Al-Qurna

Governorate of Luxor

Study Report

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1. Introduction

Al-Qurna is one of CES-MED action areas in Luxor Governorate. The purpose of the CES-MED project is to focus on enhancing the ecological qualities and sustainable energy related aspects of the studied areas. This, however, cannot be realised unless a comprehensive approach is adopted, taking on board all activities conducted and promoted by different stakeholders: the local community, investors and developers, and the government and its official organisations, as well as the international entities.

Al-Qurna was defined and selected by H.E. the Governor of Luxor for its importance. The world heritage sites, within and surrounding Al-Qurna, were the reason why Luxor was declared as a World Heritage City. The rural-urban nature interwoven with archaeological sites along the West Bank of the Nile River in Luxor demands special and careful study of heritage as the main component of any proposed development strategy.

The purpose of the present report, therefore, is to conduct an indicative investigation to explore Al-Qurna and its immediate environ to propose actions that are part of the Sustainable Energy Climate Action Plan (SECAP). Such actions are developed to confront energy and sustainable energy related, urban, rural and World heritage site management problems.

2. The Context

It is essential to have a comprehensive view while studying Al-Qurna due to the diversity of its components. As a rural-urban phenomenon predominantly envisaged as a heritage treasure by the government since the 19th century (the most important necropolis in the World), it is a sophisticated context. It is essential to define its geographical characteristics starting from defining its location within its wider environ, including the contents of the West Bank of Luxor city, as well as its inhabitants, local community and other different stakeholders and their activities. Most important as well are the legislative acts controlling and organising such activities, the developments within such a context. Another important element is to define any existing management plans, wither an urban management strategy or an historical or heritage site management one, if any. Finally, we will exhibit the current condition focusing on the imbalanced situation, current status with its problems.

2.1. Geography & Location and Importance (Al-Qurna as an action area):

- Location: West Bank of the River Nile, Governorate of Luxor, Egypt

  Green belt of vegetation of agricultural lands counting on the sedimentation along the river Nile bank and a chain of mountains, where the valleys of queens' tombs and kings' tombs, some of the most valuable heritage sites in the world, the most famous necropolis, where both the green belt and the mountain flank a valley where Habo city and other heritage sites and rural and urban settlements are located.
- Activities: Agriculture, tourism, sailing, and small crafts (Alabaster)
- Accessibility:

- ✓ By road: New Luxor Bridge.[1]
- ✓ Across the Nile: Felucca, Passenger ferry boat (local ferry), and private motor boat.

Image 1: Location of Al-Qurna in the west bank of the Governorate of Luxor
Image source: Googlemaps

Image 2: Natural barriers surrounding Al-Qurna

Image source: Googlemaps

a. Agriculture

b. Tourism

c. Sailing

d. Alabaster factory
Source:http://www.apersonalguide.co.uk /egypt/visit/pics/Alabaster-outside.jpg

Image 3: Activities in AlQurna

2.2. Institutional and Legal framework

- A Presidential decree was issued by the late President Sadat in 1980, supported by a UNESCO declaration in 1979 considering Al-Qurna and the whole West Bank area as a World heritage site. That is the whole area, administratively, became under the responsibility of the Supreme Council of Antiquity (SCA), the Ministry of Antiquities.

  The non-archaeological sites, predominantly all the agricultural green belt along the Nile River and the urban zones outside the walled-up premises of the archaeological sites and all their demands and municipal problems are the responsibility of the governorate and the concerned locality.

[1] Inaugurated in 1998 since it was introduced the West Bank has witnessed an unprecedented pace of urban development mostly uncontrolled and illegal, encroachments on agricultural lands.

(1) Heritage Sites
(2) Agriculture Lands
(2/3) Mixed urban & agriculture spots
(3) Urban spots

Urban and agriculture zone pressures

Heritage Site pressures

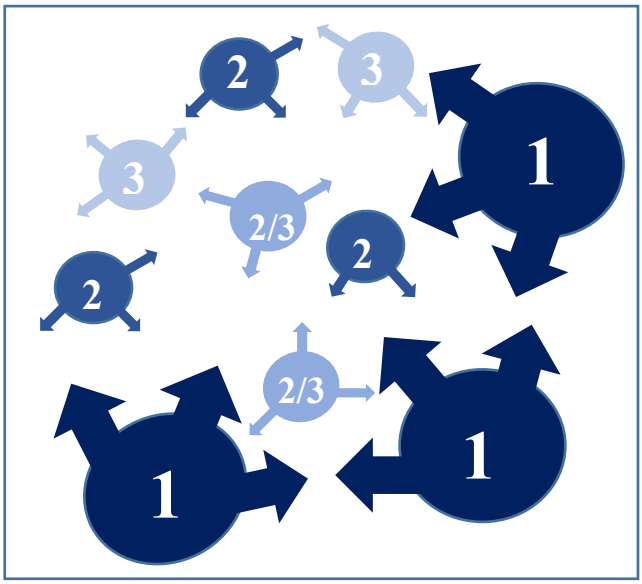


Figure 1: Conflicting /unbalanced relations among heritage, agricultural and urban zones in the west bank of Luxor.

- Article 29 of the Egyptian Constitution criminalise violations on the agricultural areas, yet it has not proven any efficiency.

  "The State shall protect and expand agricultural land, and shall criminalise encroachments thereon. It shall develop rural areas; raise the standard of living of their population and protect them from environmental risks; and shall strive to on develop agricultural and animal production and encourage industries based thereon.[2] "

  PS. Law enforcement is not efficient for there are no other alternatives to provide for necessary lands for development due to the growing demand in Al-Qurna for housing.

  Yet, based on research, there is no exact law relevant to sustainable urban growth and sprawl.

2.3. Existing Urban & Rural Development Strategy (UDS) and Historical Site Management plan (HSM), indicating main dimensions of the current status.

- UDS: based on conducted interviews with the concerned municipal staff, there isn't a comprehensive strategy that control urban development in the West Bank.
- HSM: based on communications and an interview, during WS I, with Dr. Mustafa Waziri, Gr. Director of Antiquities in Luxor Governorate, there is no HSM plan.

There are no relevant strategies or plans regarding heritage management and sustainable urban development included in the governorate of Luxor's recently realised vision and strategy issued in March 2017[3].

Based on aforementioned sections – 2.2 and 2.3, there are two major entities in charge of Al-Qurna and the West Bank, Supreme Council of Antiquities (SCA), Ministry of Antiquities and the

[2] Constitution of the Arab Republic of Egypt, 2014
[3] https://luxorpost.com/الإستراتيجي-المخطط-تفاصيل-ننشر-انفراد/

Governorate of Luxor, yet, without coordination nor actual regularisation and effective control; i.e., Without UDS nor HSM.

2.4. Physical Problems:

Following are indicative problems shedding light on the unbalanced current condition.

- Congested uncontrolled urban expansion with degraded urban environment.
- Erosion of the agricultural green belt along the River Nile.
- No organised means of transportation, especially public means, giving room to very polluting unlicensed means such as individual motorcycles and toktok cars.
- Uncontrolled energy consumption in various sectors in residential and agriculture as well as in lighting heritage sites causing huge carbon and Greenhouse Gas (GHG) emissions negatively affecting the environment quality, especially while using fossil-fuel based generators.
- Unplanned tourist transportation movement among monuments with no proper parking areas, producing emissions and vibration, together with pollution caused by the above factors, endanger the historical monuments
- Unplanned solid waste management, especially agricultural waste causing visual and air pollution in different parts of the West Bank.

a. Building activities close to monuments b. Visual Pollution

Image 4: Physical problems

3. Problems and Problem Indication

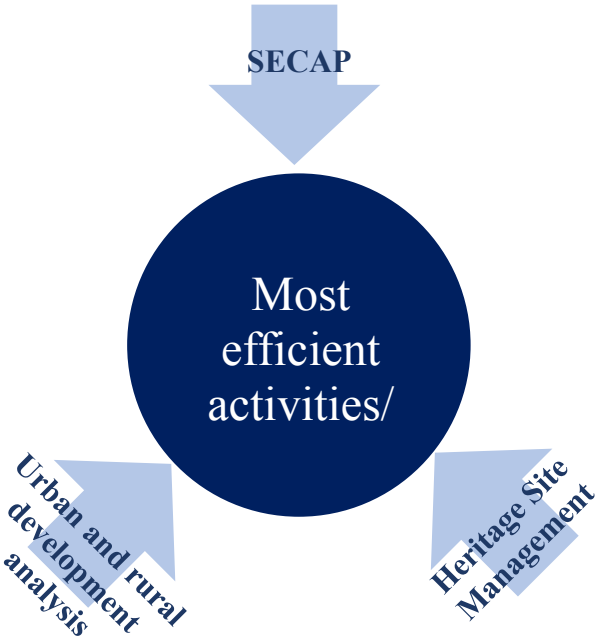
Figure 1 represents conflict/ pressure contributing to the unbalanced UD and other activities, mainly agricultural development vs. heritage sites, which is the chronic cause responsible for the current situation. Such an unbalanced situation should rather be smoothed. Instead of cantonised archaeological, urban and agricultural spots, Al-Qurna's different characteristic components (urban, agricultural and archaeological and heritage sites) should be harmonised and in balance (Figure 2).

To realise the above thought harmonised state, it is essential to pinpoint the hazards and risks applying the above-mentioned SECAP sectorial analysis.

However, as explored in the previous section – 2.4, a wider exploratory investigation is needed taking on board the strategic urban development (SUD) analysis as well as heritage site management (HSM) analysis. These three types of analyses should be integrated together for a more profound investigation to define the most efficient interventions and actions to mitigate the current status.

Figure 2: Towards a well-balanced environment in the West Bank of Luxor

Figure 3 shows the adopted three types of analyses: SECAP, SUD and HSM to overlap and define the core, prioritised interventions. Consequently, the following will be conducted in the following section:



SECAP: problems are traced and defined as per the SECAP given sectors. Main stakeholders and their activities are defined.

Strategic Urban Development (SUD): further study is conducted to define cross impacts, focusing on conflicts among sectors causing the above notified imbalanced planning and inefficient urban management responsible for the current status.

Heritage Site Management (HSM): special emphases are given to the heritage sites though conducting hazards/ risks analysis on monuments and archaeological sites.

The outcomes of the above three types of analyses shall be integrated, overlapped to define most pressing and common influencing problems responsible for the current status. Consequently, short, mid. and long term actions can be defined to confront them.

4. Hazards & Risks Analyses

4.1 SECAP sectors analysis.

- Urban and building (including agricultural activities):

  Urban expansion grows to introduce further activities that increase carbon emissions. Due to unplanned expansions, there is no land use strategy causing encroachment violation against agricultural lands. This increase level of carbon emissions due to its relatively higher rate in household activities compared to those in agricultural activities.

  Lacking any coordination or a common strategy that organise safeguarding heritage and archaeological site premises along the mountain, as well as the uncontrolled increased demand

for urban areas cause encroachments and violations against existing agricultural areas.

a. Unplanned expansions

b. Encroachments and violations against existing agricultural areas

Image 5: SECAP sectors - Urban and building problems

- Transportation:

  By road, Luxor Bridge, introduced without prior Environmental Impact Assessment (EIA) studies inviting unprecedented expansions and motor traffic to the West Bank. The increased housing in addition to development growth rate increased the demand for transportation. Lacking public means, individual fossil fuel based means increased. Motorcycles and toktok cars increased, increasing carbon emissions.

  The transportation routes available are from the Nile ferryboat stop up to the ticketing office along Memnoun street, along Memnoun Colossal and its surrounding archaeological sites. Nevertheless, the other villages surrounding the premises of the SCA and Habo temples and the other archaeological sites are deprived from regular public means of transportations. Hence, inhabitants of such villages, such as those surrounding Habo temples had to count on individual motorcycles, which contribute much to carbon emissions, as well as other means of pollution affecting also the archaeological monuments.

  Also, the west bank is rich with heritage sites and tourist visits, i.e., Valley of the Kings and Queens, Hatshepsut Temple, Memnon Colossi and its environment, and Habu Temples. All visiting tourists arrive in busses, microbuses or coasters with an average peak visits of 4000 vehicles (during the whole day before 2011). The problem lies with the awaiting vehicles outside heritage sites. The vibration and emissions (operating air conditioner) produced by the vehicles hold danger to the heritage sites and monuments.

a. New Luxor Bridge, with view to the urban sprawl

b. Unlicensed vehicles

Image 6: SECAP sectors - Transportation problems

- Electricity Problems

  The Kings Valley and the mountain and Hatshepsut temple is a working archaeological excavation gigantic size, one of the largest historical necropolis and the most important in the World. It hides tombs and treasures far much more beyond it reveals. Therefore, electric cables cannot be deeply buried, just 10 cm underneath the ground level, easily exposed and eroded. The long operation hours for cables, almost one hour or more before the sunset for using sodium and metalloid lamps that need long time to reach to their accepted tones.

  The main problem is in the redundant system to light the Kings Valley's tombs and the lower part of the mountain using two fossil fuel generators. The first is 160 kW and the second is 150 kW. These generators elicit much emissions and vibrations that are dangerous once operating in case of emergencies.

  There is no plan to manage electricity supply and design lighting on the mountain and the archaeological site causing great waste in consumed energy and visual pollution.

