Wind Farm Ayitepa 225 MW

2nd Community Engagement Event

7th April 2016
Old Ningo, Presby Church
OVERVIEW

1. INTRODUCTION
   a. NEK AND LEKELA
   b. WIND ENERGY PRINCIPLES
   c. BENEFITS OF WIND ENERGY
   d. WIND FARM AYITEPA
   e. NATIONAL IMPORTANCE OF THIS PROJECT
   f. PROJECT UPDATE

2. LAND USE ASPECTS
   a. ACQUISITION PROCEDURE
   b. OUTCOME OF NTC COMMITTEE REPORT
   c. WHAT FARMERS MUST KNOW
   d. TALK ON LAND ISSUES (KOFI YEBOAH - DISTRICT PLANNING OFFICER)

3. COMMUNITY ENGAGEMENT
   a. SOCIO-ECONOMIC BASELINE STUDY
   b. LIVELIHOOD RESTORATION FRAMEWORK
   c. COMMUNITY INVESTMENT STRATEGY
   d. RECRUITING PROCEDURE FOR JOBS

4. GEOTECHNICAL INVESTIGATIONS
   a. INTRODUCTION
   b. COMMUNITY SUPPORT

5. OUTLOOK
1. INTRODUCTION
Ayitepa Wind Farm, Great Ningo – the first utility scale wind farm in Ghana

Jeffery's Bay, Wind Farm, South Africa
NEK AND LEKELA

1998

NEK Umwelttechnik AG, Switzerland
- Swiss engineering company
- Established in 1989
- Specialized in wind energy project development, geothermal energy, heating, ventilation and cooling techniques
- Worldwide active (Spain, Romania, UK, Canada, Brazil)

- First wind measurements and site screening in Ghana
- NEK detects potential for a wind park in Ghana

2003

Atlantic International Holding Company Ltd, Ghana
- Supplier of power transmission and distribution equipment to Ghana’s main electrical networks, incl. GRIDCo, VRA and ECG
- Also active in computer-, climate control- and office furniture sector

- NEK partners with Atlantic in order to establish NEK Ghana Ltd.
- Efforts to realize Ghana’s first wind park are enhanced

2013

Upwind Ayitepa Ltd. Ghana
- NEK Ghana and NEK Switzerland establish Upwind Ayitepa Ltd.
- This company is specially for the Wind Park Ayitepa and serves as a legal vessel for the project development
- Upwind Ayitepa will also be the operator company of the wind farm
- Further enhancement of project realization

2014

Mainstream Renewable Power Ltd., Ireland
- Specialist in project development, finance, construction and operation of large-scale renewable energy plants
- Large experience with 444 MW in operation and 360 MW under construction

- NEK partners with MRP, which acts as co-developer for the Ayitepa Wind Farm

2015

Lekela Power BV, Great Britain / Netherlands
- Lekela Power is a Joint Venture between Mainstream Renewable Power and Actis
- Lekela Power is a Pan-African renewable energy generation platform
- Plans to deliver utility scale wind and solar projects into commercial operation in Africa over the next 5 years
- 1110 MW at development and construction stages

- Lekela is the investor and operator of the Wind Farm Ayitepa
NEK AND LEKELA

NEK Umwelttechnik AG

- Wind Farm “La Victoria”, 24 MW, Spain
- Wind Farm “Mihai Viteazu I-IV”, 80 MW, Romania

- Wind Farm “Noupoort”, 80 MW, in construction, South Africa
- Wind Farm “Loeriesfontein 2”, 140 MW, in construction, South Africa
- Wind Farm “Khabab”, 140 MW, in construction, South Africa
WIND ENERGY PRINCIPLES
Wind turbines follow a simple principle: The energy of the wind turns the blades around the rotor which is connected to the main shaft that spins a generator. The generator then produces electricity for a single home or building or - as in our case - is connected to the electricity grid for distribution.
**Benefits of Wind Energy**

**General benefits**
- Renewable and clean
- No pollution during operation
- No water consumption
- Little land use
- «Home-grown» energy source
- Free «fuel»

**Local benefits**
- Local job creation
- Additional income from land lease
- Improvement of access roads and therewith facilitation of the agricultural production
- Community benefit projects (e.g. scholarship fund, school, clean water, irrigation)
- Coexistence with agriculture
NATIONAL IMPORTANCE OF THIS WIND ENERGY PROJECT
Ayitepa Wind Farm, Great Ningo

The power from the project will meet 3% of Ghana’s electricity requirements and help resolve the energy crisis in the country.

The Project is build ready and can be supplying electricity to the grid within 9 months from the start of construction.

