Green Innovation and Entrepreneurship
Helmy Abouleish

- **Managing Director of the SEKEM initiative** that works for sustainable development in Egypt since 1977
- Under his stewardship, the SEKEM Initiative received the “**Right Livelihood Award 2003**”
- Member of the **Schwab Foundation for Outstanding Social Entrepreneurs** since 2004
- **Founder and co-founder of various organizations including**: The Egyptian National Competitiveness Council (ENCC), the International Association for Partnership (IAP), the Egyptian Biodynamic Association (EBDA), the Centre for Organic Agriculture in Egypt (COAE), SEKEM Development Foundation (SDF).
- Helmy Abouleish is a passionate advocate of **sustainable agriculture and sustainable development**.
Rasha El-Kholy

• Prof. Dr. Rasha El-Kholy has 19 years experience working in the field of water resources management and environmental protection. She has managed many foreign funded research projects as well as national programs in the field of water Engineering.

• Rasha Elkholy is currently the Dean of faculty of Engineering at Heliopolis University for Sustainable Development. She has more than 10 years experience developing specialized post graduate training programs and under graduate academic curricula as well as supervising M.Sc. Students.

• She also serves as a short term consultant for the United Nations - Food and Agriculture Organization (FAO) and highly involved with international organizations.

• Prof. El-Kholy has published several scientific research papers in international scientific journals in addition to some chapters in international books. She is an active member in many international associations annealing scientific research to serve humanity's well-being and protect the environment.
Maria Chiara Pastore

- Master Degree In Architecture
- PhD in Spatial Planning and Urban Development
- Post Doctoral Fellow in Urban Governance in Sub Saharan African Countries
- Adjunct Professor at Politecnico di Milano
- Project Manager of TEMPUS GIEP European Project
Lorenzo Mattarolo

- He graduated in **mechanical engineering** at Università degli Studi di Padova.
- He first focused his works on **energy efficiency in the built environment**, in an Italian consulting company and at the Technical University of Denmark.
- In 2008 he started working in the **R&D direction of an Italian energy utility**. He dealt with energy efficiency measures in the industrial and tertiary sectors.
- Since 2012 he has been working at Politecnico di Milano as **program manager for UNESCO Chair in Energy for Sustainable Development**, dealing with projects related to access to energy, sustainable development and international cooperation.
- Currently he is focusing his activity on **M&E models for energy cooperation projects**.
Hani Sewilam

- Professor of Sustainable Development and Water Resources Management
- Director of the UNESCO Chair for Climate Change and Water Resources Management
- Academic Director of the Engineering Hydrology at the RWTH Aachen University in Germany
- Coordinator for the Capacity Building Initiative of the United Nations Water
- Researcher at the National Water Research Center in Egypt
- Advisor and Member of the Board of several Universities and International Organizations
GDP Growth in Egypt

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
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</thead>
<tbody>
<tr>
<td>GDP</td>
<td>3.5%</td>
<td>3.2%</td>
<td>3.2%</td>
<td>4.1%</td>
<td>4.5%</td>
<td>6.8%</td>
<td>7.1%</td>
<td>7.2%</td>
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</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>4.7%</td>
<td>5.1%</td>
<td>1.8%</td>
<td>1.5%</td>
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</table>

GDP is calculated as the value of the total final output of all goods and services produced in a single year within a country’s boundaries.
Over 16 million urban inhabitants live in informal and squatter settlements. (World Bank 2008)
There is acute water scarcity whereby per capita water share is expected to decline from a current level of 900m³ to about 670m³ in 2017.
the lack of connection to the sewerage system remains a serious threat with less than 5 per cent of households connected in rural areas.
Egypt is facing a crucial energy problem. **Natural gas consumption nearly doubled over the last decades** and reached 1.6 trillion cubic feet in 2010. Total **petroleum consumption has risen by about one-third** over the same time period.
Education
Between 1976 and 1994, the country **lost an average of 8000 ha of agricultural land** yearly to urbanization into the desert.
An average of **15.3 million tons** of municipal solid waste is generated each year, out of which almost **2.5 million tons remain uncollected** and lack appropriate sanitary landfills for their final disposal.
the average speed on public roads will drop from actually (2008) **19 Km/h to 11.6 Km/h** by 2022. In addition, **10,000 -25,000 yearly deaths** in Cairo due to air-pollution by the transport sector and contribution of transport sector to 28% of total energy use and 25% of all energy-based CO2 emissions highlights the transport challenge in Egypt.
The unemployment rate in Egypt was last reported at 12.6 percent in the second quarter of 2012.
The analysis of the future trends in GHG emissions in Egypt indicate that they may triple by 2017, compared to 1990 levels.
Poverty