- Environment Problems:

  Increased uncontrolled, nor planned, urban and rural development alter land use and intensify the causes for carbon emissions, as well as increased cattle breading and inefficient agricultural waste collection increased the GHG emissions all affecting air quality as well as visual and all types of pollution.

a. Tons of agriculture waste collected and burned

b. Cattle: methane from manure and visual pollution

Image 7: SECAP sectors - Environmental problems

- Tourism and Heritage problem:

  Lacking clear strategy for urban development, many buildings for tourism activities have been introduced to the area consuming agricultural lands. Lacking coordination among Supreme Council of Antiquity in charge of the vast premises of the archaeological sites and the Governorate issuing urban development permits, many archaeological sites fall besieged by unplanned urban expansions. Pressure caused by limited available areas for both rural and urban development, as the mountain is a natural barrier to give an access to the desert, urban encroachments consume agricultural areas. Agricultural development, consequently started to expand besieging some monuments. Lacking any rural development plans some water consuming crops, such as sugar cane, are grown close to temples. Furthermore, there is no plan for irrigation techniques, decided by farmers who prefer immersing irrigation technique, sequencing the most lethal threat of increased water table.

a. Residential bldgs. opposite to Habo temple

b. Sugar cane grown close to the temple

Image 8 SECAP sectors: Tourism & Heritage problems

- Waste Problems

  Having no solid waste management plan, environmental and visual pollution exist. The agricultural waste especially for the most common type of crops, sugar cane, casting dull

shadows of smoke on the West Bank and the whole city of Luxor especially during the harvesting season, causing environmental and visual pollution.

Tons of agriculture waste

Image 9: SECAP sectors - Waste problems

4.2 Sustainable Urban Design analysis.

Context and Distinctive character

The studied zone's location and accessibility are elaborated in section 2. Its geographical character is best described as a valley flanked by the River Nile and the mountain, with a vast desert behind. The mountain contains some of the most important world heritage sites. Some archaeological activities and missions have been conducting their excavation for more than a century in the mountain and in some pockets in the valley. The rest of the valley used to exhibit Upper Egyptian rural environmental features, of mud architecture.

Image 10: Mud Architecture in AlQurna

Al-Qurna itself was a mountain village that was relocated in 1940s to a new Qurna village of mud architecture designed by the renowned architect Hassan Fathi.

Image 11: Al Qurna's Architecture

Since the turn of the 19th century, the area was regularly visited by individual and groups of cultural tourists, all contributing to the distinction of the present phenomenon, predominantly rural with archaeological and cultural tourism.

Urban Development

The previously common and predominantly rural character of the studied area punctuated by the monuments and temples, and bounded by the mountain has witnessed great challenge first under the pressure of tourism development without any strategy that would define the types and extent of development. The distinctive urban character eroded with time. The more environmentally compatible mud/ vernacular architecture was replaced by reinforced architecture. Given the absence of any urban and rural development strategy, the area witnessed alteration of the heights and the Floor Area Ratio (FAR).

The introduction of the by road, Luxor Bridge, unsupported by any EIA[4] studies, Luxor city urban developers influenced in the West Bank to challenge its predominant rural character, converting it into congested unplanned and informal urban settlements lacking any distinctive character, environmentally incomparable developments.

Image 12: Hassan Fathi's Architecture abandoned

[4] Misallocation of the by road with no planning strategy deprived the city from a more appropriate urban expansion in the desert behind the mountain.

Rural Development

The double pressure by the increased uncontrolled urban expansion and the uncoordinated vast premises designated for archeological sites, on the other hand both against agricultural areas, the rural development moved towards the mountain more and more expanding the agricultural areas close to the ancient temples, as around Habo and even surrounding some of them as the situation in Memnon Colossi site

Both urban and rural expansions casted great risks on the historical monuments and the archeological sites.

Image 13: Agriculture expansion behind Habo temple and Memnon Statues

Waterfront

The waterfront of the West Bank is the panoramic vista of the Eastern Bank of Luxor where most of the 5-star chain hotels are located. The distinctive vegetal rural character with the mountainous spectacular background is obscured by encroachments against the Nile River and the green belt along the river. Furthermore, the unstudied illumination of the mountains and the archeological sites contribute to the visual noise above risking the historical and aesthetics of such a most important World cultural heritage site.

Image 14: Part of the encroachment can be seen along the green belt on the waterfront

4.3 Heritage Sites Management analysis.

The rising subsoil water level is one of the most destructive elements threatening sites in Egypt today. It is caused by the effect of the constant abundant irrigation of agriculture, and other triggering factors, following the construction of the Aswan High Dam. This is combined in many cases with poor drainage systems. In the past, the seasonal flooding of the Nile meant that on the one hand many monuments in the Nile Valley were under water for much of the year but, on the other, were drained when the inundation season was over, so that the soil remained dry for the remainder of the year. There has been no indication that this was particularly damaging to the stone monuments, yet they are now suffering extensively from the rising level of subsoil water.

The result of this situation, in combination with the climatic extremes of the Nile Valley, is that all of Egypt's open air monuments are now suffering from salt crystallisation, which is causing the stone to crack and flake. The damage is caused by salt traveling with the water through capillary action within the stone and when the water evaporates on the surface the salt remains and crystallises. When moisture is added again, either through further capillary action or through dew, it breaks the surface of the stone. Dew and condensation on the stones during cold nights also dissolve the salts near the surface of the stone; when the dew evaporates during the day the salt crystals reform and cause crumbling and flaking.

Furthermore, the salts also affect the overall strength of the stone. The water in the Aswan High Dam has a high level of salt because of high evaporation, which has increased the salinity of the Nile. The evaporation at ground surface level leads to an accumulation of salt in the upper soil-strata, and, moreover, the sub-soil water itself also contains destructive impurities that seep into the monuments.

Among visible side effects, a difference in moisture concentration can clearly be seen in the discolorations on the walls and columns of the stone monuments.

Other major threats to the cultural heritage are intensive agriculture, uncontrolled urban development and poorly managed tourism. The problems with the expansion of agriculture are closely linked to those of the subsoil water, being one of the causes of its rising level. Another problem is that more and more land is reclaimed for cultivation. In a country like Egypt, so densely scattered with archaeological sites, this has resulted in the loss of a large number of unexplored sites, and their official or unofficial surrounding buffer zones.

Some crops (like sugar cane) or their residues (rice) are burned, and consequently produce unhealthy fumes which can have a damaging effect on the archaeological remains; others require the use of toxic chemicals which travel with the water into the capillaries of the stone.

Among the successful remedies to the problem of subsoil water are projects such as that at Karnak and in Cairo's Coptic historical district, in which pumps are employed to lower the underground water levels. However, this method is very expensive and thus would require a large amount of funding if all monuments were to be treated in this manner. Short-term and less costly solutions include the digging of trenches around the base of monuments to stop water from seeping into the stone, giving them a chance to dry, as well as applying silicon compounds to the stone to bind its molecules together.

The problems caused by urban development and tourism are in many places closely related. For example, in Luxor the constant stream of tourists has required the development of tourist facilities

such as hotels, restaurants and shops as well as an extended and improved infrastructure. As a result, Luxor temple is now completely surrounded by hotels, shops, restaurants and roads which are damaging the monument by polluting the air, causing vibrations and leaking sewage. There is no adequate buffer zone in place to protect the monument from these dangers.

The Population explosion within Egypt which has occurred over the last decade has led to a rapid development of urban and rural centers; archaeological land has had to be ceded for this purpose, bringing sites into danger. A related issue is the illegal building activity occurring on or around antiquities, which is further complicated by a lack of policy for rescue excavations or pre-construction explorations. The laws that currently exist are not properly enforced, and the policing system is ineffective at best.

Poor Restoration: In the past and unfortunately still today, many restorations were performed without adequate knowledge of the long-term effects generated by the use of inadequate materials. The result has been that what was meant to be a conservation measure has turned into a threat to monuments both structurally and visually. The lack of a coherent restoration policy is one of the causes, and the common use of uncertain methods another.

Torrential Rainfalls and Flashfloods: Torrential rains are becoming more and more frequent in certain areas of Egypt due to a changing climate and increased humidity. Resulting flashfloods and standing water are a great threat to mud-brick monuments, as floods of water rush down the mountains and into the valleys bringing with them masses of debris.

Wild Vegetation: Weeds resistant to burning, pulling, hoeing and to other methods of clearing are a general problem on archaeological sites in Egypt. These weeds adapt to extreme soil conditions, are found in all environments, and even tolerate shade; they are therefore extremely difficult to get rid of. Scientific tests have concluded that chemicals (herbicides) sprayed directly onto the weeds is the best method of control. The strong roots of the weeds penetrate mud brick buildings under and above ground causing cracks and sometimes the complete destructions of fragile walls. Weeds can also grow in small cracks in stone walls and in gaps between stones causing these to expand and eventually break and undermine the stability of the stone.

Fauna: Wild and domestic animals are numerous on many sites and can include rodents that tunnel through and under monuments, decreasing their structural strength. Dogs, sheep and cattle which can be found climbing over walls and inside tombs can also cause damage. Another common annoyance is bird and bat droppings found on many temple walls, floors and roofs.

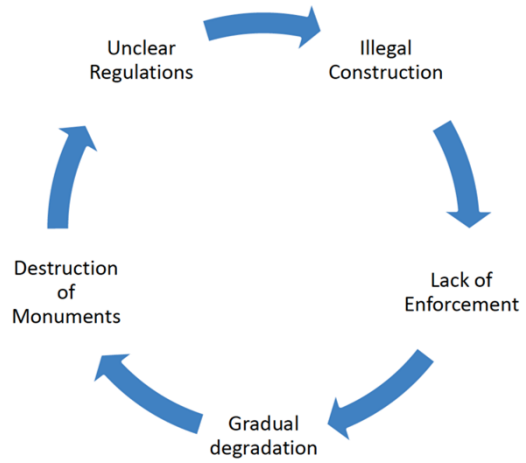


Figure 3: The destructive cycle of uncontrolled urbanization

Amin, Naguib (2011), Reference Guidelines on Site Management Planning, Unpublished report developed for the Egyptian Supreme Council of Antiquity (SCA), (registered NADocuments 08082011).

Table 1 - Hazard & risks, Heritage Sustainable Management

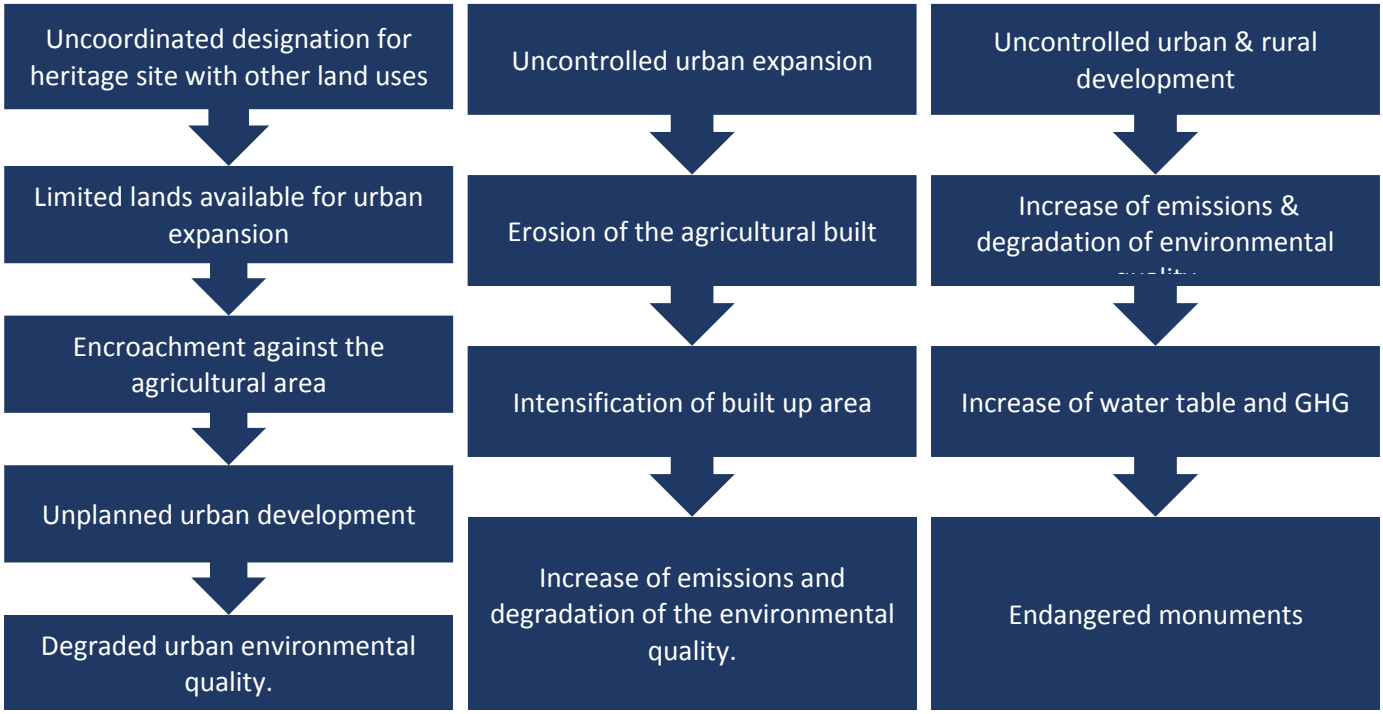
HAZARD	VULNERABILITY	EXPOSURE	RISK
Agriculture expansion	High	High	• Rising subsoil water table
Increased tourism	Medium to high	Low and expected to increase	• Wear & tear • High Levels of Humidity • Littering
Traffic	High	High	• Destructive vibrations • Decay & cracks • Toxic fumes & pollution from parked tourists' buses • Obstruct the general view of & to the monuments.
Neglect	High	High	• Insufficient conservation actions accelerate decay. • Overgrown weed
Urban Expansion	Medium	High	• Visual pollution • Polluted subsoil water • Archaeological sites' value aspects downgraded
Lack of Awareness	Low to Medium	Medium	• Theft • Waste accumulation • Vandalism
Lack of Maintenance	High	High	• Fire hazard from the tall dry grass • Bat and bird droppings • Growing weed • Littering
Electricity	High	High	• Fluctuating current • Vibrations caused from overuse of generators
Flash floods	High	Low	• Damage

4.4 Actions needed (classified as per immediate/ short, mid, and long term basis).

Reviewing the different types of analyses exhibited above, there are different arrays of problems, lines of problems that once erupted, a chain of other sequential problems occur. This would introduce us to the concept of the chain of problems (Fig.5)

Tracing the chains, it is essential to define the overlapping causes, to be prioritised. Based on the analyses above and as illustrated in (Fig. 5) lacking urban and rural development strategy as well as heritage site management strategy are the major cause responsible for the current imbalanced situation.

