byblos Bank group in particular, especially as preserving the environment and the natural, cultural and architectural heritage of Lebanon has constituted for several years the pillar of our media strategy and the axis of our deep-rooted involvement in national and public affairs, as a confirmation for our commitment to undertake our share of civil responsibility.

We greet the USEK officials and praise their diligent efforts in improving this deep-rooted university and in boosting its role through developing our human resources which constitute our most valuable capital.

We tell them in advance: blessed is your generous initiative, and congratulations to you, to your students and to Lebanon for being "the first carbon neutral university in the Middle East".

DR. HABIB N. EL-HABR
DIRECTOR AND REGIONAL REPRESENTATIVE - UNEP



«Let's go Green for a Sustainable Future» is a wonderful initiative of USEK and demonstrates how academic institutions can be part of our collective responsibility to work together in developing and implementing strategies to mitigate greenhouse gas emissions, protect the environment and travel the path to a sustainable future.

DR. BILAL ALAYLI
PRESIDENT - ORDER OF ENGINEERS AND ARCHITECTS



The international community is facing the crisis of global warming, the most dangerous crisis threatening its existence. Scientists have agreed on the necessity of reducing the greenhouse gas emissions by about 80% in order to be able to stabilize the climatic conditions. And despite the difficult tasks required from human beings, earth does not care about such difficulty and how difficult it is for us to make such a change.

Human activities, such as combustion of fossil fuel and destruction of natural systems, have led to high levels of carbon dioxide in the atmosphere from

280 parts per million throughout thousands of years to more than 380 parts per million on a daily basis. Such an increase leads to global warming and causes climate changes which harm natural and social systems.

We have all indeed noticed these changes concretized through several phenomena such as long term droughts, floods, torrential rains, sea ice melting, sea level rising, which have negative effects on transportation systems, energy, agriculture and sanitary systems.

I truly believe that universities and institutes, with their growing sense of public responsibility, are working on reducing the emissions leading to global warming in order to achieve climate neutrality. This is done through adopting sustainable strategies on campuses or throughout providing students with necessary knowledge and skills in order to definitively treat global challenges that the world is facing in the new century and enabling them to benefit from economic opportunities arising as a result of solutions they work on developing. Universities therefore would be contributing in building a more civilized and ethical society.

I also believe that leading universities and institutes, in struggling against climate change, achieving stability and reducing energy expenses on the long term, will attract top students, distinguished faculty members and more support for alumni of local universities and institutes. And I am delighted that the Holy Spirit University of Kaslik is one of these leading universities. I wish you all the luck in your endeavor.

EDGARD CHEHAB
ASSISTANT RESIDENT REPRESENTATIVE - UNDP



Climate change represents one of the world's greatest human development challenges. In just 40 years from now, about 30% more people will be living on this planet. The bad news is that shrinking resources and potentially changing climates will limit the ability of all 9 billion of us to attain or maintain the consumptive lifestyle in line with today's affluent markets. We need a world in which the global population is not just living on the planet, but living well and within the limits of the planet. Across the world, countries, cities, companies and citizens are rising to the challenge

of climate change and at a scale and pace which is truly unprecedented. Some are committing to big cuts in greenhouse gas emissions with clear targets and timetables, while others, such as the Université Saint-Esprit de Kaslik (USEK) are going that extra mile, pledging to be carbon neutral. In fact, USEK is pioneering a model of environmental responsibility, by embarking voluntarily on the process of transforming itself into the first fully sustainable, carbon neutral university in the Middle East.

While there has been much discussion in Lebanon about the need to invest in renewable energy, USEK is acting today with a cutting-edge plan to reduce its greenhouse gas emissions. From an environmental perspective, becoming a carbon-neutral campus is a substantial and dramatic illustration of the university's commitment to sustainability. This is a stepped-up effort by the university to become a "green campus" and an acknowledgment by USEK that climate change looms as the single most important challenge facing the next generation of students. USEK's willingness to both educate and model innovative solutions to climate change practically changes its mission from teaching to practicing what is taught.

The biggest challenge now is likely to be the culture change needed to achieve further emission reductions as it comes down to individual actions, where academics, administrators, technicians and students need to individually and collectively work towards this common objective.

I wish USEK success, and more importantly courage, to move towards a more sustainable future.

NAJIB SAAB
SECRETARY GENERAL - ARAB FORUM FOR ENVIRONMENT AND DEVELOPMENT (AFED)



The decision of Université Saint-Esprit De Kaslik (USEK) to transform its campus into a carbon-neutral environment embodies great vision. This is a manifestation of the unique character of USEK, which combines commitment to modernization and advancement of education and technology, together with solid ethical values.

As architect and environmentalist, I was impressed with the comprehensive sustainability endeavor that USEK is embarking on. This is not a show-off activity, but a commitment which

goes deep, including LEED certified green buildings, energy and water efficiency, renewable energy and water recycling, eco-friendly landscaping and retrofitting existing buildings with green roofs, down to details such as basing the catering system on healthy, organic and locally grown products. The plan is capped by a broad sustainable mobility programme, restricting transport inside the campus to pedestrian paths and electrical vehicles, and providing university-supported eco-friendly buses for students and staff to communicate to campus.

An operational carbon-neutral campus will set a positive example for institutions not only in Lebanon, but all over the Middle East region and beyond, for genuine action to combat climate change, preserve the environment and enhance quality of life.

The futuristic initiative of USEK deserves to be commended and supported.



SAMIR R. TRABOULSI
PRESIDENT - LEBANON GREEN BUILDING COUNCIL



Going from one element to another in your new planning of sustainable building campus, I become more and more convinced of your perception and willingness, for achieving an ambitious on campus dramatic positive green changes. Your target to secure an optimum certification rating of Francois Bassil Medical Building is but an illustration on your willingness to optimize and quicken achieving your objectives.

Each element is usually a standalone project undertaken individually by promoters of sustainability ideas. Your strategic plan calls for consolidating and investing in these elements that deserve recognizing and support. It is a vigorous and innovative comprehensive plan that will engage all in a collaborative spirit.

The sustainability is reflected this time, if not in your direct curriculum, but in the facilities and operations as well as in your Faculty and student activities. The supply of the resources and how you manage their demand of the various university buildings demonstrate the direct applications of green building technology.

Your university will be turned to a small sustainable city that will have a tradition of environmental stewardship.

In implementing this plan, USEK will be commanded by a growing list of stakeholders who are embracing the market wide push toward environmental sustainability.

I am sure you will be taking your 7000 Students, Faculty and Staff of USEK to a better place for future generations. This will be coupled with recognition by all involved in the green sustainability and with the collective efforts and on various stands you will have a positive impact on the environment in our country.

I wish you all the best and success for your campus wide initiative as you move your university into the future.

SOUHEIL ABBOUD
MIDDLE EAST REGIONAL DIRECTOR - ECOSECURITIES



For the believers in Climate Change, it is about environmental refugees, economical meltdown and to a certain extent, the survival of humanity and life as we know it. For the skeptics, it is about finite natural resources, efficient use of energy and financial bottom line. Understanding everyone's perspective is the easy part, implementing a project that takes environmental, financial, sustainability and resource management is far more complex and demanding.

USEK's Climate Action Plan is genuine, pioneering and elevates education to another level. It also deals with the human induced environmental problems, but more importantly touches the spiritual side of life of how to take what earth has to offer in a sustainable manner.

PIERRE EL KHOURY
PROJECT MANAGER - LEBANESE CENTER FOR ENERGY CONSERVATION



We look with full confidence and openness for this national initiative which is going to integrate the environmental and developmental concepts in the heart of policies and decisions, and promote the way we react with science and knowledge.

This pioneering work launched by USEK is further evidence on the efforts that this leading university is deploying in order to apply cutting-edge technology in Lebanon and narrow the wide doors of immigration. This qualitative project takes us from the era of dreams and ambitions to a deep-rooted truth which leads this prestigious university to continuous innovation.

USEK has launched throughout this project an authentic national renaissance concerning new concepts about green buildings, the rationalization of energy consumption and renewable energies. It is essential that this dynamism achieves complementarity between required renovation of our resources and spiritual renovation that the name of the University holds.

