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ACRONYMS

CEDRO: Country Energy Efficiency and Renewable Energy Demonstration Project for the Recovery of Lebanon

CLO: Community Liaison Officer

EDL: Electricity du Liban

ESIA: Environmental and Social Impact Assessment

ESMP: Environmental and Social Management Plan

GoL: Government of Lebanon

IBA: Important Biodiversity Areas

IFC PS: International Finance Corporation Performance Standards

IPA: Important Plant Conservation Area

KBA: Key Biodiversity Area

LCEC: Lebanese Centre for Energy Conservation

LWP: Lebanon Wind Power project

MoE: Ministry of Environment

MoEW: Ministry of Energy and Water

NCEA: Netherlands Commission for Environmental Assessment

NTS: Non-Technical Summary

SEA: Strategic Environmental Assessment

SPNL: Society for the Protection of Nature in Lebanon

1. Introduction

1.1 Background

The Government of Lebanon aims that by 2020 renewable energy contributes 12% of the total energy supply in Lebanon and by 2030 a reduction of 15% in greenhouse gases is achieved. In line with these aims, three wind farm projects are currently being developed in the Akkar district in the Northeast of Lebanon, near the Syrian border¹. Together, these projects will establish around 54 turbines with a total capacity of 219 megawatts (MW). The permits to establish and operate the three mentioned wind farms have already been granted to the proponents by the Council of Ministers². However, in Lebanon wind energy projects require an Environmental and Social Impact Assessment (ESIA) as per Decree 8633/2012 and interventions may not start before the ESIA is approved by the Ministry of Environment (MoE). The ESIA's and a cumulative impact study for the three projects have been submitted to the MoE.

These will be the first wind energy farms of this scale in Lebanon that provide power to the national grid. Being a new sector in the country, the MoE has limited experience in reviewing wind energy projects. Therefore, the MoE requested the NCEA for the independent review of these ESIA's, in order to learn and to assure the quality of their own review which they are currently undertaking. Due to limitations in time, resources and considerations for cost-effectiveness, the NCEA only reviewed one out of the three ESIA's, namely that of the Lebanon Wind Power (LWP, from now on referred to as 'the project'). The project will take place on a mountain ridge in Jroud Akkar, on heights between 1200–2200m above sea level. The activities will include:

- Land clearing, the installation of foundational structures, crane platforms, and between 16–18 wind turbines with an expected power capacity of 68.3 MW. This will take place on 2.6 square kilometers and an actual installation area of 58.000m² (5.8 ha).
- Road developments for the transportation of turbine parts will include:
 - Widening sections of existing roads between the port of Tripoli and the project site.
 - Establishing new access roads that branch to the turbine sites.
 - Establishing new road segments: 1 km road running parallel to Machta Hassan village ending at entrance of Machta Hammoud village, 1.5 – 3 km from Mquaible road junction, running through Mquaible village until reaching Hawa Akkar Wind Farm Project, 1.7 km road segment running through Hawa Akkar wind farm parallel to the military base ending at Sahle checkpoint, and a 2km road segment connecting the windfarms from Sustainable Akkar and Lebanon Wind Power.
- Installation of a substation between turbines 8 and 9 of LWP in an area of 3500m² that will be connected to the substation of Sustainable Akkar project in El Rweimeh village, through a buried transmission line of 7 km along an existing road corridor.
- Installing underground transmission lines to transfer electricity to the national grid.

¹ These are the projects Hawa Akkar, Sustainable Akkar and Lebanon Wind Power.

² For the project under review the proponent is Lebanon Windpower SAL.

- Construction of 2 separate operation buildings to be used by the LWP, the wind turbine manufacturer and their contractors and by Electricity du Liban (EDL).

1.2 The Lebanese ESIA procedure

The EIA Decree 8633 /2012 (Article 8 of Annex 1) obliges the execution of an ESIA for power generation projects and outlines that the MoE is the competent authority to screen, receive, review and approve ESIA reports.