It is essential, therefore, to recommend UDS and HSM as priority interventions. Meanwhile, due to critical sequenced environmental risks it is essential to prioritise dealing immediately with electricity problems currently affecting heritage sites and the agricultural waste management problem as well as another type of immediate priority projects for Al-Qurna.



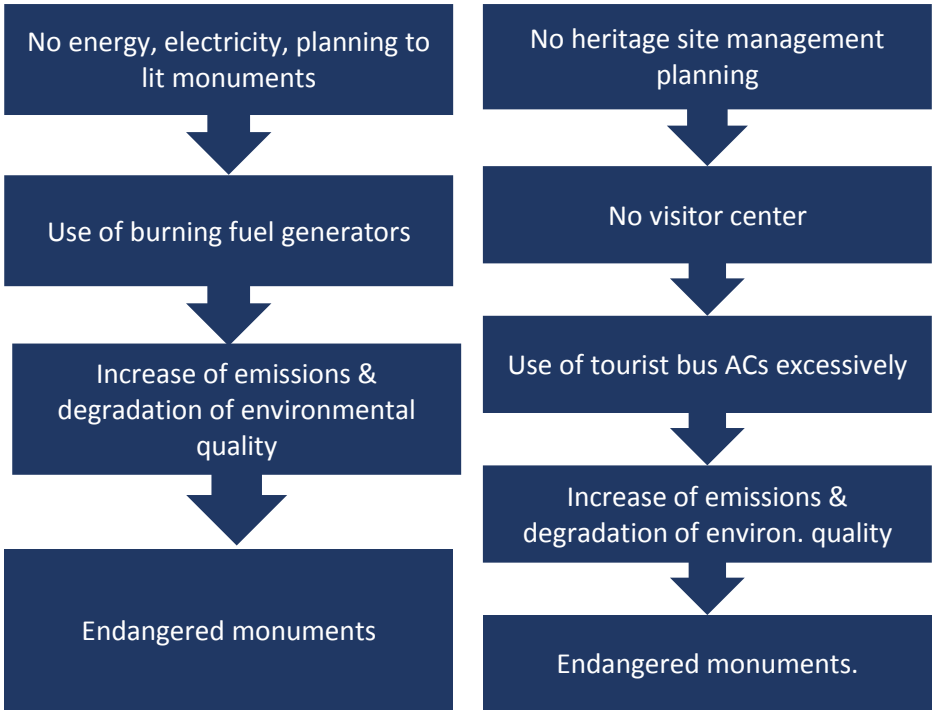


Figure 4: Chain samples Overlap to define the shared factors in all analyses.

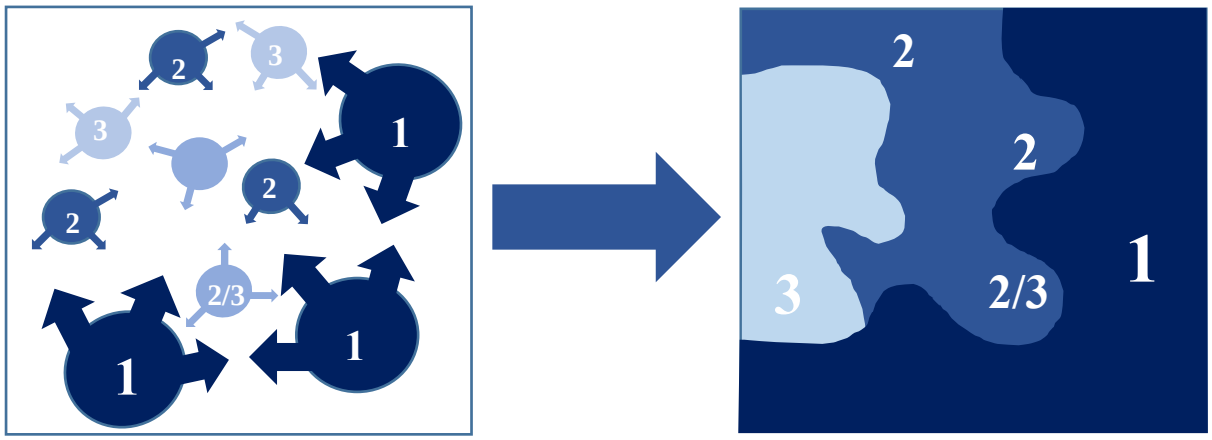


Figure 5: The shift from the heterogeneous, conflicting, current situation) to a more homogeneous balanced situation

5. Proposed Interventions

Based on the indications above, an integrated master plan is a must. Nevertheless, due to current hazards and risks caused by the above exhibited problems, it is recommended to start immediately with the following list of immediate actions.

5.1 Project fiches for immediate/short term actions

5.1.1 Tourist Centre and Ticketing Office

<table>
<tr><th colspan="3">Al-Qurna – Priority action # 1 for SECAP</th></tr>
<tr><td colspan="3">1. General presentation</td></tr>
<tr><td colspan="2">Title: TOURIST CENTRE AND TICKETING OFFICE</td><td># 1</td></tr>
<tr><td>Summary of the Action</td><td rowspan="2">Location: Al-Qurna Village
Start date: 2017
Project lifetime: 12 months
- 6 months: getting necessary consents, select location appoint project committee members, developing TOR up to selecting the best design alternative, and
- 6 months: for work initiation and construction and inauguration and the accompanied Awareness Campaign and staff training.
End date: 2018
Estimated cost €
65,000</td></tr>
<tr><td>Though the West Bank is rich with some of the most important monuments and cultural tourism attraction it doesn't contain any tourist information centre or proper ticket centre. It is missing proper historical site management in general.
The proposed project is a tourist information centre equipped with necessary facilities and trained staff with the following tentative architectural programme:

Tourist Information Centre – 200 m2
First floor
Reception + Lobby – 50 m2
Waiting area – 60 m2
Café area – 25 m2
Small Shop – 25 m2
Ticketing office – 10 m2
Toilets – 15 m2 x2

Second floor
Event centre – 30 m2 (Optional)
Storage – 20 m2
Offices + Facility management – 30 m2
Police office/station – 20 m2
Exhibition – 40 m2 (Optional)
Facilities room (cleaning and services) – 20 m2
Toilets – 15 m2 x2</td></tr>
<tr><td>General Objectives of the project</td><td>Status of the Action:</td></tr>
<tr><td>Focusing on:
a) To improve heritage site management and the archaeological site visits.</td><td>• New
• ~~Planned~~
• ~~Under implementation~~
• ~~Following previous action.~~</td></tr>
<tr><td>Specific Objectives of the project</td><td></td></tr>
<tr><td>a) To provide information centre for the necessary guidance and information to improve site and site visits,
b) To support individual tourism,
c) To provide an advanced ticketing service,
d) To mitigate visiting risks through providing careful studied visiting routs and</td><td></td></tr>
</table>

information,

e) **For more security of the archaeological sites through providing efficient base for heritage site management, including monitoring and follow up, ensured with effective SCA staff training,**

f) **To mitigate the excess use of tourist-bus ACs by accommodating all awaiting groups of drivers and tourists not willing to complete their tours or wishing to rest in a low thermal loaded building, this will minimise the excessive caused emissions by buses.**

g) **To introduce an aesthetic symbolic project that would raise awareness with conventional methods of design, construction and sustainable tourism. Thus, the building would be catalyst acting as a model to modify existing and guide new developments in Al-Qurna to minimise the thermal loads thus emissions of the housing sector in the West Bank.**

Principal partners and stakeholders	Contact person in the local authority
Supreme Council of Antiquities (SCA) (Ministry of Antiquities - MoA), Luxor Governorate, GATD (General Authority for Tourism Development, MoT), Tourism Police (MoI), Local individual investors, Potential franchising catering and tourism investors, and Faculty of Fine Arts in Luxor (South Valley University).	Dr. Moustafa Waziri, director of Antiquities Division in Luxor Governorate, MoA.

2. Technical description

Cost Analysis

Design Competition

The design competition prizes are going to be funded partially (around 40 per cent) by the sold prices of tenders which amounts to – 500 EGP = 25€. The rest is going to be funded by either sponsors or stakeholders.

First prize winner: 40,000 EGP = 1,890€

Second prize winner: 25,000 EGP = 1,180€

Third prize winner: 15,000 EGP = 710€

In addition to the cost for advertising for competition, opening reception for award winners, projects publishing, judging jury.

Cost = 175,000EGP – 8,245€

Cost (excluding 40% covered by tenders) = 105,000EGP – 4,947€

Building cost

The cost analysis is made for a simple tourist information centre with an area of 200 m^2, and height of 2 levels. The buildings should be simple and matching to the surrounding area.

1. Gawad, Architect Engineer – Madaa Architects, Cairo, Egypt

According to Eng. Gawad from Madaa Architects, the building is going to cost around 600,000 EGP – 28,280€ – including construction, materials, salaries for engineers and construction workers, transportation, electricity, plumbing, and finishing.

2. Mahmoud Salem, local builder, Luxor, Egypt

According to a local builder from Luxor who is accustomed with the buildings conditions in Luxor, the building is going to cost around 250,000 EGP – 11780 € – including construction, materials, transportation, electricity, plumbing, and finishing.
Building blocks = 60,000 EGP
Transportation of materials = 10,000 EGP
Construction = 40,000 EGP
Construction material= 15,000 EGP
Finishing = 42,000 EGP
Flooring = 28,000 EGP
Electricity and plumbing = 25,000 EGP
Taking in consideration the difference in value between the consultant and the local builder, the difference is to fill in the salary of the supervising engineer and the installation of copper cables...etc. Thus, an average was considered.

Cost = 425,000EGP - 20,030€

Furniture and equipment cost

Item	Cost per unit €	No. of units	Total cost €
Waiting area furniture			
Seating	12	20	240
3 Offices			
Office chairs	42	12	504
Office desk station – 4 persons	300	3	900
Mini refrigerator	42	2	84
Desktop computer	125	8	1000
Reception & ticketing			
Ticketing machine	50	2	100
Reception desk	330	1	330
Desk top computers	125	3	375
Chairs	42	3	126
Standalone HD touch screens	500	2	1000
Electricals			
LED downlight Lighting	8	90	720
Surveillance camera	43	4	172
Internet and network router	83	1	83
Split unit Air Conditioners	42	7-9	336
Ceiling fans	12.5	2	24
Emergency and partial system			6,000
Heritage and Archaeological Sites' Panels			
Panels	1000	20	20,000
Total sum			**31,494**

Training

Week 1

Provide training: for assigned SCA project division on energy efficiency buildings, conventional methods of construction and project management skills (pre and during design phase), 3-5 days, 8-10 staff, from

the SCA tourist info. Center staff and the SCA project div. team.

Accommodation: SCA (local), trainer 5 days EGP 500/ day x 5= EGP 2500.

Transportation: return train ticket for the trainer from Cairo: EGP. 1000

Local transportation allowance for trainer: EGP 500

Catering: 1 extended coffee breaks EGP 40/person x 12x 5days + lunch EGP 60/ person x 12x 5 days = EGP 3600. Total: EGP 2400+ 3600= EGP 6000.

Trainer Per diem: 1000x 5= EGP 5000.

Training 1 Cost: EGP 15000.

Week 2

- Provide training for modern ticketing devices,
- Provide training for SCA staff to provide technical advice for tour guides and individual tourists, and
- Provide GATD rep. with full info on the different hospitality facilities in the West Bank.

3-5 days, 8-10 staff, from the SCA tourist info.

Accommodation: SCA (local), trainer1 for 5 days EGP 500/ day x 5= EGP 2500.

Accommodation: trainer2 (ticketing system) for 2 days. EGP 500/ day x 2= EGP 1000.

Transportation: return sleeping train ticket from Cairo for 2 trainers: EGP 2000

Local transportation allowance for the 2 trainers: EGP 200+ 500= EGP. 700

Catering: 1 extended coffee breaks EGP 40/person x 12x 5days + lunch EGP 60/ person x 12x 5 days = EGP 3600.

Total: EGP 2400+ 3600= EGP 6000.