Wael HMAIDAN
EXECUTIVE DIRECTOR - INDYACT
THE LEAGUE OF INDEPENDENT ACTIVISTS



Lebanon has been defined by many good and bad characteristics throughout its history. Lately, the bad reputation of Lebanon has been dominating within the international community. It is time to redefine our identity. One aspect of this identity could be 'leading on environmental issues'. This initiative by the University of Kaslik is one step towards this green identity, and redefining who we are as a nation."



USEK : GENERAL DESCRIPTION
USEK : ΓΕΝΕΡΑΓ ΓΕΣΧΡΙΠΤΙΟΝ

2





2.1 University Overview

The Holy Spirit University of Kaslik (USEK) is a Lebanese private Catholic higher education institution, established by the Lebanese Maronite Order (LMO) in 1961. USEK is located in the heart of Mount Lebanon. It is multilingual by tradition, with French being the predominantly spoken language. Thanks to an extremely dense network of national and international relations, it plays a key role in training highly-qualified researchers and professionals.

2.2 The USEK Community

In terms of students' numbers, USEK is the third largest private University in Lebanon and the third largest University in the country after the Lebanese University (public university) and Saint Joseph University (private university). Nowadays, USEK welcomes more than 7,000 students across 4 campuses (Kaslik, Zahle, Rmeich, Chekka), its ten faculties and four institutes; i.e. fourteen academic units which offer a broad array of high-level diversified education.

In parallel, USEK students are educated at the hands of a world-class teaching workforce composed of around 1000 professional educators and researchers. In addition, the university administrative and operational duties are handled by a professional staff of 290 members.

2.3 Environmental Status Description of the USEK Campus

Like all major institutions in the world today, USEK contributes to global warming by emitting greenhouse and other polluting gases in the atmosphere. The main activities responsible for these emissions are:

1. Private Energy production
2. Transportation
3. Air Travel
4. Cooling and Heating
5. Stationery
6. Waste
7. Natural Respiration



2

Our CO2 Emissions: How They Add Up

Budgeting of USEK's General CO2 emissions:

1.Private Energy Production:

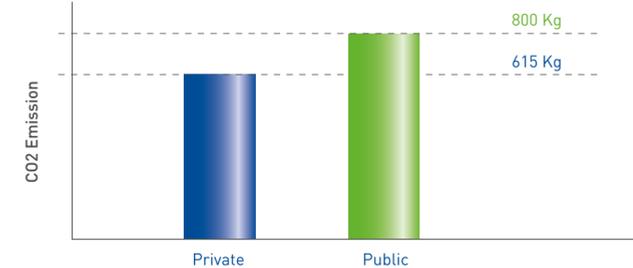
Lebanon is a country where wars and corruption have taken a heavy toll on the energy sector, leading to an ongoing national public energy crisis. Unfortunately, the result is that cities and towns face a constant shortage in public electricity, with as much as 30% to 40% of total energy still required.

To make up for it, the private sector established an energy network parallel to that of the government which now produces one third of the total energy supplied in the country.

USEK's campus is no exception to this trend. To be able to function optimally and fulfill its educational duties, it requires 100,000 KWh per month, which it gets from several sources.

Private diesel generators installed in the main campus supply around 40,000KWh per month, while producing daily emissions of around 615 Kg of CO2.

On the other hand, USEK receives around 60,000KWh per month of public electricity, producing daily emissions of around 800 Kg of CO2.



2. Transportation:

USEK welcomes around 2700 cars daily, coming mostly from the university community and visitors. This sector alone produces an estimated 16,000 Kg per day of CO2 in addition to other GHG and polluting gases.



3. Air Travel:

Next to land transportation, USEK's air travel activities constitute a large portion of the emissions released by its community. A minimum of 300 individuals affiliated with USEK travel regularly each year for educational and other institutional purposes. Besides the Greenhouse Gases (GHG) and other pollutants that airplanes emit, they also release noise pollution that can cause physiological and psychological illnesses.

4. Cooling / Heating:

A substantial portion of USEK's emissions comes from the cooling and heating of indoor rooms and water. Cooling and heating appliances consume most of the institution and household's energy, contributing to high levels of emissions and reaching their peak during the winter and summer seasons.

5. Office Stationery and Material:

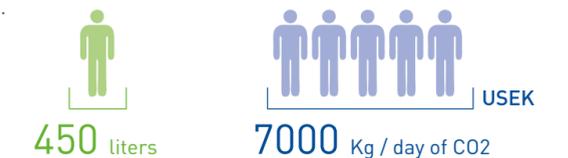
As an educational institution which welcomes thousands of people daily, USEK's consumption of academic stationery is considerable. The different types of stationery products such as pens, files, papers, office adhesives, emit significant levels of emissions in every process of their life cycle.

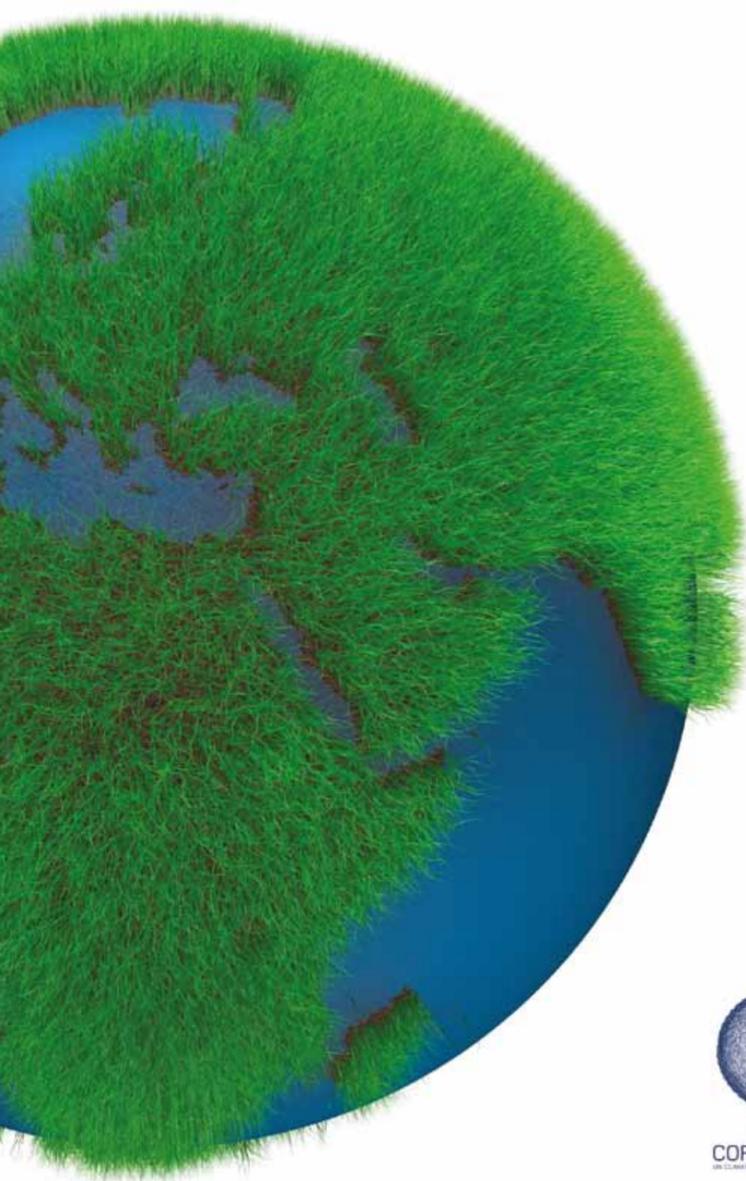
6. Waste:

The University produces tons of different types of wastes annually: organic waste, electronic waste, construction and demolition residues, fertilizers, hazardous chemicals from labs, and other types. These wastes emit high levels of greenhouse and other gases, which harm the outdoor air quality.

7.Natural Respiration:

Natural respiration by people is another area where carbon emissions occur. In USEK, assuming that the university community spends half of its day in the campus premises, and an average person's respiration generates approximately 450 liters (roughly 900 grams) of CO2 per day, then the University emits around 7000 Kg/day of CO2 from natural respiration activities.





3.1 Development Office: How the Green Plan Took Shape



The USEK Development Office is the arm responsible for raising the profile of the University and helping it embark on projects of national and wider significance. Composed of a team of dynamic professionals from different backgrounds and specializations, and headed by Mrs. Claude Khoury Azar, they have spearheaded USEK's drive for a sustainable carbon-neutral campus.