When an ESIA is required, the proponent first collects stakeholder inputs and submits a scoping report to the MoE. A technical committee within the MoE then reviews the scoping report and provides conditional or unconditional approval or requests an amendment. The scoping report for this project was submitted to the MoE on 5 June 2018 and was approved on 14 June 2018. After the scoping is approved, the proponent conducts the ESIA study and submits the ESIA report that includes an Environmental Management Plan (ESMP). The same technical committee that reviewed the scoping also reviews the ESIA and declares its position. The MoE could either request for an amendment or modification, or issue conditional or unconditional approval. The Minister will issue a letter to the proponent that takes into account the review committee's opinion. The MoE's decision is made available to the public and the parties involved and is communicated to relevant municipalities.

Once the ESIA is approved the proponent signs a pledge, which makes it legally bound to adhere to the mitigation measures specified in the ESMP. When the project starts, the MoE is responsible to follow up and monitor the implementation of the ESMP through asking for periodical reports and site visits.

1.3 The NCEA's approach and assessment framework

In order to review the ESIA of Lebanon Wind Power, the NCEA formed a working group consisting of four experts, a technical secretary and a chair. Details on the working group members are added to Annex 1. The working group reviewed the ESIA Volumes 1 and 2 and brought a visit to Lebanon between 24 – 28 June 2019 (see Programme in Annex 2). During the field visit, the working group interacted with the MoE staff, the proponent and their environmental consultant Ramboll, the Lebanese Centre for Energy Conservation (LCEC) and the NGO SPNL a.o. The NCEA also interacted with a representative from the Bank Audi and SLR Consulting, who had reviewed an earlier version of the ESIA in October 2018 on behalf of Bank Audi. Also, a visit to the project area took place where the working group had a chance to meet a group of representatives from a local community.

The NCEA assessed the ESIA to verify whether it is complete, correct and relevant to inform decision makers, the stakeholders and the public. The NCEA also assessed whether the ESIA came into being through a transparent and inclusive process. Note that the NCEA does however not express an opinion on the feasibility, desirability or acceptability of the project. The NCEA used the following benchmarks to review the ESIA:

The Lebanese ESIA procedures (EIA Decree 8633 /2012)

CEDRO Guidelines for Wind Energy (2012)

IFC Performance Standards (IFC PS) (2012)

World Bank's Environmental Health and Safety Guidelines for Wind Energy (2015)

The working group also relied on their own experience and knowledge gained through the review of many other ESIA's on similar projects.

In the next chapter, the NCEA outlines its general observations. In chapter 3 the *essential shortcomings* are presented which are issues that, according to the NCEA, need to be addressed prior to ESIA's approval or which need to be put as condition to approval. Chapter 4 outlines several detailed observations. These are issues that either require attention in the elaboration of mitigation and monitoring plans or which cannot be repaired for this ESIA (because certain decisions have already been taken), but which should be better addressed in future wind energy ESIA's. Chapter 5 outlines strategic issues that go beyond the mandate of the proponent, but which could be considered by the Government of Lebanon in the development of the wind energy projects.

During the field visit the NCEA was informed that after submitting the ESIA to the MoE in March 2019, LWP and Ramboll made improvements to the ESIA. Therefore, it might be possible that some of the NCEA's review findings and recommendations are already addressed by the proponent and their advisors.

2. Main review findings

The NCEA observes that the ESIA provides a lot of relevant and in-depth information. The report is of good quality and contains several positive elements such as:

- A clear justification of the need for this project.
- The use and application of reliable methodologies to assess noise, shadow flicker and landscape and a good outline of the related impacts.
- Description of the impacts and mitigation measures separate for the construction, operation and decommissioning phases.
- Provision of useful visualizations and maps.
- The organisation of activities to provide information and have dialogue with stakeholders, including a study tour to a wind farm in a similar landscape in Turkey.
- Adequate dealing with land issues, despite a complex local context.
- The execution and provision of adequate background studies such as:
 - *Baseline information*
 - *Noise and visual impact assessments*
 - *Traffic impact study*
 - *Soil investigations*
- A cumulative impacts study for the three wind farm projects in the Akkar region as part of the ESIA.