Trainer Per diem: 1000x 5= EGP 5000.

Training 2 Cost: EGP 17200.

Total: 15,000 + 17,200

= 32,200 EGP

= 1,521 **€**

Conclusion

The total amount to complete the project will amount to:

= (Design competition) + (Construction cost) + (Furniture and equipment) + (Training)

= 8,245 + 20,030 + 31,494 + 1,521

= 61,290 €

Adding safety factor due to current unexpected inflation

= 65,000 €

Total Cost = 65,000 €

Emissions Analysis

To mitigate the excess use of tourist-bus ACs by accommodating all awaiting groups of drivers of individual tourists and small groups coming in a microbus and individual tourists not willing to complete their tours or wishing to rest in a low thermal loaded building, which will minimise the excessive caused emissions by buses.

Estimated number of vehicles in parking lot:

- 7 minibuses
  - 1 minibus consumes 1.13 litre/hour
- 2 Buses
  - 1 bus consumes 3.8 litre/hour
- 1 coaster
  - 1 coaster consumes 2.25 litre/hour

Considering the opening hours of the Tourist information Centre from 07:00 till 16:00 (9 hours).

Thus,

Minibuses – 1.13 x 7 x 9 = 71.19 litres

Buses – 3.8 x 2 x 9 = 68.4 litres

Coaster – 2.25 x 1 x 9 = 20.25 litres

Adding these, we have 159.84 litres of diesel.

For high season (150 days)

150 x 159.84 = 23,976 litres of diesel

=239,760 kWh

For Low seasons (215 days) (50 % of high season)

215 x 79.92 = 17,182.8 litres of diesel

= 171,828 kWh

Total annual saving = 411588 kWh = 411.6 MWh

Total emissions avoided = 411.6 x 0.267 tn/MWh = 109.894 tons of CO2

Link to municipal development plan
This project fills in a great gap for the SCA that has no strategy for efficient heritage management. Also, it provides guidance and promotes for heritage coping and individual tourism with the current tendency of the governorate intending to declare the whole West Bank as a heritage designated area.
Implementation plan

Component 1: Select optimum location for the centre.

Component 2: Develop design TOR (design programme and criteria), and Archaeological sites' panels showing the important sites, showcase the monuments and be a way of guidance to individual tourists.

Component 3: Select the competition committee, jury.

Component 4: Implement selected design and construction work initiation,

Component 5: Provide training for the SCA staff who will run the centre, and

Component 6: Deliverables: consultant TOR, architectural design documents, and facility management plan, training of the SCA staff.

3. Organization and procedures

Formal approval	Staff allocated to prepare, implement, monitor action
The Governor of Luxor	Dr. Moustafa Waziri (SCA, MoA), Dr. Ramadan (CES-MED rep. Luxor Governorate) to coordinate and follow up with SCA & municipal approvals and CES-MED rep.
Staff training needs	**Role of Partners**
1. Provide training: for assigned SCA project division on energy efficiency buildings, conventional methods of construction and project management skills (before and during design phase), 2. Provide training for modern ticketing devices, 3. Provide training for SCA staff to provide technical advice for tour guides and individual tourists, and 4. Provide GATD rep. with full info on the different hospitality facilities in the West Bank.	-SCA representative (MoA): coordinate for the architectural consultant ToR and coordinate and facilitate for the architectural design competition committee. Also, supervise and coordinate for the SCA staff training. - GATD rep. (MoT): to participate in the competition committee. - Ministry of Interior rep.: to participate in the competition committee. - Faculty of Fine Arts rep.: to participate in the competition committee.

4. Summary of related Awareness Raising (AR) actions

Some of the actions include:

- Awareness Campaign regarding the importance of traditional structure and green architecture among SCA, especially project division.

- Awareness campaign for SCA staff re. efficient guiding.

- Awareness Campaign of the centre for all tourism sector staff, especially in Luxor.

5. Assumptions and risks (3)

- Delay in issuing project approval, municipal consent and SCA's.

6. Key success factors (3)

1. CES-MED partnership with the Focal Point would mitigate bureaucratic delays and expedite approval processes, if needed.
2. Efficient mean to minimise the emissions caused by ACs of tourist buses operating during tourists' visits.
3. Conventional architecture guarantees low thermal load, and

4. The building itself is a symbolic project, thus a catalyst that would serve the Awareness Campaign that can guide future buildings of the SCA in the historical areas and possibly urban developments and local community and tourism development.

7. Cost estimates	
Initial and start-up expenses: basic equipment for the unit – advertising material	65,000 €
Approximate operational Costs (including maintenance)	N/A
Approximate annual income for energy producing projects	N/A
Return of Investment (draft calculation)	N/A

8. Available and foreseen sources of funding	
Local authority's own resources:	-
International Financial Institutions:	**Available in Egypt: EG JICA**
Public-Private-Partnerships (available or to raise)	**Franchising Coffee shop and souvenir shop**
Loans and potential borrower	-

9. Projected Energy Estimates in 2030 (or other set target year)	
Energy savings MWh/y	411.6
Renewable energy production MWh/y	
CO2 reduction t CO2/a	
- Reference Year	2017
- Target Year	2030
- Net reduction on the territory	109.9 tn CO_2
- Reduction as related to BAU scenario	0.01%
- Per capita calculated reduction	0.044%

5.1.2 Clear transportation on the west bank

Al-Qurna – Priority action # 2 for SECAP	
1. General presentation	
Title: **CLEAR TRANSPORTATION ON THE WEST BANK**	**# 2**
Summary of the Action	Location: **Al-Qurna Village**
For Tourists: The west bank is rich with heritage sites and tourist visits, i.e., Valley of the Kings and Queen Hatshepsut Temple, Memnon Colossi and its environ, and Habu Temples. All visiting tourists arrive in busses, microbuses or coasters with an average peak visits of 400 vehicles (of all types of vehicles during the very high seasons before 2011 alone the whole day). The problem lies with the awaiting vehicles outside heritage sites. The vibration and emissions produced by the vehicles (operating air conditioner) hold danger to the heritage sites and monuments, as well as increase pollution. The proposed project suggests 2 parking lots (to be divided into 4 stages), locations to be decided. The parking will be designed with waiting areas for drivers to serve as a safe spot for parking. Hence, protecting the site and decreasing emissions. PS. Only the first phase of the parking lot will be implemented, 25% of the full peak capacity. The rest will be developed later after regaining the pre-2011 level of tourism attraction. <u>Programme</u> - Four Parking spaces for 25 buses, 20 coasters, 7 microbuses. (incremental phases). - Building (95 m2) including: control point, WC, large waiting hall taking up to 40-50 persons equipped with tables and seats and 2 TV panels, small buffet, and a small Storage Control point and waiting area – 60 m2 Storage – 15 m2 Toilets – 10 m2 x2 - PV sheds – Capacity of 20 kW (partial, to be extended). It can be a station that could serve other proposed projects indicated in the Tourist Information Centre and the electric readjustment projects (project fiches 1 & 3). - Vegetation for boundaries, if away from the archaeological sites. Vegetation should not shade PV sheds. **For Residents:** The available microbuses routes are limited, while there are no other means of public transportations. Hence, the inhabitants of the Bo'irat village close and around Habo temples aren't served. Therefore, they count on motorcycles, about 100 motorcycles. Though it is recommended to introduce public transportations using for example 2 large buses with natural gas engines. Nevertheless, this might not be feasible because of two reasons: a. The low number of inhabitants might cause these buses to move half empty. b. The microbuses already existing represent an income for many families in the local community. The project proposes converting all the microbuses on the West Bank from the already expensive gasoline into natural gas engines. The first Phase: will be only for 4 microbuses. While the following will be for the rest	Start date: **2017** Project lifetime: **6 months** End date: **2018** Estimated cost € **125,000**

(16 microbuses)	
General Objectives of the project	Status of the Action:
Provide comfortable environment friendly means of transportations for all users, tourists and local community in Al-Qurna and the West Bank.	• New • ~~Planned~~ • ~~Under implementation~~ • ~~Following previous action.~~
Specific Objectives of the project	
a) To provide a safe sustainable way of transportation around heritage sites **b) To mitigate the excess use of tourist-bus ACs by accommodating all awaiting groups of drivers which will minimise the excessive caused emissions by buses.** **c) Converting diesel based engines of microbuses into diesel-natural gas based engine for all public transportations is the ultimate objective.** **d) Extending microbus service to cover remote areas of the Bo'irat Village inhabitants in Habo & Basili areas to serve the local community so they can minimise their use of motorcycles of about 40%. (equivalent to saving the emissions of almost 40 motorcycles).** **e) A symbolic project, the 20-30% lower when converting into natural gas than the conventional diesel only engine would make it economically viable and and thus attractive for many other drivers in the area.**	

Principal partners and stakeholders	Contact person in the local authority
Ministry of Transport, Egypt (MoT), Supreme Council of Antiquities (SCA) (Ministry of Antiquities - MoA), Luxor Governorate, GASCO. GATD (General Authority for Tourism Development, MoT), Tourism Police (MoI), Stakeholders: Local individual investors (microbuses owners as well as owners of other vehicles interested in converting into natural gas.	Police officer/ Mohamed Salah, director of traffic, Ministry of Transportion in Luxor Governorate, MoT. Traffic Department (MoI) in Luxor Governorate: Police Lieutenant Mahmoud Mahana &Dr. Ramadan Sadeek, Head of the Environment Division - Governorate of Luxor.

2. Technical description

For Tourists

The proposed project suggests 2 parking lots (to be divided into 4 stages). The parking will be designed with waiting areas for drivers to serve as a safe spot for parking. Hence, protecting the site and decreasing emissions.

During the peak visiting days, the following numbers of visit to the archaeological site daily: 200 tourist buses (average 50 passengers), 100 coasters (average 25 passengers), & 50 microbuses (average 14 passengers). These are the number of buses along the whole day.we suggest to start with the first phase covering only 25% of the above peak numbers.

We start with 1 parking lot, expanding in the future up to 4, depending on the growing demand.

Preliminary program of the parking lot:

- Control point, WC, large waiting hall taking up to 80-100 persons equipped with tables and seats and 2 TV panels, small buffet, and a small Storage.

- Parking spaces for 25 buses, 20 coasters, 7 microbuses. (in each parking)

- Vegetation for boundaries if away from the archaeological sites and not shading PV sheds.

- PV sheds (optional or even partial). It can be a station that could serve other proposed projects indicated in the tourist information centre and the electric readjustment projects (fiches 1 & 3).

For Residents

If only 4 microbuses take a different route to serve the inhabitants of the Bo'irat it shall minimise the trips of

motorcycles 40 per cent.

It is more feasible for the microbus drivers to convert into the natural gas to save 20-30% of the cost of the diesel only engine.
For the project first phase and to reach with the microbuses to serve Habo and Basili areas a microbus line could be introduced with an incentive to the microbuses who will serve this route to receive free conversion into the natural gas based engines, starting with 4 microbuses with an average total cost of € 2500.

The traffic department (MoI) could partner enforcing a mandatory conversion to use a natural gas based engine when renewing the vehicle license.

These interventions result in:

- Decreasing the use of motorcycles, this can almost be counted as if we decrease the 100 motorcycles into 60.

- Converting 4 microbuses, out of 20 already on the roads, into natural gas.

Financial Analysis

Converting fuel machinery and tanks for each microbus cost about: EGP. 11,000- 12,000.

Out of existing 20 microbuses on the roads we can start with 4 as the first phase with a total cost of about: EGP 50,000= € 2500.

- PV Solar 20 kW capacity = 300,000 EGP = 14,285 €
- A building and monitoring unit = 200,000 EGP = 9,523 €
- Operating Air conditioners inside buildings = 84 €
- Parking construction = 1500 m2 x 100 EGP/m^2 = 150,000 EGP = 7,143 €
- Boarders for parking buses = 80 EGP/m2 x 400 m^2 = 32,000EGP = 1523 €
- Trackless electric train = 250,000 EGP = 11,904 €

Total cost = 2500+14285+9523+84+7143+1523+11904 **= 46,962 €**

Also, for the price of the land of 1500 m2 – 2000 m2 (first phase) = 1,500,000 EGP **= 71,428 €**

Adding safety factor due to current unexpected inflation

= 125,000 €

Emissions analysis

- PV system of 20kWh generates an average of 2,932 kWh/monthly and 35,179 kWh/yearly[5]
- The Building and operation unit consumption of electricity yearly

25 kWh/m2 x 95 m2 = 2,375 kWh/yearly

This amount (2,375 kWh/yearly) will be totally covered by the PV systems, thus we reduced the electricity consumption of the building.

35,179*0,55kg/kWh = 19.4 tn CO2/MWh

- Consumption for 1 bus with the AC on is around 3,8 litres per hour.
- Consumption for 1 coaster with the AC on is around 2,25 litres per hour.
- Consumption for 1 minibus with the AC on is around 1,13 litres per hour.