The cost of electricity from the project is extremely competitive in light of the other generation technologies in the country and future costs of Liquefied Natural Gas.

Local employment opportunities during the construction and operation of the project will increase the socio economic activity of the Ningo Area.
Ayitepa Wind Farm, Great Ningo

The project will not suffer from the unreliability of fuel supply like other generation technologies in Ghana.

The project will take up very little area and coexist with farming activities already on site while providing support to farmers in the area.

The wind farm will counter balance the operation of hydro generation to ensure a reliable supply of electricity all year round.

The project enjoys full support from all stakeholders and benefits from strong support from the Government of Ghana and the World Bank Group.

The project will create a legacy in Ghana helping create a sustainable future for the bright star of Africa.
Wind Farm Ayitepa - Area of Interest
**Wind Farm Ayitepa - Key Parameters**

- Up to 75 wind turbines
- Up to 225 MW
- Up to 650 MWh/year

- 2016 construction start
- 2017 first generation
- 600 jobs during construction
- Around 50 jobs during operation

*Upwind Ayitepa Ltd.*
Project Description

Turbine Layout

- Capacity of 225 MW built over 2 phases
  - Phase 1 – 150MW
  - Phase 2 – 75MW
- Around 75 turbines within 2.75 – 3.5 MW
- Max hub height 140 & max rotor diameter 131m

Site Access from main N1 road

- Road in good condition
- N1 connects to the port of Tema
- Port of Tema - 2 x 500-600T cranes
Wind Farm Ayitepa

Turbine model used: Siemens SWT113 3.0 MW (hub height: 142.5 m)
PROJECT UPDATE - STATUS

- **Permits**
  - EPA Permit – Environmental Protection Agency
  - EC Construction Licence – Energy Commission
  - Building Permit – Ningo-Prampram District Assembly
  - Fire Service Approval – Ghana National Fire Service
  - Grid Connection Agreement – GRIDCo
  - Initialised Power Purchase Agreement – ECG

- **Working on financial close with Lenders**

- **Community Engagement / Consultations**
  - Community Engagement Event 6th February 2015
  - Community visits (partly completed)
  - Various stakeholder consultations (e.g. District Health Management Team, Great Ningo Youth Association)

- **Ningo-Traditional Council Blessing / Report**

- **Finalizing Lease Agreements**
2. **LAND USE ASPECTS**
**Land Use Aspects**

- Upwind is NOT buying the land
- We are just getting the permission to construct a wind park and then operate it for approx. 30 years
- We CAN’T use the land for any other purposes, also not for real estate
- All the land between the turbines is still in possession of the respective families and clans
- Farming can be continued being done without major restrictions
**Land Use Aspects**

- Wind turbines are not sited closer than 500 m to existing villages or houses.
- Wind turbines will only be located on agricultural zoned land and WON’T be in housing areas.
- No relocation required.
- Once the turbines are installed, new buildings within a 200 m radius should not be higher than 5 m.
- Within a 500 m radius, buildings should not be higher than 10 m.
LAND USE ASPECTS - NTC

A committee of the NTC has reviewed our initial lease agreements and requested for amendments. These have now been included in the revised version of the lease agreements.

ADDENDUM TO THE LAND AGREEMENT
BETWEEN

THE FAMILIES (LAND OWNERS)
AND

UPWIND AYTEPE LTD

We the families (Land Owners) do hereby unanimously agree on the 17th Day of February, 2016 at a general meeting that the following changes be part of our existing agreement with the “Company” UPWIND AYTEPE LIMITED:

1. That the rent payable per turbine per annum is subject to review every five (5) years of which increase shall not exceed 10% of the existing amount agreeable by both parties.

2. That the Families (Land Owners) at this general meeting agreed to cede 10% of rental fee per turbine per annum to the Ninge Traditional Council for its development projects.

3. That the “Company” UPWIND AYTEPE LIMITED will support the communities by way of providing scholarship schemes and with their developmental projects.

We hereby append our signatures to this addendum this 17th Day of February, 2016 at Old Ningo.