The NCEA also identifies the following main shortcomings:

- The Executive Summary contains information that is not necessary, while leaving out information that is relevant for decision making. Also, the body of the main report could be presented in a way that is more accessible and readable.
- The results of the bird collision model do not seem to reflect a worst-case scenario and significant impacts on vulnerable bird population cannot be ruled out.
- A conclusion on the potential impacts on bats cannot be drawn as field surveys are still taking place. Significant impacts on the bat population can therefore not be ruled out.

The NCEA concludes that in general, the ESIA is of good quality and complete, however, some shortcomings and points of attentions remain. These are elaborated in the following two chapters.

3. Essential shortcomings

3.1 The Executive Summary

The main function of an ESIA is to inform decision makers and affected stakeholders. IFC PS (1) describes the need to disclose and disseminate information to affected communities in a way that it is accessible, understandable, culturally appropriate and in local language.

The NCEA is of the opinion that the Executive Summary is not of a necessary standard because:

- It contains information that is unnecessary in an executive summary, such as detailed background information and baseline descriptions.
- It fails to provide a clear overview of the location, including maps of the wider area and the layout of the location, key impacts, the mitigation measures and the residual impacts and related compensation and offset measures.
- It is written in English and not in Arabic, the language to ensure that locals can understand.

Recommendations:

Deliver an Executive Summary, also in Arabic, that provides decision makers and stakeholders an understandable overview of the project, its (residual) impacts, mitigation and compensation measures and intentions for stakeholder engagement.

3.2 Collision Risk Soaring Migratory Birds

The project and the study area are part of the main flyway of soaring birds that migrate between Eurasia and Africa. Many soaring birds (e.g. eagles, vultures, honey buzzards, storks) pass through this area in autumn and spring. In the ESIA data on soaring migratory birds were collected and the risk of bird collision with the wind turbines was assessed with the “Band Collision Risk Model”³. The additional mortality caused by the project was measured as not exceeding 1 victim annually, except for the honey buzzard. Based on this result, no significant effects on populations of soaring birds have been predicted.

(a) The NCEA questions whether the results of the bird collision model reflect a worst-case scenario because:

- The total number of hours spent on counting birds seems insufficient to use a collision risk model⁴. Numbers of soaring birds can vary strongly from day to day. Many birds of certain species can pass in a short period of time (1–2 weeks). Also, the flight altitude and

³ Collision risk models such as the “Band Model” consider the interaction of wind turbines and birds. These models are based on mathematical equations that incorporate empirical data according the number of birds observed in the study area and the proportion of flight time within rotor-swept volume. The wind turbine parameters and the size, flight direction and flight speed of birds are also considered.

⁴ There is no fixed number of hours needed for bird counting as this depends on the complexity and the size of movement of bird flocks. For comparison, in a location with similar conditions as the project site in Europe, 300 hours per season could be used for the model.

behavior depend on weather conditions or unpredictable behavior, including vicinity of threats (e.g. hunters).

- Model results as presented in Table 6–58 (p6–89) are not traceable and verifiable.
- (b) The NCEA is of the opinion that the proposed wind farm, especially in combination with the other planned wind farms in North Eastern Lebanon, poses a serious risk to soaring migratory birds. Therefore, significant effects on vulnerable bird populations cannot be ruled out:
- The ESIA presents absolute numbers on bird mortality due to collision and compares these with Eurasian breeding populations (Table 6–58), including birds using other flyways⁵. However, this approach is not appropriate to assess the significance of the impact on birds. A better way would be to use 1% of the total mortality rate of the relevant flyway population as threshold to determine if the impact is significant⁶.
 - At the same time, 1% cannot be generalized for all birds. Most species of soaring birds have a very slow reproduction rate as they live long and raise a relatively small number of young annually. For such species, more than 0.5% addition to the natural mortality rate may already represent a significant and irreversible impact on the viability of the population. It is a realistic scenario that this additional mortality will be reached, particularly with cumulative impacts that may occur with the other (planned) wind turbines and the high levels of bird hunting in the study area.