[5] **http://news.energysage.com/much-20000-watt-20-kw-solar-system-cost/**

- Calculations are made for 50 buses, 25 coasters and 7 microbuses
    - High season: 150 days

150 Days x 10 operating hours per day x (25 buses x 3.8 L/hr +20 coasters x 2.25 l/hr + 7 minibuses x 1,13 l/hr) = 1500 hours/year x147.91 lt/hr= 221,865 litres of diesel

    - Low season = 215

215 Days x 5 operation hours per day x 147.91 lt/hr = 159,003 litres of diesel

    - **Total savings = 380,868 litres x 10**
      = 3808680 kWh / 1000 = 3808.68 MWh/yearly
    - **Emissions Reduction 3808.68 x 0.267 tCO_2/ MWh = 1,016.9 tons Co_2/a**

Motorcycles consume 6 litres of Gasoline every 100 km and motorcycles usually cover 50 km aday. Thus for 100 motorcycles, the gasoline consumption would be:

Litres of Gasoline/day= 3 Litres x100 motorcycles = 300 Litres

Litres of Gasoline/year = 300 Litres x 365 day = 109,500 Litres

After minimising trips by 40 per cent,

43,800 Litres of gasoline = 402,960 kWh = 402.96 MWh

= 402.960 x 0.249 = **100.33 Tn CO_2**

The average Microbus speed is 40 km/hr; Working from 08:00 till 22:00 it will cover around 400 km a day, and with a consumption rate of 10 L/100 km. Thus, it will consume 40 Litre each day.

Microbus diesel consumption each year = 40 x 365 = 14,600 Litres/yearly

4 microbuses to be transferred to Natural gas = 14,600 x 4 = 58,400 Litres/yearly

58,400 Litres x 10 kWh/litre = 584000 kWh = 584 MWh

584 x 0.267 tnCO_2/MWh = 156 tnCO_2

Total emission reduction = 19.4 +1,017 + 100.33 + 156 = 1,292.4 tnCO_2

Link to municipal development plan

The project serves one of the most affected sectors in the SECAP which is transportation, by improving the air quality and movability of residents, decreasing the usage of motorcycles and introducing a solution to the lack of public transport. This project also helps safeguard archaeological and heritage sites. It will also promote using solar sheds as a way of branding sustainability in the City of Luxor.

Implementation plan

Phase 1 (1/2)

Component 1: Select optimum location for the two parking lots (Incremental development in 4 phases). Taking into account availability of land the Municipality should opt for a place which will be at an appropriate distance from the Heritage sites and the Tourist Information Centre (Fiche #1). Each phase (4 phases) in the parking lots should be wide enough to take about: 25 buses, 20 coasters, and 7 microbuses (Avg. area for first phase: 1500 - 2000 m^2). Finally, A trackless electric train (Tuf-tuf) will move tourists around the sites.

Component 2: Set a plan to the design of the parking lot and implement half of parking lot one. Also, design the waiting area small building to match the surrounding environment. The rest to be developed depending on the growing demand.

Component 3: Set solar panel sheds to power the waiting area's ACs with a capacity of 20kW and connect it to the national grid (give and take system). (If the location is close enough to the Tourist Information Centre, it could be able to provide electricity from sheds).

Phase 1 (2/2)

Component 1: Extend some of the microbuses to serve the Bo'irat village Habo and Basili areas. Propose new routes for such microbuses (indicated in the appendix map).
Component 2: Equip 4 of the microbuses, those who will be serving Bo'irat village, with natural gas engines.

Component 3: Set a plan to convert all the microbuses on the West Bank from the already expensive gasoline into natural gas engines (project second phase).

The traffic department (MoI) could partner enforcing a mandatory conversion to use a natural gas based engine when renewing the vehicle license.

Phase 2

Develop a plan to a future extension of to adopt bicycle lanes, and usage of electric cars. In addition to booster charging cars from new phases of PV systems.

3. Organization and procedures

Formal approval	Staff allocated to prepare, implement, monitor action
The Governor of Luxor	Mohamed Salah (director of traffic), MoT, Dr. Moustafa Waziri (SCA, MoA), Dr. Ramadan (CES-MED rep. Luxor Governorate) to coordinate and follow up with SCA & municipal approvals and CES-MED rep.
Staff training needs	**Role of Partners**
N/A	- Ministry of Transport representative (MoA): coordinate and facilitate for the planning process. Gasco Co. would capitalise covering this cost and collect it back in a monthly installment through different packages.

4. Summary of related Awareness Raising (AR) actions

A communication plan needs to be developed to highlight the importance of the value of electricity production through renewable source such as PV and the benefit both for individual producers and for the entire city of such a move. It could be suggested to raise drivers on the financial and economic benefits of converting to Natural Gas.

5. Assumptions and risks (3)

Delay in issuing project approval, and municipal consent.
The location of the parking lot is the most important feature. It should be close enough to the Tourist Information Centre to provide support for tourists and electricity through PV sheds, and also close enough to Heritage sites.
The management and monitoring of the parking lot and drivers, whom might stay in the buses and turn on AC units.
Lack of regular maintenance for PV sheds.
The microbuses owners (20 in the West Bank) might resist:
- modifying the routes of some of the microbuses (4 out of 20) to serve Habo and Basili areas in Bo'irat Village, &
- conversion in general into natural gas based engine.

6. Key success factors (3)

1. Efficient mean to minimise the emissions caused by ACs of tourist buses operating during tourists' visits.
2. The parking lots should be connected to both the Tourist information centre and close enough to heritage

sites.

3. Drivers will find an attractive and convenient place to rest and wait.
4. The PV sheds is a symbolic project, thus a catalyst that would serve the Awareness Campaign that can guide future development of renewable energy.
5. Cooperating with the Traffic Department (MoI) who are already very cooperative with the help of the Env. Dept. led by Dr. Sadeek (CES-MED rep. in Luxor Governorate), consent on mandatory renewing licence process for the West Bank only for microbuses using natural gas.
6. H.E. The governor of Luxor Governorate has approved and declared the West bank as a designated area which would facilitate special decrees such as the traffic department urging renewing microbus licenses above.
7. Those microbuses who shall modify their routes towards Habo and Basili areas shall receive an attractive incentive, free charge of conversion of their engines.

7. **Cost estimates**	
Initial and start-up expenses: basic equipment for the unit – advertising material	50,000
Approximate operational Costs (including maintenance)	N/A
Approximate annual income for energy producing projects	N/A
Return of Investment (draft calculation)	Less 20-30% of diesel price monthly

8. **Available and foreseen sources of funding**	
Local authority's own resources: The Municipality allocates staff to manage the car park	-
International Financial Institutions:	**Available in Egypt: EG JICA**
Public-Private-Partnerships (available or to raise)	-
Loans and potential borrower	-

9. **Projected Energy Estimates in 2030**	
Energy savings MWh/y	4,796 MWh
Renewable energy production MWh/y	35.18 MWh
CO2 reduction t CO2/a	
- Reference Year	2017
- Target Year	2030
- Net reduction on the territory	1,292.4 tn CO_2
- Reduction as related to BAU scenario	0.055%
- Per capita calculated reduction	0.24%

5.1.3. Solar PV for Heritage Sites

Al-Qurna – Priority action #3 for SECAP

1. General presentation

Title: **SOLAR PV FOR HERITAGE SITES**	**# 3**
Summary of the Action	Location: **Al-Qurna Village**
Since the main problem is in the redundant system to light the Kings Valley's tombs and the lower part of the mountain using two fossil fuel generators. The first is 150 kW and the second is 160 kW. These generators elicit much emissions and vibrations dangerous for the tombs. Meanwhile, there is a need for effective generator outlets for the electric cars moving from the visitor centre to the visiting sites. Instead, some of these cars, about 16 owned by SCA yet leased to individuals who frequently use diesel, when electricity supplies are insufficient, which contributes to the carbon emissions. The project proposes a solar PV, off-grid, to allow for the usage of lithium batteries system to offer in its first phase 40 kW.	Start date: **2017** Project lifetime: **6 months** End date: **2018** Estimated cost € **48,000**
General Objectives of the project	Status of the Action:
Focusing on: **b) Promote the title of Luxor's Green Heritage.**	• New • ~~Planned~~ • ~~Under implementation~~ • ~~Following previous action.~~
Specific Objectives of the project	
f) Develop a renewable energy strategy to further be adapted in the entire governorate. **g) To reduce emissions and vibrations caused by redundant electric diesel-based generators in order to protect the environment and monuments.**	

Principal partners and stakeholders	Contact person in the local authority
Supreme Council of Antiquities (SCA) (Ministry of Antiquities - MoA), Ministry of Electricity and Renewable Energy (Egypt), Luxor Governorate, Local individual investors.	Eng. Ahmed El-Nagar, Electricity Dept., Project Division, SCA.

2. Technical description

Phase 1:

PV solar plant/ stations distributed in different spots, for the PV system demands much area. The panel locations could be changed, easily dismantled and assembled depending on the excavation and the site management strategy.

PS. Instead of using 150K W PV system for the tombs area, 40KW PV would be sufficient as a beginning.

The above is for an emergency, redundant system

Phase 2:

i. To use a clean energy based generator down for the visitor centre and its environment to generate 160KW, using either PV system or natural gas.
ii. For the Kings valley tombs using PV system distributed on the mountain Ideally, 4KW * 62 tombs = 248KW

(at least 4KW for each tomb for the CCTV, light and other low voltage appliances). Distributing the PV panels would overcome the large area and cables needed from a central PV station.

Feasibility: the current electricity bill for Kings Valley area is EGP 27,000= € 1350 / month. This could be spared if converting to PV system.

Conclusion:

- A clean energy based 160KW generator.

- A PV system to generate 250 KW distributed on different spots on the mountain in the Kings valley area. Initially, it is possible to start with 40KW.

Financial Analysis

For the first phase of installing PV system of 40 kW capacity and 20 batteries.

1 million EGP = 47612.25 € = 48,000 €

Emissions analysis

PV system of 40kWh generates an average of 70,358 kWh/yearly. With an emission factor of 0,55 tn CO2/MWh, this translates to 38.7 tn CO2

Link to municipal development plan

This project solves a huge problem in the west side of the Governorate of Luxor, with the SCA contribution to provide clean energy to run some of the most sensitive heritage sites The project will contribute in building a sustainable energy strategy.

Implementation plan

Component 1: The plan is to develop solar PV units off-grid with lithium batteries to serve the electricity situation in the Kings Valley and the mountain and Hatshepsut temple.

Every 1kW of solar PV takes up 8 m^2. Thus, to serve the 160kW electricity demand for Upper area of the mountain, an area of 1,280 m^2 would be needed. Similarly, the same area will be needed for lower side of the mountain.

Phase 1
PV solar plant/ stations distributed in different spots, for the PV system demands such area. The panel locations could be changed, easily dismantled and assembled depending on the excavation and the site management strategy.
PS. Instead of using 150K W PV system for the tombs area, **40KW PV would be sufficient as a beginning**.

The above is for an emergency, redundant system

Phase 2:
i. To use a clean energy based generator down for the visitor centre and its environment to generate 160KW, using PV system.

ii. For the Kings valley tombs using PV system distributed on the mountain Ideally, 4KW * 62 tombs = 248KW (at least 4KW for each tomb for the CCTV, light and other low voltage appliances). Distributing the PV panels would overcome the large area and cables needed from a central PV station.

PS. The present project focus on the first for a start.

3. Organization and procedures

Formal approval	Staff allocated to prepare, implement, monitor action
The Governor of Luxor	Dr. Moustafa Waziri (SCA, MoA), Dr. Ramadan (CES-MED rep.

	Luxor Governorate) to coordinate and follow up with SCA & municipal approvals and CES-MED rep.
Staff training needs	Role of Partners
The allocated staff will require training regarding operating the PV stations and the further development of each station. Also, there's a need to further be trained in project management and development.	Local companies will be assigned with installing and maintaining the stations. These companies will be connected with the allocated governorate staff to avoid any communication problems.

4. Summary of related Awareness Raising (AR) actions

An Awareness plan will be required for the SCA's staff and the community to show the importance and urgency of using renewable energy and the benefit for the whole city. The dangers caused by generators should also be highlighted and explained in the awareness action.

5. Assumptions and risks (3)

- Delay in issuing project approval, municipal consent and SCA's.
- Lack of maintenance and order.
- Failure in establishing a network between local companies installing and maintaining the PV station and the governorate staff.

6. Key success factors (3)

1. CES-MED partnership with the Focal Point would mitigate bureaucratic delays and expedite approval processes, if needed.
2. Reducing emissions and vibrations from generator will be an important step towards improving the environment and saving the monuments.
3. Adopting the use of renewable energy will act as an awareness for the surrounding area.