54% of the total of Egypt’s rural poor and about 42% of the total poor population at the level of the Republic.
Green Innovation and Entrepreneurship-
Towards a Sustainable Future of Egypt

Biovision Alexandria Conference 2014
Tuesday, 8th April, 2014

Helmy Abouleish
CEO– SEKEM Group
SEKEM – A Model for Sustainable Development/Entrepreneurship

Goals:

- Biodynamic Agriculture: The development of biodynamic agricultural methods suitable for Egypt’s climate, and agricultural conditions.
- The development of a local organic market.
- FairTrade: All products should be produced in a social manner based on cooperation, association and brotherhood.
- Corporate Social Responsibility.
- Human Development: All employees should have continuous access to development, education and training to achieve self-realization.
- Investment in R&D and innovation.
- Spreading the Sekem idea all over Egypt.
Transforming the Desert – 36 Years of SEKEM

The first SEKEM building in 1979

The same building in 2009

A SEKEM field in 1987

The same field in 2009
Sustainable Value Creation

- 36 years sustainable agriculture at SEKEM
  - 20,000 feddan (including suppliers)
  - 2,000 jobs
  - 400 small-holder farmers
  - Over 1 million tons CO2e sequestrated
  - 20-40% water savings
  - Continuous yield increase
  - Continuous decrease of inputs
TEMPUS – GIEP project

Green Innovation in Egypt: Compost
Green innovation in Egypt: Irrigation technologies

Improved Irrigation Efficiency through Subsurface and Hydrip Irrigation
Green Innovation in Egypt: Treatment with Effective Microorganisms for re-usage for timber production and for gardens
SEKEM – a Learning, Living Community

- About 2,000 employees in SEKEM Group and Foundation
- Safe workplaces, respect for the dignity of every employee
- Women empowerment and religious tolerance
SEKEM – Developing Human Potential

- Kindergarten and school
- Medical centre
- Vocational training
- Community school
- Children with special needs
- Adult education
- Heliopolis Academy for research and training
- Heliopolis University for Sustainable Development

Tempus
Why a MSc like Green Innovation and Entrepreneurship Programme?

- Egypt lacks social innovators and entrepreneurs
- The current generation of Egyptian university graduates is not equipped to deal with problems at hand
- Link between Universities and Business

- GIEP seeks to produce a new generation of social entrepreneurs who can positively contribute to the sustainable development of Egypt
Thank you very much for your attention!

www.sekem.com
Helmy Abouleish
SEKEM Group
P.O. Box 2834 El Horreya
Cairo, Egypt
helmy.abouleish@sekem.com
Green Innovation and Entrepreneurship Programme – Towards a sustainable Future

Biovision Alexandria Conference 2014
Tuesday, 8th April, 2014

Rasha Elkholy
Dean, Faculty of Engineering – Heliopolis University

Khaled El-Saadany
Executive Manager, Grants, Innovation & Technology Transfer Center- Alexandria University
University & Industry!! Why to link?

- Universities must shift from teaching-based entities to research-based universities to play a more active role in Knowledge-based businesses and economy in Egypt.
- Universities should implement up-to-date knowledge, develop new technologies and bring innovative ideas to the table.
- Universities must listen to the needs of corporates in a long-term process to drive projects, research, training programs, product development, job creation and overall economic impact.
- Universities need to understand the university-industry alliances and academic entrepreneurship to create a culture of enterprise and open innovation.
Triple Helix Model
GEIP – Market Needs Analysis

<table>
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<tr>
<th>Institution</th>
<th>Alexandria University</th>
<th>AUC</th>
<th>Zagazig University</th>
<th>Aswan University</th>
<th>HU</th>
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</thead>
<tbody>
<tr>
<td>Students</td>
<td>29</td>
<td>29</td>
<td>30</td>
<td>19</td>
<td>29</td>
</tr>
<tr>
<td>Companies/Organizations</td>
<td>10</td>
<td>1</td>
<td>10</td>
<td>0</td>
<td>6 + 4</td>
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</tbody>
</table>

Assessing:

A. Challenges

B. Skills and needs

C. Communication & collaboration
GEIP – Market Needs Assessment

Challenges

Link to industry and collaboration

Graduates’ skills for innovation
To graduate the right people for the real needs

• Universities should graduate people with the following skills: entrepreneurial skills, capability to start-up business, problem-solving skills, etc.