Recommendations

Significant effects on vulnerable bird populations cannot be ruled out. Mitigation, monitoring and enforcement will hence be important. The following conditions are needed to avoid and reduce impacts on birds:

- Additional data needs to be collected to fine-tune the mitigation plans (e.g. match with peak migration).
- Elaborate mitigation measures and a monitoring plan which should be ready before turbines start operating. Mitigation should include:
 - *a radar system that detects flocks of soaring birds and support by field researchers.*
 - *a system to shut down the (or certain) turbines during the migration peak.*
 - *the daily monitoring of bird casualties during migration season.*
 - *the use of 1% mortality rate as threshold in general and 0.5% for vulnerable bird species, taking into account the cumulative impacts from other wind turbines and disturbing effects of hunting.*
 - *following the Bird Monitoring Protocol (BMP) and periodic revision based on monitoring.*
 - *an annual evaluation of the mitigation measures.*

⁵ A flyway is a flight path used by large numbers of birds while migrating between their breeding grounds and their over-wintering quarters. Raptors and other migratory birds need routes where thermals can give them the lift they require. Bird populations using the flyway that starts in northern Eurasia, crosses the middle East and leads to African winter quarters are relevant, in contrast to birds using another flyway e.g. the western Mediterranean (e.g. Gibraltar).

⁶ The 1% rate is used by the European Commission (ORNIS Committee) which refers to 1% of the natural mortality rate of the total population of a species. For instance, if the total population of a bird species is 1000 and the natural annual mortality is 20% (thus 200), the accepted level of additional mortality due to project and cumulative impacts would be 2 birds, which is 1% of 20 birds.

- Introduce and enforce a hunting ban in the project area (as suggested in the ESIA 6.13.3.4) to limit and compensate for impacts on locally breeding and migratory birds. It is also important to limit the risk of vulnerable bird species moving to wind farm surroundings due to hunting. The buffer zone where no hunting is allowed must be at least 500m on each side.
- Annual publication of the results on monitoring and the hunting ban.
- Consider investing in public awareness and support for the hunting ban among local residents, for instance through nature education and training of local bird counters.

3.3 Impacts on Bats

In the ESIA, information on bats was obtained through literature review, habitat observation and baseline information from the adjacent project Sustainable Akkar. This data suggests that 20 bat species may also occur in the LWP area.

The NCEA made the following observations:

- (a) Field surveys started in March 2019 but the results have not yet been presented in the ESIA. Because primary data is lacking in the ESIA, the NCEA cannot draw precise conclusions.
- (b) Assuming the scenario that roosts are determined which are of national importance, the project would probably have significant impact on bats.
- (c) Bat monitoring is proposed as a mitigation measure, but monitoring cannot replace mitigation. Mitigation implies the need to formulate concrete follow-up actions for what is to be done with the monitoring results, for instance when and for how long to shut down the turbines, who will be responsible, who will monitor the shutdown etc.

Recommendations

- Field surveys on bats must be completed and mitigation measures and a monitoring plan formulated accordingly.
- A mitigation and monitoring plan should be complete before the wind turbines are operational.
- Based on the monitoring results it must be assessed whether an offset plan is needed.
- Annual publication of the monitoring results. This can become a joint publication for bats and soaring migratory birds.

4. Other shortcomings and observations

4.1 Readability and structure of the ESIA

An ESIA report is a tool to support decision making. The EIA Decree 8633 demands that an ESIA report is brief, addresses only major environmental issues, focuses on investigation results and conclusions. The decree prescribes that detailed information should be presented in Annexes of an ESIA (such as minutes of public participation, tables etc.) while summaries to support the interpretation of detailed information should be given in the body text.

The ESIA is rather complete and provides a great deal of information. However, the NCEA is of the opinion that the ESIA may not easily support decision makers and be accessible to the public because:

- information and data are presented in a scattered way, making the report difficult to read. Raw data is put in the report and a synthesis is sometimes left to the reader.
- the main body text is long and contains information that could be moved to annexes, such as the turbine description and minutes of stakeholder participation.