7. Cost estimates

Initial and start-up expenses: basic equipment for the unit – advertising material	48,000 €
Approximate operational Costs (including maintenance)	N/A
Approximate annual income for energy producing projects	N/A
Return of Investment (draft calculation)	N/A

8. Available and foreseen sources of funding

Local authority's own resources:	-
International Financial Institutions:	**Available in Egypt: EG JICA**
Public-Private-Partnerships (available or to raise)	**Franchising Coffee shop and souvenir shop**
Loans and potential borrower	-

9. Projected Energy Estimates in 2020 (or other set target year)

Energy savings MWh/y	N/A
Renewable energy production MWh/y	70 MWh/yearly
CO2 reduction t CO2/a	
- Reference Year	2015

- Target Year	2030
- Net reduction on the territory	38.7 tn CO2
- Reduction as related to BAU scenario	≈0%
- Per capita calculated reduction	≈0%

5.1.4 Management of Agriculture waste

Al-Qurna – Priority action #4 for SECAP	
1. General presentation	
Title: **MANAGEMENT OF AGRICULTURE WASTE**	**# 4**
Summary of the Action	Location: **Al-Qurna Village**
In Al-Qurna, around 4900 feddan (1,176 ha) growing sugarcane, and it is considered to be the main crop in this area. The problem is that instead of managing agricultural waste, farmers usually burn the pre-harvest sugarcane because it costs less than compiling and transporting which eventually pollutes the air and is not a pleasing aesthetic view for tourists. Banana crops is the second crop with the same hazard, equal almost half of the sugarcane area yet with equal level of environmental danger for it is harvested, thus burnt, twice annually. To provide the department of agriculture in Luxor Governorate, MoAgr., with: -20 agricultural tractor, -20 shredder, and -40 trucks, To be distributed among the big farmers growing sugarcane and banana in the West Bank area, with the necessary training as well.	Start date: **Dec. 2017** Project lifetime: **3 months** End date: **Feb. 2018** Estimated cost € **237,000**
General Objectives of the project	Status of the Action:
Focusing on: **c) Enhancing the environmental quality of the surrounding and limiting CO_2 emissions from agriculture waste.**	• New ~~• Planned~~ ~~• Under implementation~~ ~~• Following previous action.~~
Specific Objectives of the project	
h) Concentration on enhancing the quality of air by banning and limiting agricultural waste burning, and replacing it by an effective waste management plans and systems. **i) Symbolic purpose; to avoid the aesthetically unpleasant smoke casting a grey dull image of the West Bank in general and deprive such an important cultural heritage spot to qualify as a world class green tourism attraction.**	
Principal partners and stakeholders	Contact person in the local authority
Ministry of Agriculture and Land Reclamation, represented in Luxor Governorate. Ministry of Environment Affairs – Egyptian Environmental Affairs Agency (EEAA), Stakeholders: Investors, Farmers…etc.	Engr. Ahmed Mohamed Ahmed Hussain (responsible for sugarcane) Agricultural Dept. in Luxor Governorate (MoAgr.) Dr. Ramadan Seedek, Head of the Environment Division - Governorate of Luxor.
2. Technical description	
Financial analysis Phase 1: 10 Shredders, 10 trailer and 20 tractors 1 Shredder machine: 50,000EGP	

10 x 50,000 = 500,000 EGP

1 Tractor: 340,000 EGP

10 x 340,000 = 3,400,000 EGP

1 Trailer: 50,000 EGP

20 x 50,000 = 1,000,000 EGP

Total Price = 4,900,000 EGP = **235,000 €**

Training

Similar to Tourist information centre = 1,521€

Total cost: 235,000 + 1,521 = 236,521 € = 237,000 €

Since the farmers will be recycling their waste, they would be benefitting from recycling:

- 1 ton of sugarcane/banana waste costs after recycling 700 EGP,
- Each Feddan (4200 sq m) of sugarcane/banana produces 3 tons of waste,
- There is 4900 Feddan of Sugar Cane with one harvest a year,
- There is 2450 Feddan of Banana with two harvests a year and
- We can calculate that after shredding they will amount to 2 Tons of waste only.

Sugarcane waste:

2 tons of waste x 4900 Feddan x 700 EGP = 6,860,000 EGP = 327,000 €

Banana waste:

2 tons of waste x (2450 x 2 Feddan) x 700 EGP = 6,860,000 EGP = 327,000 €

327,000 x 2 = 654,000 €

Emissions analysis

For agricultural waste from sugar cane: 1280gr CO2 per 1 kg of dry waste (sugarcane bagasse).

For banana waste: 1515 gr CO2 per 1 kg of dry waste.

- Each feddan of sugarcane/banana produces 3 tons of waste,
- There is 4900 Feddan of Sugar Cane with one harvest a year,
- There is 2450 Feddan of Banana with two harvests a year.

The amount of sugarcane waste:(3 x 4900) = 14,700 tons = 14,700,000 kg

The amount of sugarcane waste:(3 x 2 x 2450) = 14,700 tons = 14,700,000 kg

- CO2 from Sugarcane = 1.280 Kg CO2 x 14,700,000 Kg = 18,816,000 kg CO2

= 18,816 tn CO2

- CO2 from Banana waste = 1.515 Kg CO2 x 14,700,000 Kg = 22,270,500 kg CO2
  = 22,270.5 tn CO2

Total emissions reduced = 18,816 + 22,270 = 41,086 tn CO2

Link to municipal development plan

Preserving clean free of smoke and burning crops waste shall regain the green image of Luxor coping with Luxor as a green heritage governorate.

Implementation plan

Phase 1: Component 1: Estimate the needs and requirements of the west side.

Start with limited numbers of tractors, trailers, shredder machines and trucks. Exact number needed to cover a vast range of farms in Al-Qurna:
10 Tractors, 10 shredder machines, 20 Trailers.

Component 2: While the Agriculture department in Luxor Governorate is managing the renting and recycling process; they should urge farmers to start renting and recycling agriculture waste,

Each truck shall be leased monthly payment, tentative subjected to further calculation to include shredding machine and 2 trailers with each tractor. This is to be leased to substantial farmers, who will be responsible for serving the vast agricultural farms as well as serving other farmers in the harvesting seasons as well as doing the necessary maintenance and operation cost.

The environmental quality law enforcement will be only possible if the above machinery is introduced to Al-Qurna.

Component 3: Provide training for a period of a week for drivers and staff. The training will include management of machinery, dealing with farmers and some agriculture-related knowledge.

Phase 2: Continue with the rest of the required machinery to cover up the rest of the West Bank which amount to: 10 Tractors, 10 shredder machines, 20 Trailers. The cost could be compiled from the renting of Phase 1 machinery.

3. Organization and procedures

Formal approval	Staff allocated to prepare, implement, monitor action
The Agricultural division, Luxor Governorate.	Agricultural department in Luxor Governorate, Ministry of Agriculture.
Staff training needs	**Role of Partners**
Through the already trained and aware staff of the agricultural machinery dept., MoAgr. In Luxor will train the farmers leasing the tractors and machinery, training on how to use shredding machine and the process needed to produce straw and efficient collection and loading etc. to minimise dropped waste on the roads	- The agricultural department shall lease and follow up; the big farmers will lease and operate in their farms and provide and rent the machine ties for other farmers.

4. Summary of related Awareness Raising (AR) actions

An awareness campaign could be suggested to raise farmers' awareness of the burning impacts on the environment

and tourism. Also, the campaign could tackle the benefits of the recycled waste (fertilisers) and its return of investment.

5. Assumptions and risks (3)

- Delay in establishing a unit to monitor and evaluate the recycling process in the Governorate of Luxor.
- Rejection from farmers' syndicate to start renting necessary equipment and keep burning the waste.

6. Key success factors (3)

1. This process could be catalyst for the rest of the governorate to recycle agriculture waste. Starting with Al-Qurna as a catalyst example to be applied to all other farms in Luxor is the message to be conveyed to the farmer syndicate as well as the agricultural and environment authorities in charge.
2. The effective law enforcement led by Dr. Sedeek, the CES-MED rep. in Luxor Governorate, is guaranteed. Hence, there will be effective follow up and applied fines in case of any violation after applying the project.

7. Cost estimates

Initial and start-up expenses: basic equipment for the unit	237,000 €
Approximate operational Costs (including maintenance)	N/A
Approximate annual income for energy producing projects	N/A
Return of Investment (draft calculation)	>>0

8. Available and foreseen sources of funding

Local authority's own resources:	-
International Financial Institutions:	**Available in Egypt: EG JICA**
Public-Private-Partnerships (available or to raise)	**Hotel chains overlooking the West Bank and in the West Bank.**
Loans and potential borrower	-

9. Projected Energy Estimates in 2030 (or other set target year)

Energy savings MWh/y	
Renewable energy production MWh/y	
CO2 reduction t CO2/a	
- Reference Year	2017
- Target Year	2030
- Net reduction on the territory	41,086 tn CO2
- Reduction as related to BAU scenario	1.7%
- Per capita calculated reduction	0.075 tn CO2 per capita

5.1.5. Environmental public awareness unit

Al-Qurna Village – Priority action # 5 for SECAP

1. General presentation

Title: **ENVIRONMENTAL PUBLIC AWARENESS UNIT**	# 5
Summary of the Action	Location: **Al-Qurna Village**
As municipality staff, population and local stakeholders lack information and need to be mobilised to act on energy conservation / efficiency, environmental protection and protection of Heritage and archaeological sites. It is necessary to strengthen efforts to inform and engage all the publics in contributing to the implementation of the different components of the SECAP. Luxor Governorate will set up a dedicated unit, focusing on raising awareness in different publics to optimise the impact of the measures proposed to reduce energy consumption and improve the quality of life and the protection of heritage and monuments in the city. PS. This activity could be for the SECAP purpose for the whole city and not just Al-Qurna. However, the thought awareness campaign could be launched in and focused on an Al-Qurna as an action and catalyst area.	Start date: **2016** Project lifetime: **5 years** End date: 2021 Estimated cost € 165.000 € for 5 years
General Objectives of the project	Status of the Action:
Focusing on 3 priority targets - Governorate staff / Children / Mothers/ Hotels: • **Inform** on issues at stake regarding climate change and energy management, • **Provide guidance** to **behavioural changes** to fight climate change, • **Invite all stakeholders to engage in concrete actions** to help reducing energy consumption, and improve the urban environment and Heritage and archaeological sites. • **Promoting Green Tourism**	• New ~~• Planned~~ ~~• Under implementation~~ • ~~Following previous action.~~

Principal partners and stakeholders	Contact person in the local authority
• Governorate of Luxor: Public relation • Ministry of Environment • SCA • Ministry of Education – Local teachers • Local NGOs – Women' groups • Local media: radio and social media	Dr. Ramadan Seedek, Head of the Environment Division - Governorate of Luxor.

2. Technical description

With the success of the awareness project, we assumed a reduction of 15 per cent in residential buildings.
In 2015, A population of the city of Luxor is equal to 586,025 persons and they consume 690,697 MWh/year of electricity.
With a rough calculation, we can estimate that the 142,189 persons living in El Qurna (population of ElQurna), consume 167,585 MWh/year
(142,189x690,697) / 586,025 = 167,585 MWh/year
With a reduction of 15 per cent:
167,585 MWh/year x 0.15 = 25,137.75 MWh/year

Thus, a reduction of electricity consumption of **25,137.75 MWh/year**

= 0.55 tCO2/MWh x 25,137.75 = 13,825.76 tCO2

Link to municipal development plan

The Awareness unit will be a key component of the SECAP implementation, as most of the impacts expected for the action plan depend on the adequate mobilization and engagement of stakeholders to seize the opportunities offered to reduce their energy consumption and, in doing so, protect the antiquities and heritage sites, and contribute to the success of the SECAP.

Implementation plan 1/2

Phase 1: Setting up the unit – Allocating staff – Installing basic equipment

Phase 2: Priority programme targeting municipality staff with basic information on climate change and energy

- Reduce artificial lighting and take advantage of natural light.
- Manage temperature inside buildings to reduce use of AC/heater.
- Shut down electric equipment at end of working time…

Phase 3: Develop a specific programme "Positive energy schools", mobilising youth groups…

- Working in schools, developing energy efficiency actions and renewable energy production.
- Informing kids on climate change and sustainable energy management / explain possible actions in these domains that be enforced at school on a day-to-day basis.
- Make connection between water / waste and energy.
- Develop games and challenges to make behavioural change attractive and fun.
- Train kids for them to become change promoters at home.
- Organise a challenge between schools to reward the team – teachers & kids – getting the best results in terms of energy conservation.

Phase 4: Implement an Art symposium event promoting the slogan of "Towards a clean environment".

- Promote the slogan through showcasing an art gallery conveying that message.
- Advertise for the Development plan for the City of Luxor in being a cultural and touristic Hub.
- Encourage individual tourism.

Phase 5: Ban the use of plastic bags in the West Bank

Implementation plan 2/2

Phase 6: Expand the programme to raise awareness among women / mothers:

- Elaborating from actions in "Positive energy schools" promote activities that were done by kids.
- Inform mothers on climate change and energy management / explain possible actions in these domains at the household level on a day-to-day basis.
- Promote behavioural change that mothers can promote at home and raise potential benefits for the family.

3. Organization and procedures

Formal approval	Staff allocated to prepare, implement, monitor action
The Governor	Dr Ramadan Sadeek + other colleagues to be defined
Staff training needs	**Role of Partners**
The team which will be assigned to the unit need to receive a proper training on two subjects: • Technical questions related to climate change and energy • Pedagogy and communication to run efficient awareness programmes.	Stakeholders will be invited to contribute to the design of the different programmes and their implementation. The programme will be conceived and run to be relayed and implemented by many other stakeholders in order to get a bigger impact reaching out more people / groups.

4. Summary of related Awareness Raising (AR) actions

Some of the actions include:

- Spreading **information and training material** (posters, brochures, stickers, etc.) on how to save energy. To include training given by municipal staff.
- Creating an annual "**Energy festival/day**" to demonstrate best practices and celebrate innovative projects. Would

be promoted through traditional media and online social networks.

- **Mobilising families** by training women/mothers
- **Implement events such as an Art Symposium promoting the "Towards a clean environment".**
- Developing a network of "**Positive energy schools**" that produce not only more energy than they consume, but where teachers integrate the project into their curricula to train students, develop projects, etc.

5. Assumptions and risks (3)

The key challenge will be to people' mind-set and cultural of not trusting the government. Likewise considering the many problems people are facing on their day-to-day life, it will take a smart concept to engage the public in collective actions that will generate individual benefits (saving money from their own budget through reduced energy and water consumption) as well as global impact (reducing dependency on Israel regarding energy, mitigating climate change, etc.)