LOWE ANAMORS FAMILY OF
DAKPA
Kowa Kwar Beemose IV

MANYA CLAN OF DJANGMAI
Mawo Yoa Samaomo

KABUERU CLAN DJANGMAUS
Mawo Yoa Barada

OSAINYAA FAMILY LOTUBUER

WITNESSED BY:

NINGO TRADITIONAL COUNCIL
Ngoe Arikum Ekeke II
Governor

UPWIND AYTEPE LTD

(Community Liaison Officer)
BOUNDARY DEMARCATION AND DISPUTES

- At the Lands Commission, the lands within the project area are generally not registered.
- The site plans provided by the families/clans are often inaccurate or have overlapping boundaries.
- In addition to that, there are several land disputes.
- Therefore, boundaries will need to be verified in field, demarcated and surveyed.
- Any disputes will need to be solved in advance.
- If disputes can’t be solved or if there are any ongoing court actions, then we can’t register the land.
- If we can’t register the land, then we can’t construct turbines on it.
IDENTIFIED FAMILIES/CLANS

So far, we have identified the following families:

- Lowe Aniamsosi
- Lowe Saunya
- Kabueku Clan
- Kabiawe Clan
- Manya Clan
- Anumasa Family
- Adjer Family
- Osabunya Family
- Ayittah Family
- Lowekeponor
- Mamonor
IDENTIFIED FAMILIES/CLANS

We humbly appeal to all families and clans to work together and come to a common understanding and agree on their common boundaries.

If no agreement can be found, the project can’t go on!
WHAT FARMERS MUST KNOW
WHAT FARMERS MUST KNOW

Source: Musselroe Wind Farm, Tasmania
WHAT FARMERS MUST KNOW

Wind Energy goes along very well with Farming

- The space occupied by the turbines is minimal
- The space between the turbines is large (several hundred meters to more than 1 km)
- Farming can be done all around the turbines, except on the maintenance platform, roads and other wind farm structures
- There is no negative impact of wind energy on farming, neither on crops nor on animals
WHAT FARMERS MUST KNOW

Sheds for pigs, chicken asf. could be build everywhere, but should not exceed a height of 5 resp. 10 m.
3. COMMUNITY ENGAGEMENT
Community Engagement

- Consultation is a two-way process of dialogue between the project company and its stakeholders
- Initiating and sustaining constructive external relationships over time
- Good Neighbour Policy
- Community Engagement Plan
Community Engagement Objectives

The purpose of community engagement is to ensure that the community’s local to Ayitpea:

- Get to know the developers of the project;
- have access to relevant and up to date information about the project;
- are informed about the project’s progress and outcomes;
- realise the benefits this project can bring to communities;
- Understand the national importance of this project is resolving the current energy crisis.
Community Engagement Programme

Ayitapa Wind Farm Community Engagement Programme

<table>
<thead>
<tr>
<th>LEKELA Novation</th>
<th>Project Development &amp; Design</th>
<th>Community Consultation</th>
<th>Socio Economic Baseline</th>
<th>Consultation Event April 2016</th>
<th>Identify Community Projects</th>
<th>Consultation Event Aug 2016</th>
<th>Implement Community Projects</th>
<th>Consultation Event Dec 2016</th>
<th>Job Creation</th>
<th>FINANCIAL CLOSE</th>
<th>CONSTRUCTION</th>
</tr>
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DEVELOPMENT PHASE

<table>
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<tr>
<th>Quarter 3</th>
<th>Quarter 4</th>
<th>Quarter 1</th>
<th>Quarter 2</th>
<th>Quarter 3</th>
<th>Quarter 4</th>
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<td>2015</td>
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<td>2017</td>
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Duration of wind farm’s development, construction & operation

Duration of wind farm

Duration of wind farm

Duration of wind farm

Duration of wind farm
Community Engagement Strategy

AYITEPA COMMUNITY ENGAGEMENT STRATEGY

- Stakeholder Register
- Stakeholder Consultation
- Community Engagement Plan
- Social Economic Baseline Study
- Community Investment Strategy
- Community Project Evaluation Committee
- Community Forum
- Grievance Mechanism
- Livelihood Restoration Plan

- Stakeholder Management Plan
- Formal Consultation/Events
- Project Newsletter
- Local Radio Broadcasts
- SMS Communications

- Project Manager

- Traditional Council
- District Assembly
- Women’s Group
- Youth Associations
- Queen Mothers
- Assembly women/men
- Farmers
- Fishermen
- Local MP
- Clans

- Social Development Projects
- Enterprise Development: Supply chain capacity building
- Scholarship Scheme
- Skills Development e.g. Local Labour Pool System

- Traditional Council Reps
- District Assembly Reps
- Project Reps
- Queen Mother
- Women’s Group
- Local MP
- Traditional Council
- District Assembly
- Fishing Organisation
- Farming Organisation
- Queen Mother
- Any other relevant Organisation

A new beginning
Community Investment

Lekela defines Community Investment as:

*The Financial and other investment we make in projects and initiatives, above and beyond our core renewable energy business, to help create thriving and empowered communities.*