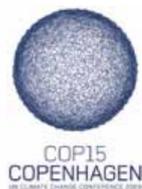
Developing the Green Plan

The state of the environment received worldwide attention in Copenhagen 2010, the international conference on climate change. It was from there that a member of the Lebanese delegation returned to the Development Office, and conveyed a message about the importance of environmental action. Added to this was the Development Office's steady involvement in environmental matters, leading them to consider how USEK could fruitfully be an environmentally-responsible institution.

After months of research, the Office formulated what would become USEK's Climate Action Plan with the full endorsement and backing of the University leadership.

Minister of the Environment H.E Mr. Mohammad Rahhal and UNDP Assistant Representative Resident, Mr. Edgard Chehab, were two of the first true believers in this initiative and demonstrated their support all throughout this journey.

Currently the Development Office is following up on every detail of the Climate Action Plan as it enters another exciting phase of development.



3.2 Taking the LEED: Our Team of Experts

Sustainability is one of the most cutting-edge fields in architecture today. So when it came to adopting the LEED building certification, USEK's Development Office needed a high level of expertise

In 2010 Dr. Antoine Dahdah was invited by the Development Office to be the lead project architect of the USEK's Sustainable Carbon Neutral project. He has formed an award winning project team of architects who have complimentary areas of competence and experience, having dealt with many different aspects of architecture and urbanism: town planning, hospital structures, education buildings, residential housing, office buildings, leisure and entertainment complexes and landscape architecture. The team has worked with leading architect practice Studio Valle on various projects winning different national and international competitions in Europe and the Gulf countries.

About Dr. ANTOINE DAHDAH Project Architect



Since an early age Antoine has been interested in architecture and how it affected the environment. So it was an easy choice when deciding his profession and degree subject – Architecture, which he studied at the University of Rome La Sapienza.

After his Laurea in Architecture he continued his post graduate studies and specializations at the University. First, doing his PhD in Architecture Design and, then wishing to study more about environmental issues, a Masters II level in Bio-ecological Architecture and Sustainable Technologies for the Environment. He is a LEED Green Associate of the U.S. Green Building Council – USGBC.

Antoine has a broad range of experience, working with leading Italian Architects and international architect companies. Such projects include civil works construction and international engineering for buildings, in design, supervision, direct management, both in the private and public building sectors, and the academic environment. He has also lectured so he understands the needs of students and members of staff on a campus.

He has his own Studio in Rome travelling to Lebanon, Middle-East and Europe for his practice.

Antoine is no stranger to Beirut and the City's architectural landscape having been the commissioning editor of "CONTEMPORARY ARCHITECTURE IN BEIRUT" published in the Architecture & Environment Magazine n.13 / 2007 - Palombi Editors.



THE DESIGN TEAM Architects Associates



Marco Garofalo



Massimiliano Celani



Emanuela Capobianchi



Marta Scuncio



Alessandro Amoroso





3.3 Project Description

The Holy Spirit University of Kaslik (USEK) has embarked on the process of transforming itself into the first fully sustainable, carbon neutral university in the Middle East.

Carbon Neutrality is a long-term goal that encompasses far more than the physical sources of carbon emissions. As with all sustainability practices, there is no simple approach, no single strategy that will lead to success. The Development Office and a team of experts have focused their strategy on four major areas: LEED Buildings - Sustainability Operations - Transportation-Shifting Community Behavior

USEK's ambition is to transform the University campus into a model of environmental responsibility in the Middle East. It is a goal that will involve the entire campus community in the process of becoming a carbon neutral, resource efficient, zero emissions, internationally certified educational institution.



Our Goals:

1. Contribute to the worldwide actions against climate change dangers and work on resetting the worldwide environmental balance.
2. Become a pioneer educational institution in sustainability education, research and practices.
3. Help Lebanon in general and the region in particular take a huge leap in the environmental field.

3.4 Project Management: Getting Started

USEK's leadership will form an administrative structure and assign clear responsibilities through a specially delegated Climate Action Plan (CAP) taskforce. One of the first and most important steps of this newly formed team will be to create the right institutional framework for the sustainability project to succeed.



The CAP taskforce will:

1. Create an inventory of Greenhouse Gas (GHG) emissions
2. Set an overall CO2 Reduction Target (for example, 50% CO2 reduction by the 2025)
3. Develop a Climate Action Plan (CAP) to become sustainable by 2025 that includes detailed solutions to achieve Carbon Neutrality, and a practical schedule to implement those solutions
4. Complete the University Master Plan by 2015, including space optimization and strategies for building footprint efficiencies
5. Involve project stakeholders in the campus's local sustainability policy
6. Estimate and allocate financial resources to subsidize the process of achieving sustainability.



List of participants in the CAP taskforce:

- President's Office
- Development Office
- Key operations offices including Finance and Architecture
- Energy Officer
- Faculty experts
- Students
- Alumni
- External Key experts and advisors



BASELINE EMISSION INVENTORY
BASELINE EMISSION INVENTORY

4

WHERE WE STAND TODAY





ONE OF THE FIRST THINGS REQUIRED BY THE PROJECT IS A SURVEY OF THE ENTIRE CAMPUS'S FOOTPRINT. THE SURVEY WOULD DETERMINE HIGH-EMISSION ACTIVITIES AND THUS FIND THE MOST PROMISING OPPORTUNITIES FOR REDUCTION TO TAKE PLACE.

SUCH A SURVEY WILL BE ADMINISTERED BY THE CAP TASKFORCE WITH THE INVOLVEMENT OF STUDENTS AND SPECIALIZED EXTERNAL PARTIES. IT WILL FOCUS ON FIVE TARGET AREAS: ENERGY, GROUND AND AIR TRANSPORTATION, SOLID WASTE, AGRICULTURE AND REFRIGERANTS.

4.1 Boundaries and Scopes

The purpose of the boundaries and scopes is to establish the criteria by which USEK will measure the progress, and to define its area of work. Boundaries act as a reference for the carbon management process, guiding everything from the inventory to the climate action plan, from institutionalization to implementation. The globally-recognized Greenhouse Gases Protocol defines two types of boundaries: organizational and operational.

4.1.1 Organizational Boundaries

Organizational boundaries are generally the highest-level, most straightforward boundaries. They define the sites we are measuring and reporting carbon emissions – whether it is one department or the entire campus.

4.1.2 Operational Boundaries

Once we have identified where we will be managing carbon emissions, our next task is to decide which emissions sources to measure. Since there are Greenhouse Gas emissions associated at some point with nearly every action we take and every product we use, this counting should be limited at some point.

Scopes of USEK:

These follow the scopes laid out by the GHG Protocol:

Scope 1: Direct emissions from sources that are owned and/or controlled by our institution.

This category includes all the combustion of fossil fuels in college-owned facilities or vehicles, fugitive emissions from refrigeration, and emissions from on-campus agriculture. The University has complete control over these emissions, and assumes direct responsibility over them.

Examples of direct emissions:

- On-Campus Stationary Sources Emissions from all on-campus fuel combustion, excluding vehicles.
- Direct Transportation Sources Emissions from all fuel used in the institution's fleet (the vehicles USEK owns)
- Refrigeration and other Chemicals Fugitive emissions from refrigerants and other sources
- Agriculture N2O emissions from fertilizer use.



Scope 2: Indirect emissions from sources that are neither owned nor operated by the institution but whose products are directly linked to on-campus energy consumption.

Although the University is not directly responsible for such emissions, nevertheless it is strongly implicated. These emissions come from converting energy sources that release greenhouse gas emissions when used (fossil fuels) to energy sources that do not (electricity, steam, or chilled water). This category includes emissions from purchased electricity.

Scope 3: Other emissions attributed to our institution, deemed "optional" emissions by corporate inventories.

This category includes emissions from sources that are neither owned nor operated by our institution but are either directly financed or are otherwise linked to the University via influence or encouragement

To prevent the University from accounting for too many Scope 3 emissions, there will be distinct financial or control boundaries to distinguish which Scope 3 emissions we are responsible for.

Solid Waste

Emissions from managing the institution's waste (incineration, land filling, etc.)

Directly Financed Outsourced Transportation

Emissions from travel that is paid for by the institution, but does not occur in fleet vehicles (business trips in commercial aircraft, staff travel in personal vehicles where mileage is reimbursed, etc.)