Recommendations

The accessibility of the ESIA and support to decision makers could be improved by:

- moving (raw) data and information to annexes and only presenting synthesis and conclusions (with referencing to relevant annexes) in the main body;
- restructuring the report in a way that information and findings for specific themes are clustered and give a systematic overview of baseline, interventions, impacts, mitigation and compensation.

4.2 Alternatives

Assessing the impacts of realistic alternatives is an integral and essential part of any ESIA. This is also required as per Decree 8633 and the CEDRO Guidelines for Wind Energy. These guidelines (paragraph 5.1.1) state that diverse locations should be compared in terms of technical, environmental and economic criteria. Then, for the selected location, a multi-criteria analysis should be done for different scenarios, such as the number and location of the wind turbines, infrastructure and technology. This is to facilitate the understanding of the choices made by the developer and justify the alternatives selected.

The NCEA observed that:

- (a) The scoping report (Appendix A Volume 2) outlines that various project alternatives would be assessed on their potential impacts, costs, benefits, feasibility etc. In the ESIA, the following alternatives are considered: *project versus no project, turbine types, turbine sites, vehicle types for transport, transport modalities, alternative routes for transport, substation locations, design and transmission to the high voltage network*. These alternatives are not an integral part of the ESIA but briefly discussed in a separate chapter and lacking depth.

- (b) Even though the ESIA report gives valid explanation – but no exact information – for the selection of certain elements in the design (for instance the reduction of wind turbines from 23 to 16 to exclude the nature reserve and reduce the number of houses with a high noise– and shadow flicker impact), such pre–elimination cannot replace a systematic comparison of alternatives and a multi–criteria analysis of the variants as prescribed in the CEDRO Guidelines.
- (c) The process of selecting the turbine locations between the two villages appears satisfactory. This also seems to have improved the local land tenure situation. However, the process of fine tuning to reduce potential impacts, even if accomplished, is not presented in the report.
- (d) Based on the above, the NCEA is of the opinion that the selected design is not entirely substantiated and the process of fine–tuning to reduce potential impacts, even if accomplished, are not made visible. The justification of the project would have been stronger if a complete assessment of two variants, 23 turbines and 17 turbines, were fully assessed and compared.

The NCEA is of the opinion that the above described observations would be considered as essential shortcomings that need to be repaired before ESIA approval. However, due to considerations of the specific context, the NCEA does not draw this conclusion. These considerations are:

- The selected location is mentioned as a potential site in the national SEA and a permit was given to the proponent before the ESIA started.
- Negotiations with stakeholders and arrangements for land lease for the turbine locations have already been concluded.
- The NCEA is of the opinion that the ESIA provides valid considerations to justify the alternatives selected. In addition, based on observations and expert judgement, the NCEA expects that other alternatives (e.g. for turbine lay out or transport) in the chosen location, would not necessarily result in fewer impacts.

Recommendations

The NCEA recommends for future impact assessments of wind energy projects:

- Justify the selected location based on the comparison of alternatives. Include the alternative ‘no project’ in the assessment to get a better overview of the impacts caused by the project. Real alternatives such as windfarm layout and transport options, should be presented in the same way as the preferred alternative and in the same chapters to justify the choices made.
- Study alternatives with sufficient variety in impacts on landscape, nature and the living environment (the so–called ‘corners of the playing field’) to ensure that alternatives with low environmental and social impacts but low energy yield are compared with alternatives producing more electricity but larger environmental and social impacts.
- Present a sensitivity map of project area to pre–eliminate areas from development.
- Present a more systematic analysis of alternatives and variants in order to justify the selected project location and design.
- Take the worst–case scenario for the assessment and the selection of the wind turbines. It is for a wind development ESIA good practice to indicate the minimum and maximum sizes (and not types) of turbines and to assess the impacts of the worst case (the highest peak and nacelle level, highest rotor diameter, highest noise and shadow flicker levels, and lowest expected safety levels).