![Diagram showing Strategy, Alignment, Sustainability, Results and Measurements, Stakeholder partnerships, and better outcomes and benefits for Communities and Lekela.]
Community Investment - Key Principles

- Focus on development priorities that are aligned with our renewable energy business objectives
- Emphasis on projects that create long-term benefits that will have a lasting legacy
- Ensure that local people and partners shape community investment plans avoiding dependency and encouraging self-reliance
- Measure and evaluate the return on community investment to both Lekela and the community
- Proactively communicate the value generated by community investment to internal and external audiences
Community Investment - Key Elements

**Strategy** – A well-defined strategy linked to a clear business case and assessment of risks and opportunities

**Internal and External alignment** – Aligns strategic business issues with the various countries’ development priorities

**Stakeholder partnerships** – Recognises that a multi-stakeholder approach adds value by building local ownership and complementarity around shared interests.

**Sustainability** – Seeks to encourage self-sufficiency and create long term benefits that can outlast Lekela’s support.

**Results and Measurements** – Measures return on community investment to both Lekela and the community and proactively communicates the value generated by community investment internally and externally.
Community Investment
- Focus Areas

**Education and Skills**
- Early childhood, primary, secondary & Tertiary
- Environmental education and Renewable sector skills development

**Employment and Enterprise**
- Enterprise support
- Capacity building, sustainable livelihoods

**Environment and Energy**
- Nature conservation, climate mitigation & adaptation, clean energy etc.
Community Investment - Funding

• Lekela will establish a community investment fund for each project

• 0.5% of revenue agreed as a guiding minimum

• A proportion of the funds should be made available pre-construction

• Scheduling of disbursements will be linked with the activities planned for each period
Community Investment - Monitoring and Reporting

- Annual report on Community Investment programme across Lekela Platform
- Link to individual project Community Investment Plan
- Set clear indicators and measures of success
- Focus on both outcomes and impacts
- Communicate results internally and externally
SOCIO-ECONOMIC BASELINE STUDY (SES) - GOALS

- Provide benchmark of socio-economic and socio-cultural conditions in potentially affected communities, understand the local context
- Provide comparative data
- Analysis of potential livelihood impacts of the wind park
- Understand existing development context
- Identify stakeholders, including vulnerable groups
SOCIO-ECONOMIC BASELINE STUDY (SES)

- 62 Focus Group Discussions (FGDs) with youth, men or women
- Key informant interviews (teachers, health sector employees)
- 18 village profiles for settlements around the wind farm
- Site walkovers
Female majority (55%) in the Ningo Traditional Area

Source: Socio-Demographic Information on Ningo Traditional Area, Dodowa Health Research Centre, Ghana Health Service, January 2015.
68% are younger than 30 years in the Ningo Traditional Area

Source: Socio-Demographic Information on Ningo Traditional Area, Dodowa Health Research Centre, Ghana Health Service, January 2015.
Adequate toilet facilities (24%)

Source: Socio-Demographic Information on Ningo Traditional Area, Dodowa Health Research Centre, Ghana Health Service, January 2015.
Own electrical connection (20%)

Source: Socio-Demographic Information on Ningo Traditional Area, Dodowa Health Research Centre, Ghana Health Service, January 2015.
SOCIO-ECONOMIC BASELINE STUDY (SES) - FINDINGS

Distribution of livelihoods in the Ningo Traditional Area

Source: Socio-Demographic Information on Ningo Traditional Area, Dodowa Health Research Centre, Ghana Health Service, January 2015.
# Socio-economic Baseline Study (SES) - Results

<table>
<thead>
<tr>
<th>Current status</th>
<th>Challenges identified</th>
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<tbody>
<tr>
<td><strong>Agriculture</strong></td>
<td></td>
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<tr>
<td>• crop and animal husbandry</td>
<td>• post-harvest loss</td>
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<tr>
<td>• average 6-8 acres/ household</td>
<td>• problems with droughts</td>
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<tr>
<td>• mostly cassava cultivated for income, but also for subsistance</td>
<td>• no irrigation</td>
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<tr>
<td>• no market access</td>
<td>• no market access</td>
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<tr>
<td>• only by men</td>
<td></td>
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<tr>
<td>• equipment inherited</td>
<td>• stocks are depleting</td>
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<tr>
<td>• women process</td>
<td>• absence of cold storage</td>
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<tr>
<td>• no market access</td>
<td>• no market access</td>
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<tr>
<td><strong>Fishing</strong></td>
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<tr>
<td>• only in Old Ningo a health center</td>
<td>• absence of accommodation for health workers</td>
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<td>• health posts with nurses for part of the week in some villages</td>
<td>• inadequate facilities</td>
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<tr>
<td><strong>Health &amp; Sanitation</strong></td>
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<tr>
<td><strong>Education</strong></td>
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<tr>
<td>• ¼ with primary education</td>
<td>• some schools in bad conditions</td>
</tr>
<tr>
<td>• additional 10% finishing Junior Secondary School</td>
<td>• kids dropping school because they have to work at home or girls because of teenage pregnancy</td>
</tr>
<tr>
<td>• Less than 1% with tertiary education</td>
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</tbody>
</table>
Potential vulnerable groups:
- households with little land
- households were head is elderly, infirm or disabled
- women headed households
- lower income households and reduced access to saving and credits
- household with high dependency rate
- Women