Commuting

Emissions from regular commuting by faculty, staff, or students (does NOT include student travel over breaks). Note that student commuting is generally considered to be under a greater degree of institutional control than staff/faculty commuting.

Study Abroad Air Travel

Emissions resulting from flight travel connected to USEK, such as students traveling to study-abroad locations as well as regular faculty, staff, and student commuting, and other commercial air travel paid for by the institution.

Upstream Emissions from Directly Financed Purchases

Emissions associated with paper production, food production, fuel extraction, etc.



GREENHOUSE
MITIGATION STRATEGIES

MITIGATION STRATEGIES
GREENHOUSE

BROAD SOLUTIONS FOR USEK





GHG STRATEGIES ARE THE GENERAL PRIMARY MEASURES THAT THE DEVELOPMENT OFFICE, ASSISTED BY ENVIRONMENTAL AND ENGINEERING EXPERTS, HAS PROPOSED FOR KEY AREAS LIKE, ENERGY CONSERVATION, SUSTAINABLE CONSTRUCTION, THE USE OF SPACE, TRANSPORTATION, WASTE DISPOSAL, LANDSCAPING AND MORE.

5.1 Energy Conservation and Efficiency

One strategy will see USEK reducing its energy consumption through conservation and efficiency, and by switching from diesel private energy generators into cleaner and renewable sources of energy such as solar and wind energy.

The University will conserve energy by focusing on the following fields:

- **End-Use Energy Conservation:** In other words, this means increased energy efficiency. End-use energy conservation will be used for setting up measures and policies.
- **Energy Conservation Program Elements:** This field includes key components of USEK's program to reduce energy use and GHG emissions from campus operations. Elements will include Strong Program Leadership, Enhanced Energy Awareness, Aggressive Energy Conservation Policies, Green Computing and others.
- **Energy Awareness:** There will be a sustained campaign to encourage people in USEK to save energy. The campaign will take place over several stages, and inform how behavior can be adapted for conservation purposes.



- **Energy Conservation Measures:** USEK will review existing buildings in order to reduce energy consumption and operating costs by installing better features. Updated features include:
 - Light sensors to dramatically reduce energy usage when users are out.
 - Water-conserving fixtures, as well as substituting older non-water-conserving models.
 - Water-conserving landscape irrigation equipment
 - Rainwater harvesting equipment or equipment to make use of water collected as part of a storm water system installed for water quality control.
- **Performance Contracting:** USEK will pay third parties for measures to reduce energy costs and waste disposal costs, or to recover materials. A contractor will design, install, and will then be paid according to guaranteed savings agreed upon beforehand.
- **Key Role of Facilities Management in Energy Conservation:** USEK will have to employ a Facilities Management staff to use technology and energy management strategies to reduce energy use. This includes Energy Managers responsible for improving the energy efficiency and the control role from maintenance.
- **Evaluating Energy Conservation Projects:** USEK will compare measures based on CO2 reduction efficacy.
- **Heating and Power Plant Solutions:** These include what is known as Cogeneration (CHP): Relying on plants that simultaneously generate energy (electricity) and heat from a single sustainable source (i.e. wood)
- **Reducing the Carbon Footprint of Oil Burning:** Switching to other sources of fuel to reduce the total emissions of CO2 (i.e. Natural gas or #2 oil instead of cheaper #4 or #6 oil)
- **Carbon Capture and Storage (CCS):** Carbon capture and storage (CCS) will be used to capture CO2 from large point sources in USEK and store it away from the atmosphere by different means. It may also involve the scrubbing of CO2 from ambient air.
- **Renewable Energy Technologies to be pursued on-campus:**
 - Photovoltaic Solar Electric Arrays
 - Other Solar (solar water heating system)
 - Wind Energy
 - Biomass
 - Geothermal energy.

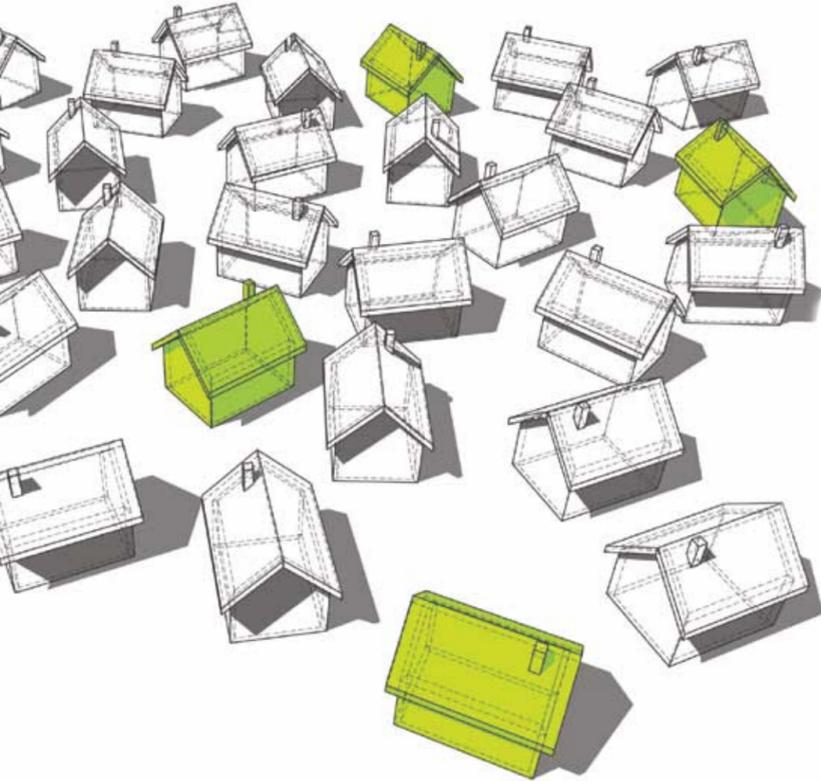
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5.2 Fostering Sustainable Construction

USEK will seek to improve the sustainability performance of its buildings to minimize the amount of greenhouse gas emissions on its campus. The University will include a healthy, low energy consumption quota and highly sustainable environment through:

- Green Design Strategies and Measures
- Green Design Process
- LEED Green Building Rating System – or its equivalent
- Some Potential passive systems – Ventilation, Lighting, Windows



5.3 More about Transportation Solutions: Keeping USEK moving

Since transportation is a major source of greenhouse gas emissions and other pollutants, USEK is aiming to move towards sustainable transportation systems. The aim is for a Car-Free campus coupled with a university-wide private shuttle system to constitute the first and the most vital milestone towards sustainability. USEK aims to push the university community towards alternative transportation programs like carpooling, walking, bicycling, living on campus, or taking public transportation to replace single-occupancy vehicle transportation.

The 'CAR'bon Effect

A primary study conducted by the Development Office showing the number of cars which enter USEK on average daily, according to their area of departure.

In Numbers

2700

Average number of cars entering USEK daily in 2010

2.4 Million

Total CO2 emissions currently resulting from USEK transportation

150

Estimated number of cars entering USEK daily in 2025

33.33%

Decrease in CO2 emissions expected after the launch of Green Fleet shuttle program and the carpooling cure program

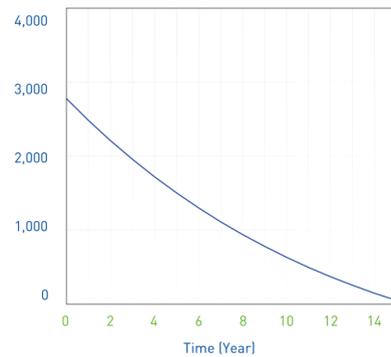


Figure 1: The effect of the strategy presented on the number of cars entering USEK

Green Fleet: A Hybrid Shuttle Program

The University will introduce Green Fleet, a private transportation system for USEK's students and employees based on the usage of hybrid shuttles that use on-board Rechargeable Energy Storage Systems (RESS) and a fuel based power source for vehicle propulsion. These vehicles use much less fuel than their counterparts and produce fewer emissions. Green Fleet will help minimize USEK's overall car usage.