• Higher Education Institutions have to move to Entrepreneurial University concept

• Recognize the community & industry needs

• Integrate the Innovation and Entrepreneurship in Education system.
Approach

• The new Master program “Green Innovation & Entrepreneurship” will be started next Sept. 2014 as joint degree with 4 sub-tracks:
  ▫ Green Technologies
  ▫ Sustainable Cities
  ▫ Green Innovation management & Entrepreneurship
  ▫ Sustainable Communities

• Establishment of Career Development Centre (CDC) to develop and build the students & graduates skills
Green Energy for Green Companies

- To contribute to the pollution emissions decreasing by adopting the renewable energy as main power source, particularly at the farm level.
- Spreading the RES plants use and ensuring the energy self-sufficiency at farms level & strengthening SMEs innovation capacities.
- Mapping of local farms and standardization of crop production defined
- RE systems implemented; define the size of the farm, and the technology among those most commonly used in the field of agro-industry:
  - Solar photovoltaic plants integrated on structures and existing buildings
  - Tri-cogeneration plants biomass
  - Small wind turbine plants
Capacity Building in RE sector

- **RES training workshops**: Promoting knowledge and awareness about green energy and energy saving, opportunities of RES implementation, the most advanced technology available in the market.

- **“Green Energy Promoter” training courses**: To spread the know-how in the field of green energy helping companies to choose a green agricultural system and leading them in the path to RES implementation offering its technical and administrative support.

- Develop a **data collecting system** of local SMEs include administrative (company type, turnover, internal staff,..), territorial (RES availability, developing energy supply opportunities according to local SMEs peculiarities) and energy data (energy needs, technologies adopted, energy resources used, land availability for plants implementation), plus quantified data about waste production and an overview to the long term SMEs development opportunities.
Sustainable old towns

- Identifying, exchanging, testing and sharing feasible waste management models in old towns
- Develop policy guidelines for the waste management

Expected result

- Improved waste management policies & strategies through the integration of practices, tools and policies
- Improve attitude of population towards the waste management from the environmental, social perspectives
- Reinforced overall environmental protection at Med. Countries by engaging many old towns in the use of feasible pattern for waste collection
Waste Water Treatment and Reuse

The aim of the WWTR project is to introduce unconventional water resource from a locally assembled treatment unit treating from 15 m$^3$/day of water to reach 90 m$^3$/day. The effluent is reused for irrigating unproductive trees and extending the greenery around the campus (4 feddans) without negatively impacting the ground water by infiltration.
The aim of the **Photovoltaic** project is to stimulate the photovoltaic market in Egypt by using demand-oriented systems and anchor application-oriented knowledge about the solar technology in the education sector and in the private sector of the country sustainably.

**Deutsche Entwicklungsgesellschaft (DEG)**

- Installation of 5 kWp demo plant with different types of modules and integration of local materials for mounting structure
- Establishment of PV lab at Heliopolis University
- Integration of PV practecalities into existing curricula of HU
- Development of business model for Egyptian PV market
• Project proved improvement in the physical-chemical properties of soil.
• Total water saving and reduction of weeds leading to high profit.
Agro Photo Voltaic-system combined with Reversed Osmosis-water pumping and purification technology based on a hybrid system

Solar water pumping for irrigation purposes in the small marginalized villages
Politecnico di Milano is a Public State University founded in 1863 thanks to a strong cooperation with the local industrial setting in Milano.

- **Engineering** (since 1863) - 19% of engineers, 22787 students
- **Architecture** (since 1865) - 29% of architects, 9692 students
- **Industrial Design** (since 2000) - 78% of designers, 4159 students
New directions

The global context becomes increasingly multi-disciplinary and multi-ethnic. Social challenges are increasingly complex. Specific knowledge and skills are needed and a systemic vision is now mandatory. Attention and relevance need to be given to:

1. Innovating teaching activities and learning outcomes
2. Scientific research for development and innovation
3. Partnerships for capacity building and joint project (north-north, north-south)
4. Responsibility and ethics

Innovation

• a key driver for enabling growth potentially resulting in development
• the creative attitude towards new business models able to fit different frameworks and policies
Polihub – Startup District & Incubator

Polihub is the startup district and incubator run by Politecnico di Milano. It is an ideal place for getting the most out of ideas and turn them into a genuine company. The opportunities are vast, encompassing hi-tech, design, gaming, social networks, mechanics and computer security, medical device and energy.

It is for developers, makers, designers, managers and experts in sectors characterized by technological innovation (electronics, mechanics, energy, medical device, robotics, telecommunication). It is aimed at entrepreneurs seeking to grow their business in a district, through new ideas and products and services in the process of being developed.