4.3 Stakeholder management & engagement plan

The Lebanese EIA regulations include procedures to inform and to seek feedback from stakeholders and the public during scoping, assessment and the review phases. The IFC PS (sub 12, 27 and 30 a.o.) specify the criteria for the engagement process such as:

- The need to be inclusive and to identify vulnerable and disadvantaged groups⁷.*
- Taking differentiated measures to ensure that vulnerable and disadvantaged groups participate effectively, are not disproportionately impacted and are not disadvantaged in sharing development benefits and opportunities.*
- When stakeholder engagement depends substantially on community representatives, reasonable efforts must be made to verify that such person does in fact represent the view of affected communities.*
- Grievance mechanisms established to facilitate the resolving of concerns and grievances should use a process that is understandable and readily accessible. Involving community representatives in the monitoring activities, where appropriate.*

The NCEA observes the following with regard to stakeholder engagement:

- (a) Information in chapter 2 indicates that good efforts have been made to inform and consult stakeholders. From the ESIA and the interactions with the proponent, it has also become clear to the NCEA that there are plans to ensure community benefits, for instance:
- Annually, a certain amount of funds will be available for CSR initiatives in the five surrounding villages. This amount will not be given in cash, but the proponent will, after consultations, initiate activities as prioritized by communities.
 - The proponent leases land from a municipality and members from a local family, who will annually receive financial compensation for each MW capacity installed on their land.
 - The above implies an injection of a relatively high amount of money into the communities. This in turn raises questions like: what kind of local dynamics could this create, could it lead to any tension and how will the proponent deal with this in an appropriate manner?
- (b) From the ESIA it is not clear how inclusive the stakeholder consultation and local decision-making process has been so far, and how this will be guaranteed in the future:
- It seems that, aside for refugees, no separate efforts were made to identify and consult vulnerable and disadvantaged people.
 - Most of the people consulted are family leaders and mayors, mostly men, as community representatives. It has not been verified, or the verification is not reported, that these representatives also represent the view of different community members.
 - The stakeholder engagement plan makes no reference to differentiated measures to ensure effective participation and equal benefit sharing, including for the vulnerable and disadvantaged.
 - From the report it is not always clear how the proponent will ensure that the grievance mechanisms will be accessible to everyone.

⁷ The IFC PS 1 states '*This disadvantaged or vulnerable status may stem from an individual's or group's race, color, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status. The client should also consider factors such as gender, age, ethnicity, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources*'.

- However, during the visit to Lebanon and exchanges with the proponent, the NCEA learnt about the proponent's plans to make efforts to ensure inclusiveness of stakeholder engagement in the coming project phases.
- (c) From stakeholder consultation minutes, it appears that local stakeholders have high expectations from the project such as employment, improved and affordable electricity supply, tourism in the area etc. These expectations seem unrealistic because:
- The electricity supply is not the proponents mandate;
 - the employment created, suitable for local people seems to be limited;
 - it remains uncertain whether and to what degree the project shall induce tourism.

Recommendations:

- The NCEA underlines the proponents intended efforts to ensure inclusiveness and recommends taking the IFC PS as guidance. It is also recommended that in the CSR initiatives, there will be coordination with municipal authorities.
- Permanent presence in the project area by a Community Liaison Officer (CLO) as proposed, will be essential to secure good interactions with local people. It is recommended that the CLO is assigned the task to proactively manage people's expectations and deal with local dynamics and he/she is supported to carry out these tasks. Some issues to consider in this regard:
 - Assisting landowners on demand, in financial literacy and managing the financial compensation they will receive.
 - Engaging/employing local people in the implementation and monitoring of mitigation plans, for instance in bird and bat monitoring, enforcing a hunting ban and guiding tourists.
 - Discuss and collaborate with local stakeholders (affected communities' municipal authorities) their views and ambitions for their landscape and find linkages how the project could feed into these ambitions.
- There will be a need to define concrete measures to ensure the accessibility of the grievance mechanism to all, including vulnerable groups.