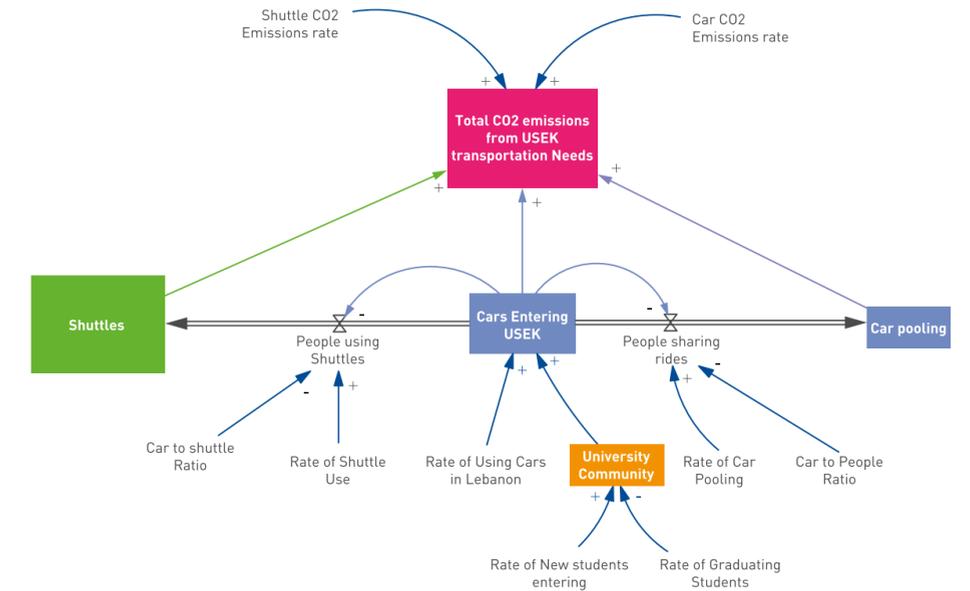


Figure 2: Vensim Representation of the Transportation System Model



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Shuttles used over 15 years

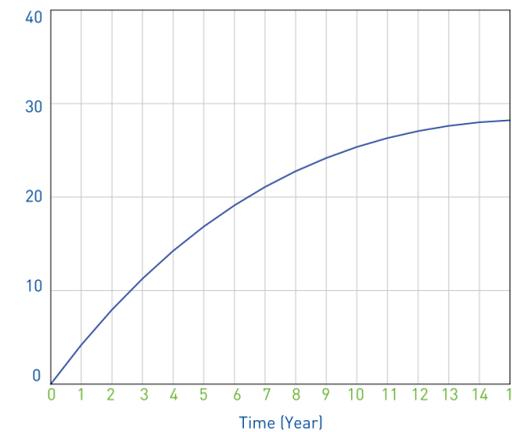


Figure 3: Number of shuttles needed to satisfy USEK's community needs



Carpooling Cure

The fact is, today only about 500 vehicles in USEK participate in some form of carpooling, although it is an easy and effective way to cut down emissions. USEK's Transportation measures, part of the Let's Go Green project, will boost that number to 2200 vehicles.

USEK will create a carpooling program to motivate students to share rides to the University and minimize the usage of cars. The program will also offer several advantages for carpool participants.

Car Pooling

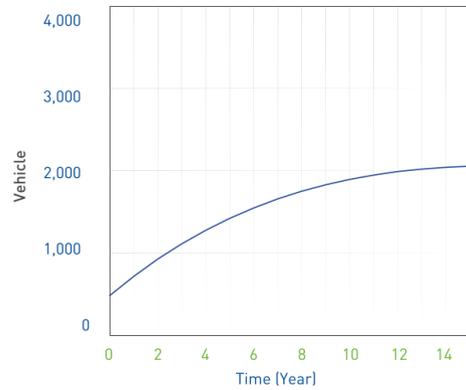


Figure 4: The effect of the Carpooling Cure on the increase of carpooling at USEK



Other Transportation Programs

Bicycle Plan: Develop a bicycle plan that includes facilities for bicyclists such as indoor and secure storage space, showers, lockers, etc.

Condensed Work Week: Offer a condensed work week option for employees.

Cash out of Parking: USEK aims to motivate its university community to minimize the usage of private cars.

Local Area Housing: Coordinate with banks, local municipalities, and local real estate businessmen to create incentives or programs to encourage employees and students to live close to campus. This in turn can benefit the local economy and revitalize the local market.

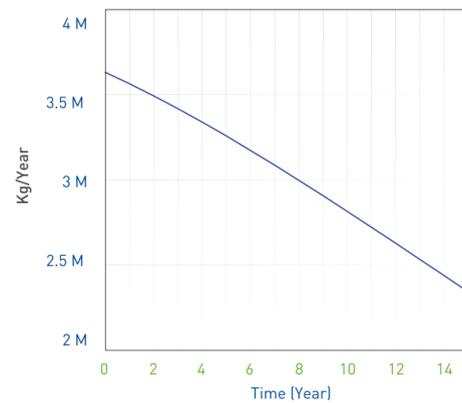


Figure 5: The effect of the strategy presented on the CO2 emissions from USEK's transportation needs



5.4 Transforming Spaces Verdantly and Efficiently

The University will try to minimize the construction of new buildings, adopting instead a strategy that focuses on maximizing the efficiency of existing buildings. Furthermore, the University plans to transform the campus's concrete and asphalt concentrations into a green natural forest-like zone. The result will be a healthier, more welcoming campus flourishing with many drought-resistant plant species.

The entire Campus will be transformed into green spaces where students will be able to study, socialize, eat or just relax. All types of toxic chemicals used in the daily operations of the community will be limited, in order to protect wildlife habitat, and conserve water and resources.

Applicable steps will include:

- Reduce Wasted Space on Campus
- Strategies for Addressing Poor Space Utilization
- Reforestation

5.5 Eco-Garden: Xeriscaping to Save Water

17,000 m2 of USEK's landscape will be remodeled according to xeriscaping standards, in the first step of its kind in the Middle East.

Xeriscaping is a form of landscaping with seven basic principles intended to save water:

1. Planning and designing
2. Soil analysis
3. Practical turf areas
4. Appropriate plant selection
5. Efficient irrigation
6. Use of mulches
7. Appropriate maintenance



Planning and Designing

USEK will consult landscaping experts in order to create a water-efficient landscape. The implementation will happen gradually over 5 years.

Soil Analysis and Preparation

To nurture plant health and raise water conservation levels, the adequate choice and quantity of organic matter will be analyzed and determined.

Plant Selection

Trees, shrubs and groundcovers will be selected based on their adaptability to the region's climate, while referring to a comprehensive soil analysis.

Grass Selection

Since turf grasses require more frequent watering and maintenance than most other landscape plants, USEK will carefully consider the choice of grass in order to suit its water efficiency design. We will carefully select grass according to its intended use, planting location and maintenance requirements.



Landscape Maintenance

Since a well designed Xeric Landscape requires less maintenance, a corresponding smart maintenance plan will be adopted.

Measures will include:

- Performing efficient watering processes
- Removing un-adapted plants
- Mulching (which involves adding a protective layer over the soil) to conserve water by significantly reducing moisture evaporation from the soil. Mulching is beneficial for reducing weed populations, preventing soil compaction and keeping soil temperatures more moderate.
- Mowing grass at the proper height in order to conserve water.
- Fertilizing the lawn once in the spring and again in the fall to produce a beautiful turf without excess growth which demands frequent watering
- Checking the irrigation system periodically
- Timing insect and disease control properly
- Eliminating water-demanding weeds.

Irrigation Systems

USEK will create water-efficient irrigation systems in order to give plants a sufficient amount of water without waste. Irrigation systems will undergo zoning, and incorporate both sprinkler and drip irrigation, in order to achieve maximum water conservation in the landscape.





WASTE MINIMIZATION AND RECYCLING

5.6 Other GHG Mitigation Strategies

• Food Service and Food Choices:

The University will build a sustainable food system in its premises. USEK will grow organic food without introducing any pesticides or fertilizer and by utilizing minimum water amounts.

Regarding imported goods from outside the University, USEK will seek to deal with institutions producing organic and environmentally friendly food. In addition, the University will privilege the nearest suitable food companies, fulfilling the above requirement while reducing polluting gases emitted by the transportation activities of the goods.

• Waste Minimization and Recycling

The University will install a special collecting and sorting system for all materials including glass, paper, metal, plastic, textiles and electronics, and outsource recycling. Special waste bins, each intended for a certain type of waste, will be distributed all over the campus. An educational and awareness campaign will be followed to educate students on the recycling process implemented in USEK and to encourage them to take part. Specialized recycling companies will transport the sorted wastes into their factories to re-manufacture them.