PoliHub provides:
- Network
- Empowerment programme
- Services
  (administrative, legal, communication and press office, ICT consulting, assistance in finding funding)
- Venture capital
- Advisors
Entrepreneurship and Innovation at Politecnico di Milano

Polihub – Startup District & Incubator

- Founded in 2000
- Over 5000 ideas collected
- 83% of startups active in business and 59% of startups are still operating 12 years on
- 5 major acquisitions international and national acquisitions
- Over 300 ideas supported in the startup phase
- Average age of our entrepreneurs: 32 years
- 9° among the best incubators in Europe
- Over 100 highly innovative startups incubated since 2000
- 50 companies incubated in 2014

Target Markets

- Information Technology: 35%
- Electronics: 15%
- Management: 12%
- Industrial Design: 4%
- Electronics: 15%
- Management: 12%
- Industrial Design: 4%
- Biomedics: 13%
- Mathematics: 1%
- Aeronautics: 3%
- Mechanics: 5%
- Telecom: 7%
Polihub – Some success stories

TRE: Tele-Rilevamento Europa (www.treuropea.com)
Founded in 2000 as the first Spin-Off of Politecnico di Milano
Market: satellite radar analysis for land subsidence
Two headquarters in Italy and Canada with leading a global market.

NEPTUNY (www.moviri.com)
Founded in 2001 in the AI, opened the Inc. in Bay Area some years later.
Market: hardware and software optimization in data-center.
Trade-sale operation in 2010 by BMC Software in US.
MOVIRI is the Consulting Company supporting Neptuny technology acquired by BMC.

FLUIDMESH (www.fluidmesh.com)
Founded in 2005 with two head quarter: one in Milan and one in Boston.
Market: wireless mesh network for critical applications in security and industrial systems
**Polihub – Some success stories**

**RESTECH (www.restech.com)**
Professional and domestic diagnostic system for the full evaluation of the respiratory function.
Markets: hospital, clinics, professional and domestic.

**XG LAB (www.xglab.it)**
High-performance electronics and instrumentation for X-ray and Gamma-ray applications.
Markets: all vertical markets adopting X- and Gamma-ray diagnostics.

**EMPATICA (www.empatica.com)**
Wearable sensors tracking personal emotions and health parameters
Market: personal medicine, consumer-electronics and video-games

**PLOONGE (www.ploonge.com)**
Social Ticketing Network
Small-Medium Size Events

**JUSP (www.jusp.com)**
Mobile POS
Market: mobile payments

**JOB YOUR LIFE (www.jobyourlife.com)**
Personalized job-seeking web-system
Market: job-hunting and HR

**GINKGO (www.ginkgoumbrella.com)**
Ultra resistant and 100% recyclables umbrellas fully personalized.
Market: Consumer products, both B2B and B2C
Cooperation between departments and private sector

Research activity
Oriented towards innovative solution, by improving methodologies and assessing most appropriate technologies for specific contexts

Advisory
To improve the effectiveness and sustainability of projects
Innovation in education for Sustainable Development

New competences and new attitude to social responsibility and global concerns

The Alta Scuola Politecnica (ASP)
The mission of ASP is to provide high-profile graduates combining in-depth (vertical) disciplinary knowledge from their MSc program with interdisciplinary (horizontal) skills that are needed to work and contribute leadership in a truly multidisciplinary environment and to pursue complex innovation projects.

Energy for Development - new track in MSc in Energy Engineering
The track has the goal to prepare a professional figure with a broad knowledge in technical and scientific fields, including the development of technologies and the energy analyses of different scenarios in different areas, aiming at promoting local sustainability and socio-economic growth. Students acquire and enforce skills, competence and knowledge, in line with the globalization and the complex interrelations that the challenge for sustainability requires.
Green Innovation and Entrepreneurship Programme
The GIEP consortium

Tempus programme is a European Union programme which supports the modernization of higher education in the Partner Countries of Eastern Europe, Central Asia, the Western Balkans and the Mediterranean region, through university cooperation projects.

Egyptian Partners
Ministry of Higher Education
The American University in Cairo
Alexandria University
Aswan University
Heliopolis University
Zagazig University
Sekem Development Foundation
Soil and More - Egypt

European Partners
RTWH
TUGraz
Fondazione Politecnico di Milano
Politecnico di Milano
General Objective

to make **Sustainable Development and Green Economy** the new entrepreneurial frontier and hot business in Egypt. The project aims to develop a **double MSc program on “Green Innovation and Entrepreneurship - GIEP”** in order to create a whole new generation of business and social entrepreneurs.

Specific objective

1. Developing a joint/double **MSc program GIEP**.
2. Introducing **green technologies** and labs.
3. Developing the **capacities** of the EG academic members.
4. Developing a **Web-based online Learning Management System**.
5. Pilot **implementation of GIEP** and EG&EU **accreditation**.
www.giep.eu