6. Key success factors (3)

- High cost of energy means that any saving will be a significant incentive
- A lot of efforts can be made without heavy investment
- Governorate determination to act in a comprehensive way on the issue

7. Cost estimates

Initial and start-up expenses: basic equipment for the unit – advertising material	15,000 €
Approximate operational Costs (including maintenance)	30,000 € /year
Approximate annual income for energy producing projects	Not relevant
Return of Investment (draft calculation)	If the programme allows 15% saving in electricity in governorate buildings only, it will avoid 40,000 € expenses per year…

8. Available and foreseen sources of funding

Local authority's own resources: The Municipality allocates staff to the unit and provides an office and basic working equipment.	**National Funds and Programs**
International Financial Institutions	**EU Funds & Programs and other external funds**
Public-Private-Partnerships (available or to raise)	**Lined up private investments**
Loans and potential borrower	**Expected annual cost savings to City budget**

9. Projected Energy Estimates in 2030 (or other set target year)

Energy savings MWh/y	25,137.75 MWh/year
Renewable energy production MWh/y	Not relevant
CO2 reduction t CO2/a	
- Reference Year	2015
- Target Year	2030
- Net reduction on the territory	13,825.76 tn CO2
- Reduction as related to BAU scenario	0.6%
- Per capita calculated reduction	2.5%

5.1.6. Waterfront Aesthetics

Al-Qurna – Priority action #6 for SECAP

1. General presentation

Title: **WATERFRONT AESTHETICS**	# 6
Summary of the Action	Location: **Al-Qurna Village**
The project suggests: - An Awareness Campaign to shed light on the importance of preserving the aesthetics of the Waterfront for the environmental quality and visual quality important for the tourism industry. - A National meeting to coordinate among Mehleb committee and other officials in charge to safeguard the waterfront.	Start date: **Dec. 2017** Project lifetime: **3 months** End date: **March 2018** Estimated cost € 13,000
General Objectives of the project	Status of the Action:
Focusing on: **a) Safeguard the aesthetics of the West Bank waterfront.**	• New ~~• Planned~~ ~~• Under implementation~~ ~~• Following previous action.~~
Specific Objectives of the project	
a) Minimise massive illumination, thus mass electricity consumption lighting the mountain. **b) Safeguard green belt and minimise the urbanised lands in order to minimise electricity housing consumption.**	

Principal partners and stakeholders	Contact person in the local authority
Luxor Governorate, Ministry of Agriculture, Ministry of Tourism, Tourism chamber (representing hotels investors and hotel chains), farmers syndicate, and Mehleb committee (Nile encroachment committee led by the ex-prime minister).	Dr. Ramadan Sedeek, Env. Dept., Luxor Governorate

2. Technical description

Financial Analysis

Advertising and campaign: 10,000 €

The Meeting necessitate:

- Airplane Ticket: Business class Cairo-Luxor-Cairo, return flight booking for 8-10 persons.
- 4000 EGP per Person = 36,000 EGP = 1718.6 €
- Accommodation: 2 nights in a 5-star hotel in Luxor; preferably where the meeting & workshop shall be held.
- 1000 per 2 nights/person = 9,000 EGP = 430 €
- Meeting room for up to 30 persons for a whole day, 2 coffee breaks and lunch for 20-30 persons
- 500EGP/person, for 25 persons = 12,500 EGP = 600 €
- 2 microbuses or 1 coaster for a whole day.

- 1500 EGP = 72 €
- printed materials and logistics.
- 400 EGP = 24 €

Total Cost of Conference: 2844.6 € = 3,000 €

Total cost of Project: **13,000 €**

Decreasing Emissions

PS. Redesign of the lighting of the mountain in coordination with the electricity department, Luxor Governorate and the SCA, would certainly save much electricity.

PS. Removing encroachments on the waterfront would minimise the residential and building, limiting thus the consumed electricity in housing.

Both saved electricity would minimise emissions. Nevertheless, investigations are needed and lighting redesign should be applied in order to define the spared KW/hr. saved.

Link to municipal development plan

Coping with Luxor the city of green heritage slogan where the green waterfront is safeguarded with a rationalised the mountain (waterfront background) illumination reflecting rather more sustainable meaning in energy consumption.

Implementation plan

Component 1: Investing on what is called Mehleb committee, named after the ex-prime-minister commissioned by H.E. President to clear all violations along the River Nile, coordination among concerned stakeholders. The committee is an essential need to confront the current rapid pace of uncontrolled development consuming the green belt and casting a grey ugly shadow in what used to a spectacular heritage panoramic view characterising Luxor.

Component 2: An awareness campaign is also needed to raise the awareness of the importance of preserving the aesthetics and environmental balance of the West Bank waterfront among all stakeholders: SCA, Localities & Luxor Governorate, Local Community & private investors in tourism sector, mainly hotels and hotel chains. The art symposium under the title 'together for a clean environment', part of action fiche 6 could contribute to the awareness campaign proposed above.

3. Organization and procedures

Formal approval	Staff allocated to prepare, implement, monitor action
Governor of Luxor	The office of HE. The governor of Luxor, SCA rep. Dr. Moustafa Al-Waziri, Dr. Ramadan Sadeek (CES-MED rep. in Luxor Governorate).
Staff training needs	**Role of Partners**
The governor office establish communication with Mehleb committee calling for the national meeting. Dr. Sadeek, coordinating with Dr. Waziri (SCA) and the farmer syndicate and Tourism chamber with the rep. of the ministry of tourism for the Awareness Campaign, as well as liaising for the parallel activity: organising for the national meeting.	Dr. Sadeek and CES-MED team introduce the project to H.E. The governor providing necessary training and support for his Excellency's office staff for logistics and support for the Awareness campaign and the national meeting.

4. Summary of related Awareness Raising (AR) actions

Some of the actions include:

- Spreading **information and training material** (posters, brochures, stickers, etc.) on how to save energy. To include training given by municipal staff.

- Creating an annual "**Energy festival/day**" to demonstrate best practices and celebrate innovative projects. Would be promoted through traditional media and online social networks.
- **Mobilising families** by training women/mothers
- **Implement events such as an Art Symposium promoting the "Towards a clean environment".**

Developing a network of "**Positive energy schools**" that produce not only more energy than they consume, but where teachers integrate the project into their curricula to train students, develop projects, etc.

5. Assumptions and risks (3)

- Resistance from farmers and owners with an access to the waterfront land.

6. Key success factors (3)

1) The presidential decree against encroachments on the Nile is a strong legislative mean facilitating law enforcement
2) The area designation decided by the governor would slow the pace of the violations/ uncontrolled urban expansion.

Cost estimates	
Initial and start-up expenses: basic equipment for the unit – advertising material	13,000
Approximate operational Costs (including maintenance)	N/A
Approximate annual income for energy producing projects	N/A
Return of Investment (draft calculation)	

7. Available and foreseen sources of funding

Local authority's own resources:	-
International Financial Institutions:	International hotel chains on the East Bank. JICA (specially for the scientific lighting design of the mountain on the West Bank).
Public-Private-Partnerships (available or to raise)	
Loans and potential borrower	-

8. Projected Energy Estimates in 2030 (or other set target year)

Energy savings MWh/y	Not available
Renewable energy production MWh/y	
CO2 reduction t CO2/a	
- Reference Year	2017
- Target Year	2030
- Percentage of net reduction on the territory	Not available
- Reduction as related to BAU scenario	Not available
- Per capita calculated reduction	Not available

5.2 Project fiches mid-term actions.

5.2.1. Integrated Master Plan

Al-Qurna – Priority action #7 for SECAP	
1. General presentation	
Title: **INTEGRATED MASTER PLAN**	**# 7**
Summary of the Action	Location: **Al-Qurna Village**
Aiming at a balanced environment, it is essential to address uncontrolled urban and rural developments, unsuitable and inappropriate crops close to the archaeological sites, ineffective management of the archaeological sites etc. There must be a master plan that combines the inputs of different authorities. Many problems could be resolved only if there is coordination among different stakeholders. Thus, an integrated master plan must be developed: urban development plan, rural development plan, archaeological site management plan, and integrated plan/ strategy must be developed, to be achieved: - Form the committee in charge of managing the master plan development, - Develop the TOR, - Send the RFP and receive the technical & financial props., - Analyse props. and select the winning consultant/ consultancy, - Select a scientific committee to be in charge to follow up, monitor the progress, hold regular meeting and get progress monthly report; it could be all or some of the members of the managing committee. Around 2 workshops shall be held, - Hold the pre-final workshop where reps. of all stakeholder shall attend: Local community reps., SCA& MoA, farmers syndicate, Luxor Governorate and Localities, MoL, MoI, NUCA & MoH, MoD. - Final submission and exhibition of the final master plan through a national meeting where top ranked officials of the above stakeholders, specially of governmental entities, shall attend and decree the necessary consents and decisions needed to implement the integrated master plan.	Start date: **Dec. 2017** Project lifetime: **12 months** End date: **Dec. 2018** Estimated cost € 162,000
General Objectives of the project	Status of the Action:
Focusing on: **d) Develop a balanced environment enhancing urban, rural environment as well as safeguarding heritage.**	b)New ~~c)Planned~~ ~~d)Under implementation~~ ~~e)Following previous action.~~
Specific Objectives of the project	
c) Control UD so the housing emissions are controlled and balanced, **d) Control agricultural development and expansions for less emissions and minimise water table hazards against heritage areas, and** **e) Provide effective heritage site management for heritage safeguarding and more effective lighting thus less electricity and emissions elicited due to unplanned lighting of the mountain and the archaeological sites.**	
Principal partners and stakeholders	Contact person in the local authority

Luxor Governorate & localities, SCA (MoA), Farmer syndicate, Local community, New Urban Communities Authority (NUCA) (MoH), and Armed Forces (MoD).	Dr. Ramadan Sedeek, Env. Dept., Luxor Governorate & CES-MED rep. & Dr. Moustafa Waziri, SCA, Luxor Governorate.

2. Technical description

Financial analysis

Conference

A national meeting and a workshop to invite the representatives of the ministries and authorties in charge under, a prosed, under the auspices of H.E. the Prime minster and called in by H.E. The governor of Luxor. Delegates from: Prime minister office, Ministry of Defense, Ministry of Housing & New Urban Community Authority (NUCA) shall group, accommodated discussing and coordinate an integrated Master plan in the west bank. They will participate and discuss with delegates from Luxor Governorate and MoI already in Luxor.

The above necessitate:

- Airplane Ticket: Business class Cairo-Luxor-Cairo, return flight booking for 8-10 persons.
  - 4000 EGP per Person = 36,000 EGP = **1718.6 €**
- Accommodation: 2 nights in a 5-star hotel in Luxor; preferably where the meeting & workshop shall be held.
  - 1000 per 2 nights/person = 9,000 EGP = **430 €**
- Meeting room for up to 30 persons for a whole day, 2 coffee breaks and lunch for 20-30 persons
  - 500EGP/person, for 25 persons = 12,500 EGP = **600 €**
- 2 microbuses or 1 coaster for a whole day.
  - 1500 EGP = **72 €**
- printed materials and logistics.
  - 400 EGP = **24 €**

Total Cost of Conference: **2844.6 €**

Workshops

Each workshop will be attended by around 20 – 30 persons

- 500EGP/person, for 25 persons = 12,500 EGP = **600 €**

Total cost of 2 workshops

25,000 EGP = **1200 €**

Design Competition

The design competition prizes are going to be funded partially (around 40 per cent) by the sold prices of tenders which amounts to – 500 EGP = 25€. The rest is going to be funded by either sponsors or stakeholders.

First prize winner: 40,000 EGP = 1,890€
Second prize winner: 25,000 EGP = 1,180€
Third prize winner: 15,000 EGP = 710€
In addition to the cost for advertising for competition, opening reception for award winners, projects publishing, judging jury.
Cost = 175,000EGP – 8,245€
Cost (excluding 40% covered by tenders) = 105,000EGP – **4,947 €**

Consultant

Fees per day: 900 €
Assumption that work will last for (90 days for the UD consultant, 40 days for Agronomist, 40 days Urban Heritage Management Consultant: **(90+40+40) X 900= 153,000 €**
Total Cost: 8991.6 € + 153,000 = 162,000 €

Link to municipal development plan
The project will be integrated with the Governorate's vision towards a green Governorate of Luxor, thus, sustainability dimension is addressed in such an important and catalyst area, Al-Qurna and the West Bank.
Implementation plan
Component 1: Select and formulate the integrated master plan development management team (committee) and its coordinator, **Component 2:** Develop the TOR and release the RFP and select the winning bidder/ consultant or consultancy, **Component 3:** Follow up master plan development process including organising 2 workshops, **Component 4:** Hold the workshops and the national meeting to declare the agreed upon components of the developed integrated master plan to facilitate its implementation and all cooperation and coordination necessary to fulfil that.

3. Organization and procedures

Formal approval	Staff allocated to prepare, implement, monitor action
Governor of Luxor	Dr. Ramadan Sedeek, Env. Dept., Luxor Governorate & CES-MED rep. & Dr. Moustafa Waziri, SCA, Luxor Governorate.
Staff training needs	**Role of Partners**
Instead, 2-3 workshops to integrate the inputs of all participating stakeholders for effective, sustainable master plan. The workshops shall be during the course of developing the thought master plan.	reps of: Luxor Governorate, MoL, SCA, NUCA & MoH, CES-MED to formulate the committee managing the development of the master plan.