• Embodied GHG Emissions in Products

To achieve the level of minimum GHG emissions, the University is taking measures to reduce the release of these gases from major emitting sources such as products used on university premises.

USEK will set a full strategy that clearly identifies the environmental friendly products which could be used inside its campus. Products are classified according to their release of GHG across the life cycle of extracting raw materials, processing, manufacturing, transporting, using, and disposing of products.

• Carbon Offsets

USEK will pursue projects that can create Carbon Offsets in the form of forests and lands, and when necessary, buy or create Carbon Offsets.



5



THE SUGGESTED MASTER PLAN COMPLEMENTS THE OVERALL MITIGATION STRATEGY, ACTING LIKE AN ON-THE-GROUND "ROADMAP" FOR MEETING USEK'S GHG REDUCTION GOALS. IT ESTABLISHES A REALISTIC AND FEASIBLE WAY OF IMPLEMENTING THEM IN DIFFERENT STAGES. THE FOLLOWING MASTER PLAN PROPOSED BY THE DEVELOPMENT OFFICE WILL BE PRESENTED TO THE UNIVERSITY LEADERSHIP AND TO THE TO-BE-FORMED CAP TASKFORCE FOR FURTHER DEVELOPMENT AND APPROVAL.



6.1 Short-term Steps (by 2010 - 2012):

University policies are included under short-term steps because they can take effect immediately once approved.

Policies:

- All new campus constructions will be required to meet the U.S. Green Building Council's LEED Gold standard or equivalent.
- All existing campus constructions will be refurbished to meet the U.S. Green Building Council's LEED Silver standard or equivalent.
- The University will adopt an energy-efficient appliance purchasing policy requiring the purchase of ENERGY STAR certified products or equivalent in all areas and replace existing ones that do not match this requirement.
- The University will become, within 5 years, a car-free campus.
- Car pooling initiatives will be encouraged and campus shuttles made available for all faculty members, staff, students, and visitors of the institution
- The University will begin producing at least 30 percent of its electricity consumption from renewable sources on site, within 4 years of launching the sustainability project.
- Support climate and sustainability shareholder proposals at companies where the institution's endowment is invested.



6.2 Medium-term Steps (2012 - 2018):

These are steps which will take more time to fully implement around the campus, including the Green Fleet program and the multistory car-park.

- **Green Fleet hybrid shuttle system and multi-story car park**
USEK will work towards a car-free campus and roll out the Green Fleet hybrid shuttle system. Furthermore, USEK will construct an underground multi-story car park outside of the main area of the campus. This step will provide a wide 17,000 m2 green roof (park) accessible to students and resident community.
- **François Bassil Medical Building**
USEK's latest landmark, the François Bassil Medical Building, will be built following a strict LEED Platinum certification, the highest grade of environmentally friendly design.

The new faculty design will incorporate advanced energy savings, optimized energy use, waste reduction and occupant comfort. In addition, some of the more advanced features will be harvested rainwater and steps to minimize storm water runoff.

• Sport Complex

To complete the picture, the new Sport complex will be built according to the highest sustainable environmental standards, including being powered completely by renewable energy.

This will house the University's student sports programs - mini-football, basketball and tennis - under one roof, with facilities including training grounds, sports medicine, and offices for coaches and staff.

The complex will also function as a cultural space for the USEK community, housing activities such as concerts and giving students a vibrant meeting point.

• Energy Conservation and Efficiency

In addition to building new environmentally-friendly structures, USEK will outfit older structures already in place with better conservation and efficiency mechanisms, and strive for a transition from diesel private energy generators to cleaner and renewable sources like solar and wind energy.

• Recycling and Water Treatment

The introduction of a full recycling program will become a priority; and with it, a dedicated gathering area for recycled material.

USEK will also begin work on water treatment processes that use modern technologies and combine multiple filtration methods. The result will be water systems both greener and more customized for USEK's water needs.

• Inter-Campus Electrical Mobility System

An Electrical Mobility System will be installed to transport students around the campus. By relying on such an electric system, USEK will reduce the usage of Carbon based vehicles and overall CO2 emission.

• Landscape Design

The campus's landscape design will be revisited and recreated into a more water-efficient landscaping that minimizes the Heat Island effect. Xeric landscapes will be adopted that uses a lush variety of indigenous plants, trees and other flora.

• Healthy Food (Sustainable and Seasonal Produce)

Part of its master plan, the university cafeteria will be moved to the newly established Eco-Garden. The University will begin integrating sustainability initiatives into its food service operations, by purchasing locally-grown produce, ideally straight from producers. A related measure will be to adopt seasonal menus that rely on the local produce.

6.3 Long-term Steps (2017 - 2025):

Mainly the long term steps will deal with the transformation and renovation of the existing buildings to meet the neutrality program. The remaining steps, will be left to be determined by the CAP Taskforce accordingly upon the implementation and evaluation of the short and medium-term steps.

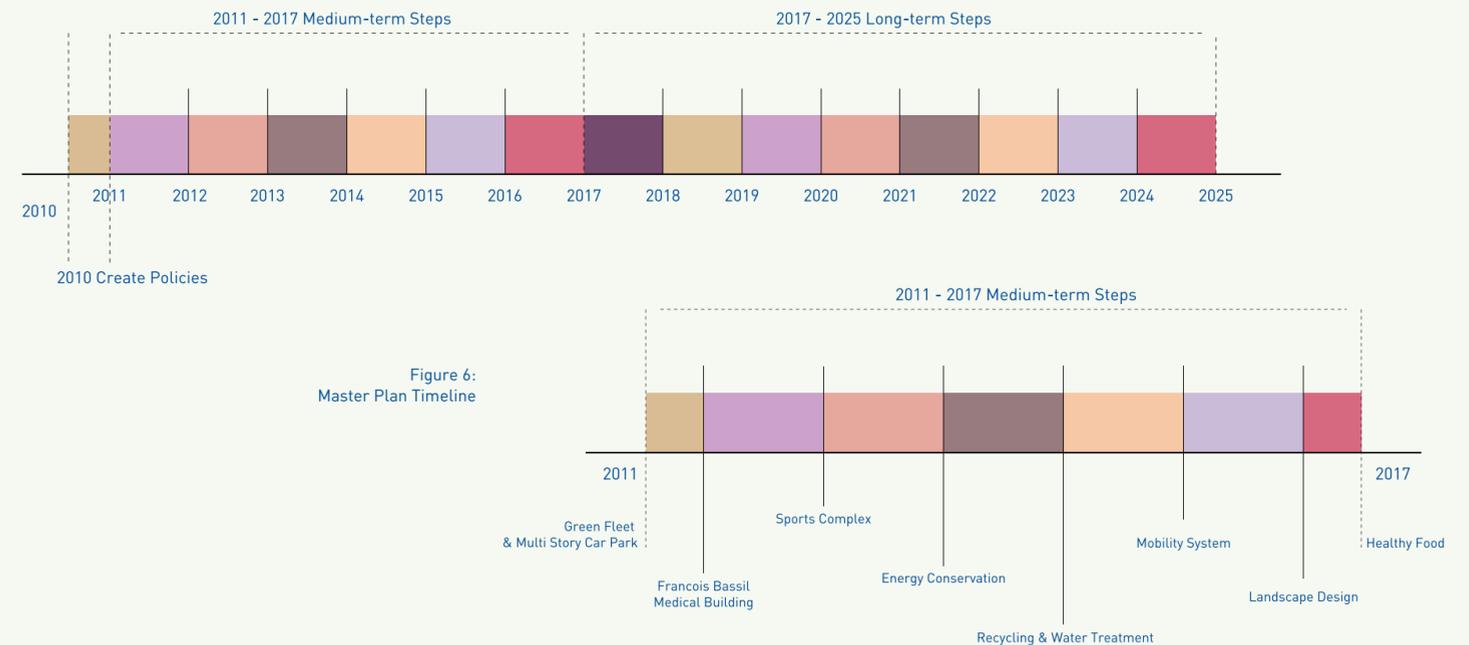


Figure 6: Master Plan Timeline





LET'S GO GREEN FOR A SUSTAINABLE FUTURE NOT ONLY ENCOMPASSES PHYSICAL TRANSFORMATIONS; IT ALSO ENGAGES THE MINDS AND HEARTS OF THE UNIVERSITY'S COMMUNITY. IT IS IDEALLY CAPABLE OF TRANSFORMING BEHAVIOR AND SPREADING SUSTAINABLE ACTIVITIES ON ALL LEVELS VARYING FROM CO-CURRICULAR EDUCATION, SUSTAINABILITY CAMPAIGNS, CURRICULUMS AND RESEARCH.