4.4 Assessment of impacts

Noise

The ESIA presents two sets of noise limits. One is the EHS Guideline norm of 55dB(A) during the day and 45 dB(A) at night. The other concerns Lebanese national norms divided into categories with varying norms. It is not clear which limits should be used, though note that IFC PS prescribes that the most strict norms must be used. Neither is clear whether the worst-case calculations on noise impact (95% nominal power, 10 m/s wind speed) fit to the noise limits. The noise measurements conducted in the area could have been used to substantiate the limits.⁸

⁸ Both the noise impact by wind turbines as the ambient noise around rural areas increases with the wind speed (as is shown in the noise measurements at the location). Therefore, noise limits for rural areas – assuming no wind – are mostly too low for wind turbine projects. At the same time wind turbines don't produce sound all day, nor at wind speeds of 10 m/s – as used in this ESIA. Therefore the calculated noise levels are *worst case values* that can be tested against higher limits than those for rural areas.

Habitats

The project lies in the buffer area of the Karm Chbat forest reserve, overlaps with the Western Akroum Key Biodiversity Area and is entirely situated in Quammoua Dinnyeh Jurd IPA (important plant conservation area) and is said to contain the largest continuous stands of natural forest in Lebanon.

Chapter 6 refers to the loss of habitat that supports endangered plant species. In the middle study zone (total 6,567ha) the direct habitat loss is estimated as 24.24ha (0,4%) and a total loss of 18ha within Karm Chbat forest (total 473ha). Based on this limited habitat loss it is concluded that impacts will not be significant. However, endangered species within this habitat types are among the protected and preserved species in the KBA/IPA. Therefore, measures will be taken into a Biodiversity Management Plan to offset any loss of the endangered species.

Potential indirect or induced impacts that could result from the project need to be outlined. This is required by Lebanese regulations as well as by the IFC PS. These impacts are not clearly described in the ESIA, nor is it justified how the proponent intends to deal with these impacts in case they occur. The NCEA understands it is difficult to predict the occurrence and magnitude of such impacts but these impacts need to be described in the ESIA and eventually in the ESMP.

Recommendations:

Noise

Clarity is needed about which noise limits will be used and why, and which conditions should be used in the calculations (wind speed, continuous operation of the wind turbine (worst case) or average conditions).

Habitats

- Define standards for offsetting the losses, e.g. minimum size of habitat area, required quality to be developed, the level of homogeneity of the area, the level of protection, and against what norms the success of the measures will be assessed.
- Monitor annually and publicise the implementation of the offset plan.

Indirect or induced impacts

- Describe the potential indirect impacts of the project and the approach to deal with these impacts in the ESIA and/or ESMP where relevant:
 - Potential impacts from tourism on local communities and natural habitats.
 - Potential impacts related to improved roads and accessibility of the area.
 - Potential impacts related to sourcing of materials from existing quarries.
 - Potential impacts from transmission lines connecting wind farms with substations and the grid.
 - Potential hindrance that people may experience from the noise of transport of the turbines (at night) and arrangements to deal with such hindrance.
- Monitor and formulate arrangements in interaction with affected households along the transport route of the turbines, when they experience hinder.

5. Strategic Considerations for the Lebanese Government

One of the most critical aspects related to the impacts of wind parks is their location. By choosing the location carefully, significant impacts can be avoided. The World Bank EHS for Wind Energy indicates that Strategic Environmental Assessments are a useful tool to select locations and sites for wind energy development. The SEA for the Lebanese Renewable Energy Sector (2014) outlines for potential wind areas the specific land uses, constraints and distance between high wind potential areas with important ecological and cultural sites.

The NCEA did not execute a full review of the SEA for Renewable Energy but did a quick scan on the information included on wind energy. The NCEA would like to draw the attention of the Lebanese Government to the following points:

- (a) From the proponent's point of view, the selected location appears to be a logical choice: the area has high wind yields and a near absence of residents. Nevertheless, the choice for this location is less obvious from an environmental perspective:
- The SEA identifies where areas with wind development potential overlap with, or is near to ecologically sensitive areas such as Karm Chbat, Quammoua and Wadi Oudine birds bottleneck. Consequently, it states as a condition that no wind farms are allowed in nature reserves and 500m buffer zones, in Important Bird Areas (IBAs) and forests. At the same time, the project location seems to be approved while being adjacent to Karm Chbat nature reserve (and turbines will be placed in the buffer zone) and is entirely situated in Quammoua Jurd Important plant conservation area (IPA) and overlaps with the Western Akroum Key Biodiversity Area (KBA). It is important that the GoL sets clear norms, targets and conditions for development in such areas and monitors their enforcement.
 - In the SEA there is no visible 'funneling process' to prove that specific locations are, in comparison with others, the best ones. It can therefore not be ruled out that more favorable alternative locations exist with fewer impacts.
 - The SEA is rather generic and does not consider how wind energy developments fit in and interacts with other national and regional development plans.
 - The SEA does not seem to link to a specific policy, plan or programme or formal decisions.
 - The SEA does also not set a framework for dealing with cumulative impacts of wind energy, combined with other developments.

Recommendations

Considering the GoL's ambitions for renewable energy and more wind power development, the NCEA recommends the GoL to conduct regional SEAs. These SEAs should focus on those parts of the country that are most promising for wind energy in order to:

- set more specific conditions for wind energy developments and ensure that developers receive and comply with these conditions;
- be more specific about which locations should be considered for wind energy and which excluded and how to deal with cumulative and indirect impacts;
- develop a comprehensive view by analyzing wind energy development in relation to other sectors and national/regional plans;
- enhance the SEA's influence by linking it to a concrete government policy, plan or programme and decisions.

Annex 1: Composition of the Working Group

The NCEA's working group consisted of the following persons:

Mr Rob Vogel has been an expert for the Dutch department of the NCEA for 20 years. In this capacity, he has reviewed numerous ESIA/SEAs for wind energy in the Netherlands, focusing on impacts on protected natural areas and in particular on birds, bats and natural habitats.

Mr Peter van der Boom is physical engineer by training and advisor for wind energy projects since 1971. For the NCEA, he reviewed numerous ESIA and SEAs for wind energy in the Netherlands, focusing on noise, vibration, shadow flicker, visual impacts and mitigation.

Mr Erik Zigterman is an international consultant in the energy sector and has managed several onshore wind projects in the Netherlands. He has been an expert for the NCEA in the review of ESIA in various sectors, focusing on technical, institutional issues and stakeholder participation.

Mr Ben Peters is a mobility and traffic expert. He has been an expert for the NCEA since 2003. In this capacity, he has reviewed many ESIA and SEAs, therein focusing on the impacts of traffic (plans) on the social and natural environment, including safety and health aspects.

Ms Tanya van Gool is the chair of the NCEA's international department. She has a long state of service working for the Dutch Ministry of Foreign Affairs, including as ambassador in Bolivia, Kenya, Surinam, Romania, a permanent representative to the UNEP and special envoy for sustainable development.

Ms Leyla Özay is Technical Secretary at the NCEA and manages capacity building and advisory activities in several countries including Lebanon. In her role as technical secretary she is responsible for facilitating working groups to submit a final advice.

Annex 2 Visit Programme

DAY	ACTIVITY
Monday 24 June	Travel from Amsterdam to Beirut
Tuesday 25 June	Introductions and exchange about the review framework and process
9.00 – 11.00	Meet the MoE team – Introductions and discuss the Lebanese institutional set up, decision making stage of the project.
11.00 – 12.00	Meet LCEC
12.00–13.00	Meet LWP and their environmental consultancy firm) to discuss questions from the working group.
13.00 –14.00	Lunch Break
14.00 – 17.30	Session MoU – Working group (presentations on the review criteria & process)
Wed 26 June	Visit to the project location
9.00 – 17.30	Pay a visit to several places within the project area (including nature reserve, turbine locations, substation, new roads, potential receptors of noise and shadow flicker) and meet with local representatives.
Thu 27 June	Working group
9.00–13.00h	Meet SLR / Bank Audi (9:00–11:00) Second meeting LCEC (11:00–12:00) Meeting representative SPNL (12:00–13:00)
13.00–14.00h	Lunch break
14.00–17.30h	Working group discusses internally their draft findings
Friday 28 June	
9.30–13.00h	Working group presents to MoE and LWP / consultant the preliminary findings Discussion and exchange
13.00–14.00h	Lunch and departure to the airport