4. Summary of related Awareness Raising (AR) actions

No AR actions needed during the development of the integrated master plan.

5. Assumptions and risks (3)

- Expected resistance from H.E. The governor as studies and planning are not his priority seeking direct projects & funding,
- Local community might resist and uncontrolled urban and rural development pace might obscure the master plan development process,
- Resistance from the SCA for the redefined premises part, and
- Resistance from the Armed Forces to participate in the master plan development process.

6. Key success factors (3)

3) CES-MED partnership with FP would mitigate bureaucratic delays and expedite approval processes if needed. CES-MED team shall conduct short but effective meetings before and during the development of the thought master plan to explain its importance.
4) The declaration of the West Bank as a designated area would secure the development statuesque desired during the master plan development process.
5) The effective coordination with the SCA rep. in Luxor and with the Governorate transportation, agriculture, electricity and housing department through the CES-MED rep. in Luxor Governorate shall facilitate the process.
6) The Integrated Master Plan is a process with a participatory dimension, through WSs, which would bridge many gaps shedding light on varied obstacles that might not be clear for some stakeholders, due to the incoordination among them.

7. Cost estimates

Initial and start-up expenses: basic equipment for the unit – advertising material	9000 + 162,000

Approximate operational Costs (including maintenance)	
Approximate annual income for energy producing projects	
Return of Investment (draft calculation)	

8. Available and foreseen sources of funding	
Local authority's own resources:	-
International Financial Institutions:	**Available in Egypt: EG JICA**
Public-Private-Partnerships (available or to raise)	
Loans and potential borrower	-

9. Projected Energy Estimates in 2030 (or other set target year)	
Energy savings MWh/y	Not available
Renewable energy production MWh/y	Not available
CO2 reduction t CO2/a	
- Reference Year	2017
- Target Year	2030
- Percentage of net reduction on the territory	Not available
- Reduction as related to BAU scenario	Not available
- Per capita calculated reduction	Not available

6. Appendix:

Luxor Governorate Strategy

Outline:

A.1. Introduction:

The purpose of this report is to define the Luxor Governorate strategy. Since there have been years of turmoil due to unsmooth political conditions for years, clear defined comprehensive strategies might not be clearly defined or accessible. Reviewing the governorate's site and official Facebook page, no mission or vision is clearly defined or stated. Hence, and for the very purpose of the present report (Al-Qurna), tracing the news fed and press reviews to assemble a tentative vision that guide the moves and development of the governor and the governorate with its different sectors is the only available mean now.

We will explore the context: actual tendencies through projects and interventions and declared projects, as well as through the available legislative framework.

A.2. Objectives:

CES-MED project aims at developing the SECAP in resonance with the already existing strategies, if any, for the participating cities and governorates. Hence, it is essential to define the main dimensions prioritised by each municipality/ governorate for more effectively developed SECAP.

The need for an inspiring slogan for the CAPP, normally the seed on which the municipality's/ governorate's, or proposed, vision can be defined.

A.3. The Context:

Luxor received special recognition, decreed by the ex-president as a special city separating from Qina governorate and appointing H.E. Genr. Samir Farag as the governor in 2004. He developed an ambitious but rapid development strategy for Luxor 2030. However, Luxor developed from being a heritage city into a governorate adding Armant and Esna cities and their villages to its official domain through a presidential decree issued in 2009. This certainly necessitates revisiting the previously set strategy by H.E. Genr. Farag, due to the change in the administrative status and scale, converting Luxor from a city into a governorate.

Luxor is certainly a heritage city par excellence for it contains more than one fifth of the World monuments. However, other pressing problems of the inhabitants such as:

- Illegal urban expansions especially those on the dispense of the agricultural lands,

- Investments and economic challenges after the recession in the Luxor's number one industry, tourism (more than 70 per cent of its economy necessitating diversifying the sectors of investment and not to count only on tourism) and

- Energy and pollution challenges, were some among many other obstacles obscuring the governorate's objectives.

Based on an article on Luxor Post News [6], The Governorate of Luxor has four (4) strategic plans by the year 2032:

a. Luxor: The Capital of Monuments, Tourism and Culture.
b. Centre of Commercial, Logistics, health and education in Upper Egypt.
c. Luxor, the governorate of diversified economy: Tourism, Agriculture, Trade and Industry
d. Green City of Luxor

Figure A.1 presents the SWOT analysis done by the Governorate for assessing the current situation and analysing future opportunities in regards with their strategic plan.

[6] https://luxorpost.com/الإستراتيجي-المخطط-تفاصيل-ننشر-انفراد/

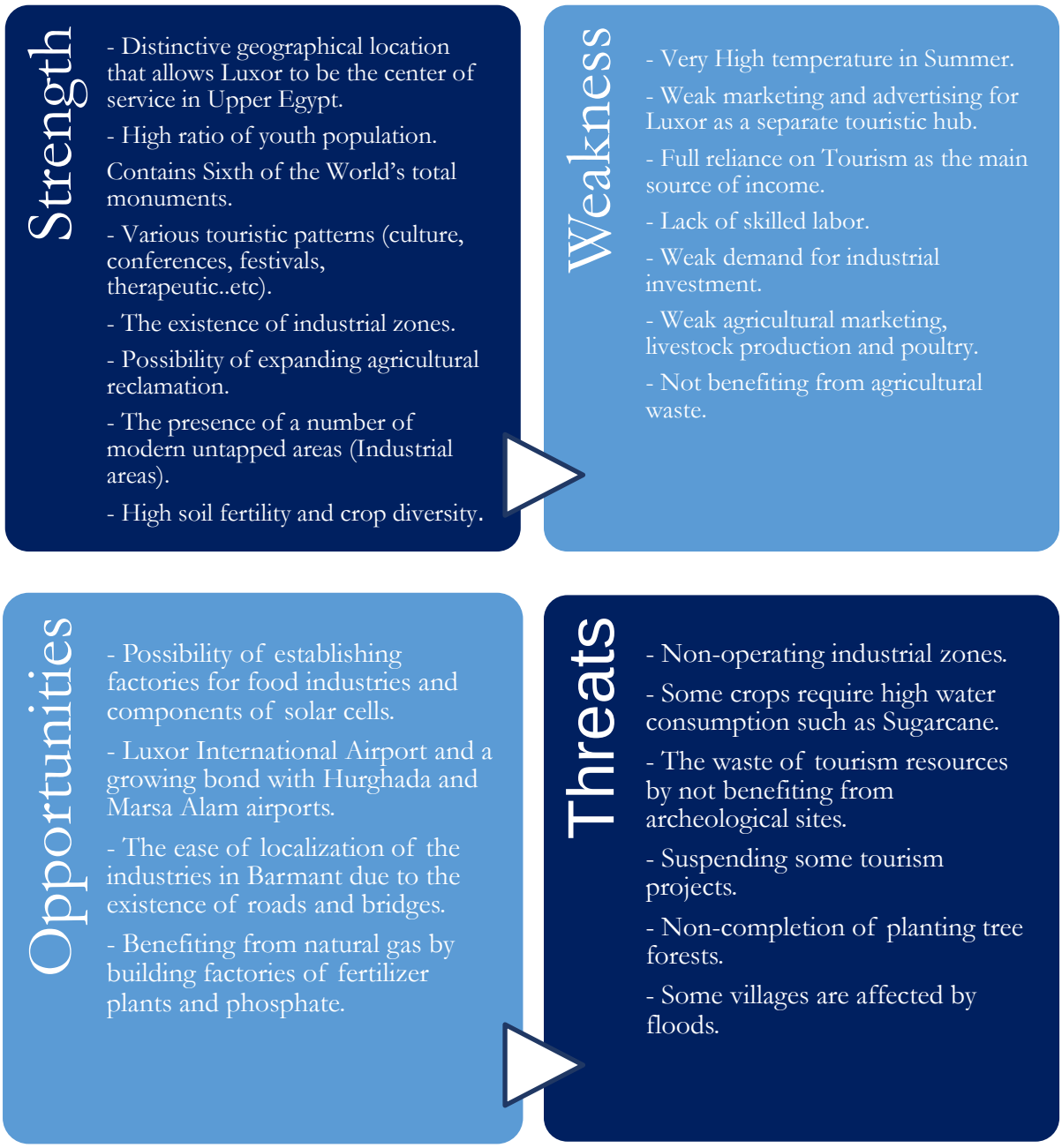


Figure A.1: SWOT Analysis by the Governorate of Luxor for the 2032 strategic plan

The above are few among a long list of hazards and risks that endanger the whole governorate and more precisely Al-Qurna, the subject of this report as elaborated above.

A responsive, effective strategy is, thus, a must. In general, according to the NRR, Egypt adopts Sustainable Development Strategy (SDS) known as Egypt 2030 vision, in line with Sustainable Development Goals (SDG), of the UN, issued in December 2015. Accordingly, Luxor must be seeking a comprehensive strategy addressing the key performance indicators (NRR, 2016: pp. 35, 36). Therefore, Luxor as all governorates in Egypt, is committed to increasing urbanised areas providing more housing units and resolving slum problem while safeguarding heritage and enhancing the environmental quality. This is implied in the concept of 'Luxor as a green city' referred to by the NRR (page 66). Furthermore, a balanced well controlled urban development and agricultural expansions are essential for both are responsible for many hazards that concern the CES-MED purpose.

Nevertheless, there is no clear and legal framework declared by Luxor governorate as a tool to implement the above, i.e.: no clearly identified and stated goals and strategy. This, however, can be assembled through a survey tracing the press releases about the governorate's projects and the declarations of the H.E. the governor.

Declared by H.E. the governor, Luxor is declared as a green city by 2020 expanding the utilisation of clean energy, mainly solar energy financed by the UAE (\al-Arab Newspaper, issue 9591, p.10, 2014), declared in a conference held in Luxor on 13th-14th June 2014. This was also to be achieved via expected grants from JICA, GiZ, EU and other granting agencies to realise the Luxor as a green city by 2020. [7]

It was also declared in the same conference (13th-14th June 2014) that 'Luxor the Heritage City of the World' recalling the same vision declared in 2004 due to the especial nature of the city.

Furthermore, and seeking the above referred to the thought balanced strategy, a comprehensive strategic urban development plan, very relevant to the CES-MED objectives as indicated in the NRR (NRR, 2016, P.36, Fig.7), H.E. the governor maintained that he adopts a combined study of the GOPP & and the HABITAT. Such a study is an expansion of the previous UNDP strategy for Luxor adopted by H.E. Genr. Samir Farag, to include Esna and Armant cities and their surrounding villages. It is a study under the supervision of the MoP that aims at a comprehensive urban, agricultural and investment expansions in Luxor Governorate.[8]

A.4 Projects & Tentative Vision:

Action projects to realise the above were proposed as listed by H.E. the governor in his interview with Al-Wafd newspaper (16th March 2016):[9]

1. Construct a solar energy station that spans 80 KW/ 10 hrs. providing 5000 *feddan*s (feddan = 4200 sq. meters) in Armant desert as a solar plant location,
2. Pilot expansion of solar energy to reach 133 houses in 6 villages,
3. To reach with the Natural Gas pipes from the West Nile bank to the Eastern bank to feed 17 thousand housing unit,
4. Sign a protocol to re-operate the fertilizers (of waste recycling) factory,
5. Transfer the 44 floating hotels from Luxor Cornish to Esna,
6. Banning the caret and cargo pulled by donkeys and buffalos from the city centres,
7. Establishing a committee to confront violations against agricultural lands,
8. Relit Al-Qurna village and west bank heritage sites and mountain, and

[3] www.alarabonline.org/?id=25412
[4] An interview with H.E. Dr. Mohamed Saied Badr for Akhbarelyoum Newspaper 21st May 2015. Akhbarelyom.com/article/55ccd9d80cff1350034e2/1440662960
[5]/ المحافظات 1079558أسعى-لتحويل-الأقصر-الى-منطقة-استثمارية-للخدمات-المتكاملة- m.alwafd.org/

9. Construct 4500 housing unit in Al-Toud hill.

Furthermore, HE. the governor maintained that he is also adopting the strategy of the HE. the ex. governor Gr. Samir Farag with its 34 projects modifying them to fit with the new administrative status of Luxor,[10] incorporating Esna and Armant, including:

- Reclamation of 80,000 *feddan*s,
- Developing a new housing scheme in El-Bughdadi town, and
- Regeneration of the Luxor Cornish walk.
- Continuing the Rams road (Al-Kibash Rd.) project.

P.S. Based on the CES-MED team investigation, mainly by the TL and NKE, during the team's visits in December 2016 and January 2017, most of the projects above related to energy and environmental quality enhancements haven't been launched.

Though there is no governorate's vision and mission nor clearly declared strategy, yet reviewing the above it is obvious that we have three main dimensions that articulate what we can define as a tentative vision of Luxor:

The First: Luxor as a Heritage City/ Governorate of the World, as has been aimed at and attempted since 2004.

The Second: Luxor as a Green City/ Governorate, declared in 2014.

The Third: Luxor as a governorate of investment opportunities, as declared by H.E. the governor in 2015 for potential investment in clean energy, housing and agriculture and its industries.

[6] Akhbarelyoum Newspaper 21st May 2015.