- It will be reassessed if the above definition of vulnerable groups are accurate
- Goal of livelihood restoration plan will be to secure that there are no adverse impacts on vulnerable groups
Livelihood Restoration Framework

Measures being discussed at the moment for land owners and affected households in scope of the LRF:

- Financial management training
- Agricultural extension services
- Assistance in preparing land (temporarily affected land post-construction / replacement land)
- Lekela employment opportunities: Pre-construction training opportunities; and Support facilitating employment applications
- Community / Social Investment (community-wide benefits from community/social investment)
- Replacement agricultural land; OR cash compensation as part of lease agreement with Clan Leader
- Other livelihood restoration measures
LIVELIHOOD RESTORATION PLAN – PHASES

1. Data Gathering
   Identify in detail how people use the project area and the impact the of this land will have at a household level

2. Market Study
   The market study will collect information to help define the replacement value of assets

3. Reporting
   LRP report with detailed household level definition

4. Livelihood Options
   Develop livelihood restoration options and discuss them with affected households

5. Disclosure
   Defined set of restoration options and feedback can be provided for final approval

UPWIND AYITEPA LTD.
**Recruiting Procedure for Jobs**

- **Enterprise Days:** A day where contractors come to meet the communities and tell them what skills they need.
- There will be the chance to register your interest in working for a contractor based on your skills.
- The Enterprise Days will be announced in the newsletter.
4. GEOTECHNICAL INVESTIGATIONS
Geotechnical Investigations - Introduction

- To get information on the geology, geotechnical investigations are required.
- This information is needed for planning how to construct the roads and the turbine foundations and will also be needed for the placement of the turbines.
- Geotechnical investigation will be completed by an experienced contractor who has experience in building wind farms.
- Works will include trial pits and boreholes at locations across the site to enable the design of the turbine, substation and pylon of the overhead line foundations.
- Assistance of family representatives to liaise with sharecroppers required.
- If farmers are affected by yield losses, compensation will be paid directly to them but we aim to avoid this.
**Trial Pit Works**

Trial Pit made by an excavator

Pits will be closed after analysing the soil.
No lasting damage for the fields!

Taking soil probes for testing

Drilling a borehole in the field

Soil profile
5. CONCLUSIONS AND OUTLOOK
6. CONCLUSIONS AND OUTLOOK

- This is the first Wind Farm in Ghana and can only be realized with your support.
- It is a big opportunity for the people of Ningo-Prampram to realize the benefits of renewable energy.
- The design of the project is progressing and we are working with the Government and the World Bank to get all the necessary approvals to start construction.
- With the completion of the Socio-Economic Study we now are prepared to progress our Community Investment Plan.
- In order to finalize the construction plan, the geotechnical investigations are needed and your support with this is fully appreciated.
Program towards Construction

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<th>2016</th>
<th>2017</th>
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- Sign Land Leases & Register
- Formal Community Consultation
- Energy Production Estimates
- Energy Commission Construction Permit Award
- Sign Grid Connection Agreement
- Sign PPA
- PCOA Approval Process
- World Bank PRG Approval Process
- Financial Close
- Construction
- Operation

15–18 Months
The project is a nationally significant one that will create a legacy for Ghana

- It will be Ghana’s first wind farm showing the world that Ghana is a place where large scale renewable energy can flourish.
- The project will set the template for more large scale renewable energy projects in Ghana to follow creating a new industry that increases economic activity and is sustainable.
- In light of recent climate change agreements under COP21 in Paris 2015, the success of this project demonstrates that Ghana is a country looking towards a sustainable future helping combat climate change.
- The project will help Ghana avoid emitting 225,000 tons of CO₂/year into the atmosphere which would normally come from oil or gas power stations.
- It will supply approximately 450GWh of clean electricity every year that will help resolve the energy crisis in Ghana and diversify its fuel mix.
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