ACCELERATING UPTAKE OF RENEWABLES

LESSONS FROM CONCRETE PROJECTS

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on Natural Resource Based Development,
OECD Development Centre
About VERGNET Group: solutions based on field experience

- **30 YEARS’ experience in REMOTE areas**
- **1992**: first hybrid system
- **50+** WIND & PV plants installed on remote areas
- **5** continents – **40+** countries
- **4** subsidiaries of maintenance and local partners
Mont Mau – Nouvelle Calédonie
Project Experience in the Extractives Sector: Case Study on SNIM, Mauritania
Overview of the power sector in Mauritania

Since 2000, electricity demand has been growing more than 10% per year on average.

FORECASTED DEMAND FOR ELECTRICITY FOR MAIN ENERGY ACTORS (MW)

Somelec  SNIM  Kinross  MCM  Xstrata  Zone Int.  Akjoujt  ZRT  Senegal

Mining companies
Energy strategy in Mauritania

Based on Master Plan, Tariffs Assessment, Institutional Studies

• Growth of production capacity through national resources (renewable energy, hydroelectricity and gas) to meet demand in 2030 (domestic, mining, industries)

• Large-scale integration of renewable energy (solar, wind, cogeneration) in the national energy balance, with a target of 15% in 2015 and of 20% in 2020.

• Development of solutions for isolated centers and rural areas

• Construction of a HV and MV networks (and Grid Code) to regroup generators and rationalize exploitation activity.
SNIM, Mauritania

- 2nd African producer of iron ore, capacity 12 million tonnes per year
- Mines around Zouerate, 700 km railway to port Nouadhibou
- 10,000 people working for SNIM
- Self-generating electricity to satisfy its mining activities at Zoueratt and Nouadhibou

<table>
<thead>
<tr>
<th>Thermal</th>
<th>PV</th>
<th>Wind</th>
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<td>126.5 MW</td>
<td>3 MW</td>
<td>4 MW</td>
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Existing Power plant and grid of SNIM in Nouadhibou

- Production: diesel 4 x 4 MW

- Loads:
  - More than 20 motors ranging from 200 kW to 600 kW
  - Other Low Voltage loads (about 20 of 380 V) range from 63 kVA to 1600 kVA
**Excellent wind conditions:**

Average : 8.78 m/s, $k = 3.63$, $I_{15m/s} = 7$

**Very harsh conditions:** salty air, sand, no rain

⇒ very high corrosion

**Tender attributed to**

VERGNET in 2011

- 16 GEV MPC 275 kW (4.4MW Wind)
- Installation and O&M on ground (no crane)
4.4 MW Wind Plant
Nouadhibou – Mauritania
**Technology:** Hybrid wizard controller, no storage

**Results:**
- Wind output: 19 GWh / year
- Wind power penetration (average): 30%
- Diesel Savings: 4,800 tons / year
- Pollution avoided: 11,500 tons / year

**Penetration**
- Average: 30%
- Instantaneous: 45%
## What about financing?

<table>
<thead>
<tr>
<th>Financing Model</th>
<th>Details (description)</th>
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| **Full-Financing** | a. Miner develops, finances, and operates a Wind or PV farm on their own site (or through a sub-contractor) and uses all the energy generated.  

b. Miner develops, finances, and operates a Wind or PV farm on their site and sells the excess capacity to the Grid (this applies only to grid connected mines) |

**Possible evolution with SOMELEC for Nouadhibou city** |
| **Co-Financing** | a. Miner enters into a partnership, joint venture or other co-investment structure with the developer. This co-investment could be structured as a lease or sale-leaseback. |
| **PPA** | a. Miner contracts to buy energy from a renewable energy project via a Power Purchase Agreement (PPA).  

b. Miner enters into a PPA Agreement with a coalition or consortium of other industrial firms to use power from a shared renewable plant. |
| **Metal Swap** | a. Miner pays for energy with minerals extracted (PPMSA) |
Lessons Learned

• Right policy environment in the power sector (and Government support) is important and remains the main driver
  • SNIM being a government owned mine, made the project a lot easier to implement.

• Technology choice must be the result of the feasibility, not an apriori choice
  • Renewable resource assessment must be carried out.
  • Ensure that choice of technology fits the local situation.
  • Grid stability is very important, and must be at the heart of the project

• Project a flexible system, able to adapt to the grid evolutions
  • Fix reasonable targets for penetration rates and have a step by step approach
  • Prepare for possible evolutions of the consumption (community supply for instance could be an off-shoot)
  • Take Operation & Maintenance into account from the beginning of the project.

• Explore innovative business models and financing options.
  • Mines are formidable partners for uptake of renewable energy at a National level.
  • Finacing models with elements of government support are important
Thank You

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