7.1 Co-Curricular Education

On the level of co-curricular Education, USEK will seek to provide its students with sustainability learning experiences outside the regular curriculum. Our approach will be to engage students to serve as educators in co-curricular activities which allow them to deepen and apply their understandings of sustainability principles and spread sustainability concepts and ethics throughout the campus community.

- **Student Groups-Societies:** Engage students in groups and societies that work on sustainable projects and campaigns.
- **LEED Certified Construction Sites:** Provide excellent applied experience for USEK's architecture students to learn how to build LEED certified sustainable buildings.
- **Organic Garden:** Create an on-campus agricultural plot that uses organic gardening techniques, where USEK agriculture students will be able to gain organic farming and/or gardening experience.
- **Sustainable Dorm Rooms:** Create dorm rooms that demonstrate sustainable living principles
- **USEK Sustainability Events:** Hold major sustainability events: conferences, conventions, and symposiums during the University calendar.
- **Outdoors Programs:** Instigate outdoors programs such as hiking, camps, extreme sports and other outings where students can participate in eco-friendly activities.
- **Themed Semester or Year:** Choose sustainability-related themes for a semester or yearly basis, with all projects, campaigns, conferences and other activities revolving around a certain theme.



7

7.2 Sustainability Campaigns

USEK seeks to hold sustainability campaigns that engage the student body in sustainability issues and can help raise community awareness of it, as well as push the University community to engage and spread sustainable operations.

New Students Orientation

Launch new student orientation activities based on sustainability that encourages new students to adopt sustainable habits in and outside USEK.

Publications

Produce outreach publications that promote sustainability learning and knowledge. They might include the following:

- An USEK sustainable **website** under the name "GCNUSEK"-Going Carbon Neutral USEK- that incorporates information about the institution's efforts and tracks its advancement
- A sustainability **newsletter** that also publishes student research on sustainability

- **Visual advertisements on USEK screens that:**
 - Highlight LEED building features
 - Promote information about sustainable food
 - Include sustainable grounds keeping strategies employed
 - All types of sustainability related educational activities occurring at the University
 - All types of sustainability improvements achieved on campus
 - Policies

- **Guides** for commuters about how to use USEK's Green Fleet hybrid shuttle system
- **Guides** for on campus residents about sustainable living practices
- Regular **articles** on sustainability in the main student newspaper
- Others **ideas** that reach our audience effectively and creatively will be pursued as well

7.3 Curriculum

USEK will open new education programs and courses that focus on sustainability. It shall become USEK's mission to train and educate leaders, professionals and educational experts to become pioneers in sustainability issues in Lebanon and the Middle East.

Sustainability Related Courses

USEK will step up its course-offerings related to sustainability, with the aim of introducing students to sustainability concepts in all the academic fields already being taught at USEK. These courses can serve dual purposes: either providing students with an in-depth knowledge of a particular aspect or dimension of sustainability, or broadening students' understanding of sustainability linked to their major disciplines.



7.4 Research

USEK will conduct research related to or focused on sustainability. The University will strive to become a major research centre, in Lebanon and the Middle East, of sustainable technologies and advancements. The contributions of the research launched by USEK will add a new touch on worldwide sustainability concepts. USEK faculty members will conduct research on sustainability topics through their respective fields. Research will be initiated in the different university departments to entitle students to engage more with sustainability-related research linked to their own curriculums.





WE BELIEVE THAT PEOPLE WILL MAKE GOOD CHOICES FOR OUR PLANET'S HEALTH IF GIVEN THE CHANCE. WITH USEK GREEN FINGERPRINT, WE STRIVE TO MAKE THIS PROCESS EASY, AND BY WINNING THEM TO OUR CAUSE, WE WILL BE ABLE TO PLAY A BETTER PART TOWARDS A GREENER ENVIRONMENT. GREEN FINGERPRINT IS AN EFFORT TO EXPAND THE SUSTAINABLE PLAN USEK IS FOLLOWING BEYOND THE GATES OF ITS CAMPUS, BY ENABLING LEBANESE CITIZENS AND THE BROADER REGIONAL COMMUNITY TO TAKE RESPONSIBLE STEPS AS WELL.

Objective:

We believe that it is easier and more effective to help many people make small changes than to convince a few to completely change their way of life. Being an academic institution with a mission to spread education, research and social awareness, USEK can be a powerful agent for change. Our objective is to involve the widest spectrum of Lebanese and regional figures, from businessmen to politicians, teachers to students, artists to holy men and women, and many others, to take part in our pioneering environmental project.

How will we accomplish this?

USEK will seek to motivate the entire Lebanese and regional community to pursue green sustainable practices. With USEK Green Fingerprint, the University will dedicate annual special awards for all contributors to the environment who are compliant with the criteria preset by USEK. The awards, Gold, Silver and Bronze, will be bestowed based on their level of commitment to the climate cause and their achievements.



How will we operate?

A special USEK committee will be formed of faculty specialists, experts, staff, and students. They will be responsible for:

1. Setting an assessment plan based on national and international environmental laws and sustainability criteria
2. Helping participants implement it
3. Evaluating and deciding on the participant's eligibility for the "USEK Green Fingerprint" award.

What to expect from friends receiving the "USEK Green Fingerprint" award?

- A friend contributing to the Sustainable Carbon Neutral USEK: Individuals and organizations that support USEK in accomplishing its project towards a Sustainable Carbon Neutral university through all types of donations, expertise and contact sharing, etc...
- A friend implicated in the cause: Individuals and organizations that work on promoting the environmental cause through activities, events, in direct link with USEK's community. Examples of such activities might be conferences, symposiums, environmental activities (clean-up campaigns, reforestation, etc...)
- A friend creating sustainability awareness and promoting environmental responsibility in their enterprise: Individuals and organizations that promote and mediate, with the collaboration of USEK, information about sustainability and how employees and customers can share the responsibility in preserving the environment.
- A friend that is environmentally friendly and socially responsible: Where institutions, organizations, and individuals apply the best environmental operational practices and are compliant with USEK's preset criteria (i.e material used, recycling, activities and other). In addition, products are to be classified according to their release of GHG across the life cycle. Factors such as raw materials extractions, processes adopted, manufacturing manners, transportation means used, and disposal methods of products will be critical in USEK's new evaluation and purchase plans.

Why are we different?

The Lebanese-grown USEK Green Fingerprint project will be established as a national and regional pioneer environmental endeavor. The project will bring together various societal elements and participate in long-term environmental activities, giving back Lebanon its leading cultural and environmental role in the Middle East and North Africa (MENA).



GOING SUSTAINABLE: A CRASH COURSE

Below we have included some of the most common terms used today in discussions about the environment.

Sustainability:

Sustainability means meeting the needs of the present without compromising the ability of future generations to meet their own needs. An example of a sustainable resource would be a continuously maintained forest where mature trees are harvested and new trees are replanted to filter pollutants and provide continued resources and products for future generations.

Carbon Neutral (Carbon Neutrality):

When a fossil fuel is burned, CO2 trapped (or, as scientists call it «fixed») by the ancient plants is released and added to the CO2 currently in the atmosphere. Humans have added a huge amount of «new» CO2 to Earth's atmosphere by aggressively burning fossil fuels over the past 150 years. This CO2 is now widely understood to be the cause of global warming.

Carbon Neutrality is the goal of achieving zero net release of carbon emissions, whether you are a business, organization, activity, event or household. This is usually achieved by calculating your total carbon emissions, reducing them where possible, and balancing your remaining emissions with the purchase of carbon offsets.

Green Building

Term that refers to designing and building structures that are environmentally sound and follow the tenets of sustainability. Such buildings consume less energy, are durable and can be recycled. During all phases, the building saves resources and places fewer burdens on the environment, protects workers and minimizes health exposures.

LEED®:

Leadership in Energy and Environmental Design (LEED) is a voluntary, consensus-based standard in the US to develop high-performance, sustainable buildings. Members of the U.S. Green Building Council representing all segments of the building industry developed LEED and continue to contribute to its evolution. LEED provides a complete framework for assessing building performance and meeting sustainability goals.

Greenhouse Gases (GHG)

These are gases that are a natural part of the atmosphere. They absorb and re-radiate the sun's warmth, and maintain the Earth's surface temperature at a level necessary to support life. Human actions - particularly burning fossil fuels, agriculture and land clearing - are increasing the concentrations of the gases that trap heat within the atmosphere. This is the enhanced greenhouse effect, which is contributing to a warming of the Earth's surface.

The Kyoto Protocol lists six major greenhouse gases, which vary in their relative warming effect. The six gases are: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), HFCs (hydrofluorocarbons), PFCs (perfluorocarbons) and sulphur hexafluoride (SF6).

Carbon Footprint

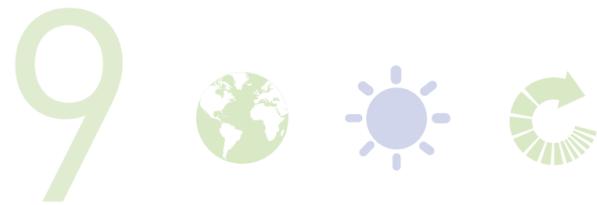
The total set of greenhouse gases (GHG) emissions caused by an organization, event or product. Usually a carbon footprint is calculated for the time period of a year.

Xeric Landscaping - Xeriscaping

Landscaping designed specifically for areas that are susceptible to water shortage, or for properties where water conservation is practiced. Derived from the Greek "xeros" meaning "dry", the term xeriscape means literally "dry landscape."

Hybrid Vehicle

Vehicles that use two or more distinct power sources to move the vehicle. A hybrid petrol-electric vehicle uses conventional petrol fuel, but is more economical because it uses a smaller engine and converts some of its energy to electric power for acceleration.



Standards and codes used:

- GHG Protocols
- LEED gold standards
- Energy Star certified products
- ASHRAE Standards
- U.S. EPA Act - the Energy Policy
- U.S. EPA Clean Air
- IPC - International Plumbing Code
- IPMVP International Performance Measurement and Verification Protocol
- ASTM Standards
- ISO 140211999-
- SMACNA Standards
- GREEN SEAL Standards
- CRI - the Carpet and Rug Institute Green Label plus testing program
- FloorScore Program

REFERENCES:

- * The Greenhouse Gas Protocol - World Business Council for Sustainable Development and World Resources Institute
- * Clean Air-Cool Planet - Campus Carbon Calculator - USER's Guide
- * Cool Campus! - A How To Guide for College and University Climate Action Planning
- * Guidebook on How to Develop a Sustainable Energy Action Plan (SEAP)
- * Arizona State University - carbon neutrality action plan
- * University of Delaware Carbon Footprint - Inventory
- * Carbon Neutral - Sense and Sensibility - The University of Sydney
- * Carbon Neutral Assessment Project - University of Florida Office of Sustainability
- * Baseline Emission Inventory and Sustainable Energy Action Plan - Covenant of Mayors
- * STARS 1.0 Early Release Technical Manual
- * Graphs Designed using Vensim 5.9e





المخطط العام الحالي لجامعة الروح القدس - الكسليك

USEK existing general plan



المخطط الرئيسي المستقبلي لجامعة مستدامة وحيادية الكربون

Sustainable Carbon Neutral University Future Master Plan





منظر عام للجامعة والحديقة البيئية الجديدة

General view of the University and its new Eco-Garden



المنظر من الحديقة البيئية وتبدو فيه الألواح الضوئية على الجمة اليمنى

View from the Eco-Garden with photovoltaic panels on the right side





المجمّع الرياضي الجديد ومبنى فرنسوا باسيل الطبي على الجهة اليمنى

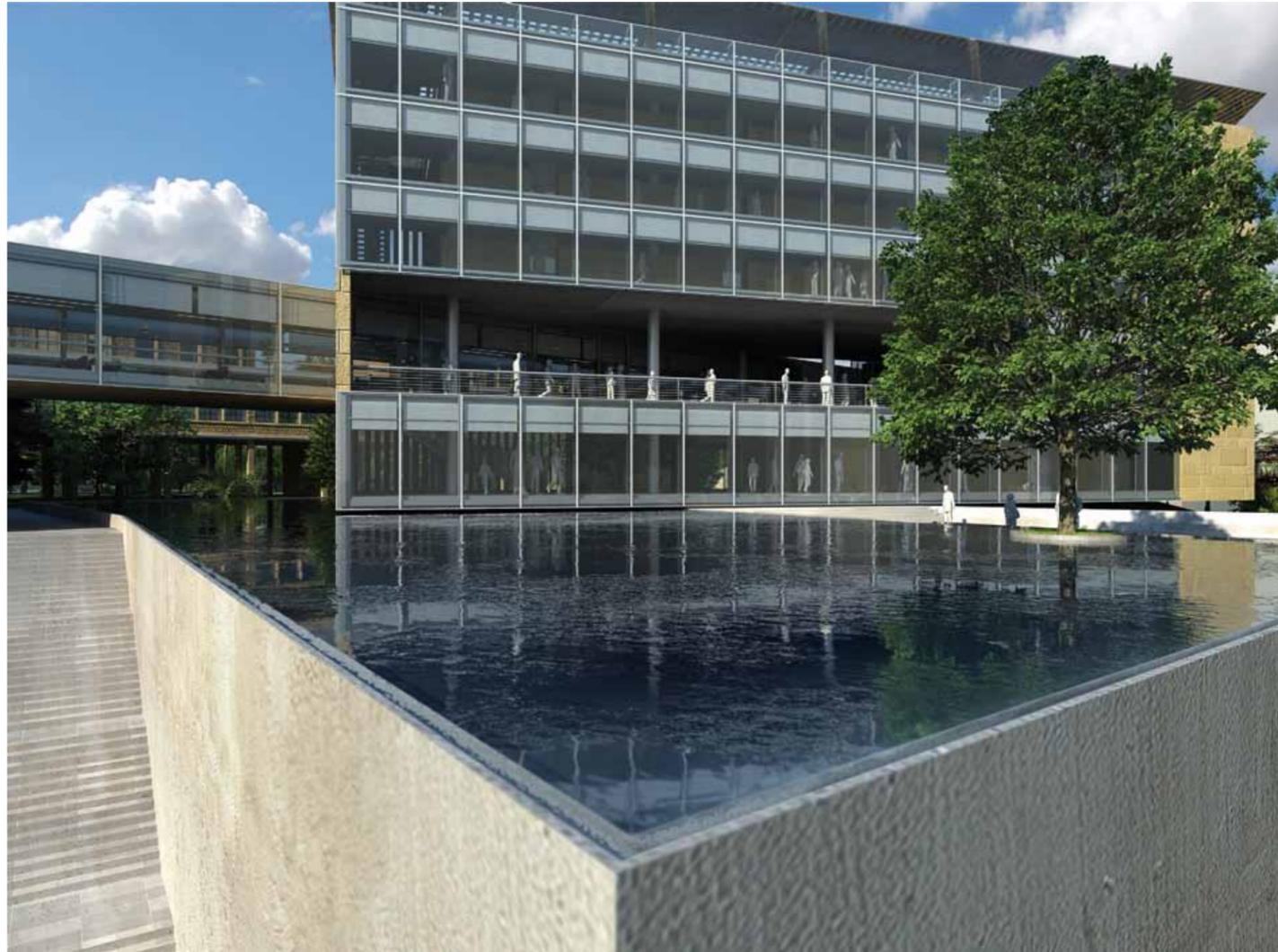
View of the new Sport Complex and the François Bassil Medical Building on the right side



منظر لداخل المجمّع الرياضي الجديد

Indoor view of the new Sport Complex





مينى فرنسوا باسيل الطبي ومنشآت تخزين المياه لري الحدائق

François Bassil Medical Building and water storage facility for landscape irrigation



ترام كهربائي داخل حرم جامعة الروح القدس - الكسليك

Electrical Tramway inside the USEK Campus



مدخل الجامعة

Entrance view of the University



مبنى فرنسوا باسيل الطبي وقاعة الطلاب

François Bassil Medical Building view and Student Lounge

