Litani River &
Litani River Authority Projects

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LITANI RIVER AUTHORITY - LEBANON

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Litani River & Watershed

- The Largest in Lebanon with 2170 Square Kilometer (20% of Lebanon Total Area)
- 30% From the total Flow of all Lebanon Rivers
- Totally running in Lebanon along 170 Km
- 60 Km of tributaries
Litani River Authority

- Created by a Law dated on 14 August 1954 and rectified later on 30 December 1955:
  - Execute the Litani River Master Plan for irrigation, drainage and domestic water.
  - Execute the hydraulic electrical power generation and electrical networks between powerhouse and electrical distribution networks in all Lebanese regions.
By different decrees, the government of Lebanon adds the following tasks:

- Hydraulic measurements on all Lebanese rivers.
- Study and execution of different mountain lakes like Kawachra in Akkar Zone, Kfarhouna in Jezzine and Ballout in Matn region.
- Technical land survey and studies of dams on North Lebanon Rivers.
- Bisri Dam Studies.

Recently, new law 221 (water authorities Law) adds to its responsibilities all irrigation schemes in South Bekaa and South Lebanon Regions.

A new Environmental department was created in 2006 to assess the water quality of Litani River & tributaries.
Litani River Authority Projects

- Sited in and out Litani River Basin
- Three Hydro electrical Plants producing 7-10% of Electrical Energy produced in Lebanon
- Potable Water for Southern Lebanon Region representing 20% of Lebanese population
- Irrigation Schemes for South Bekaa and South Lebanon – Concerned Regions Represent 42% of Lebanese Area (264 Villages and Towns)
- Possibility for Tourist Projects
Barrage et Reservoir de Karabun

Galerie de Markabni

Q = 22 m³/s
D = 3.10 m
L = 6,400 m

Ain Zarka - Bassin intermédiaire
(Barrage mobile)

Usine de Markabni
Cote de restitution = 659.4 m
Débit max = Q = 22 m³/s
Chute brute max = A = 199 m
Puissance installée = A = 2x17 = 34 MW

Galerie d'awali

Tunnel de Jezzine + Tunnel de Kanane
L = 10,440 m²
D = 3.27 m
Q = 22.5 m³/s
L = 6,630 m²
D = 3.27 m
Q = 22.5 m³/s
Usine de Joun (phase B)

- Cote de restitution : 32,00 m
- Débit max : Q = 30 m³/s
- Chute brute max : A = 196 m
- Puissance installée : 108 MW

Usine d'Awali

- Cote de restitution : 226,13 m
- Débit max : Q = 33 m³/s
- Chute brute max : A = 400 m
- Puissance installée : 3 x 36 = 108 MW

Bassin d'Awali

- Prise d'eau sur Bisri (barrage moyen)
- Voirie de tête

Galerie de Joun

- L = 6800 m
- D = 327 m
- Q = 30 m³/s
<table>
<thead>
<tr>
<th>Designation</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Length</td>
<td>1090 meters</td>
</tr>
<tr>
<td>Height (From ground level)</td>
<td>62 meters</td>
</tr>
<tr>
<td>Altitude Water level surface</td>
<td>858 meters</td>
</tr>
<tr>
<td><strong>Useful Volume of the Lake</strong></td>
<td><strong>220 MCM</strong></td>
</tr>
<tr>
<td>Area</td>
<td>12.3 Km²</td>
</tr>
<tr>
<td>width at Top</td>
<td>6 meters</td>
</tr>
<tr>
<td>width at Bottom</td>
<td>162 meters</td>
</tr>
<tr>
<td>Concrete mask area</td>
<td>50,000 m²</td>
</tr>
</tbody>
</table>
# Water Conveyance Structures Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Markabi Tunnel</th>
<th>Awali Tunnel</th>
<th>Joun Tunnel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length in meters</strong></td>
<td>6400</td>
<td>17.070</td>
<td>6984</td>
</tr>
<tr>
<td><strong>Diameter in meters</strong></td>
<td>3.1</td>
<td>3.27</td>
<td>3.4</td>
</tr>
<tr>
<td><strong>Useful cross section in square Meters</strong></td>
<td>7.55</td>
<td>8.35</td>
<td>9.52</td>
</tr>
<tr>
<td><strong>Flow Cubic Meters per Second</strong></td>
<td>25</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td><strong>Slope (per Thousand )</strong></td>
<td>2.2</td>
<td>-0.5 &amp; + 2.2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Head loss friction in meters</strong></td>
<td>9.7</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>
Electrical Plants Power

- **Markabi** (2 X 21250 KVA) 2X17 MW -
  Waterfall (chute) 199 m

- **Awali** (3 X 45625 KVA) 3X36 MW: Waterfall
  400 m

- **Joun** (2 X 30000 KVA) 2X24 MW: Waterfall
  196 m
## Irrigation Schemes (Lebanon Vs LRA)

<table>
<thead>
<tr>
<th></th>
<th>Irrigated</th>
<th>Ongoing &amp; Proposed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Lebanon Schemes</strong></td>
<td>60,900</td>
<td>82,000</td>
<td>142,900</td>
</tr>
<tr>
<td><strong>LRA Schemes</strong></td>
<td>16,530</td>
<td>60,330</td>
<td>76,860</td>
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<tr>
<td><strong>LRA IN % OF LEBANON</strong></td>
<td>27.14</td>
<td>73.75</td>
<td>53.79</td>
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</table>
Existing Irrigations schemes
## Litani River Authority Irrigation Schemes

<table>
<thead>
<tr>
<th>Region</th>
<th>Project</th>
<th>Irrigated</th>
<th>Ongoing</th>
<th>Proposed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>South Bekaa</strong></td>
<td><strong>South Bekaa</strong></td>
<td>2000</td>
<td>6700</td>
<td>14800</td>
<td>23500</td>
</tr>
<tr>
<td></td>
<td>South Qaraoun Dam</td>
<td></td>
<td>980</td>
<td></td>
<td>980</td>
</tr>
<tr>
<td></td>
<td>Small and medium Schemes</td>
<td>8090</td>
<td></td>
<td></td>
<td>8090</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>10090</td>
<td>7680</td>
<td>14800</td>
<td>32570</td>
</tr>
<tr>
<td><strong>South Lebanon</strong></td>
<td>South Lebanon</td>
<td></td>
<td>15000</td>
<td>20000</td>
<td>35000</td>
</tr>
<tr>
<td></td>
<td>Qasmieh</td>
<td>4000</td>
<td></td>
<td>2000</td>
<td>6000</td>
</tr>
<tr>
<td></td>
<td>Pilot Sector</td>
<td>350</td>
<td>850</td>
<td></td>
<td>1200</td>
</tr>
<tr>
<td></td>
<td>Small and medium Schemes</td>
<td>2090</td>
<td></td>
<td></td>
<td>2090</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>6440</td>
<td>15850</td>
<td>22000</td>
<td>44290</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>16530</td>
<td>23530</td>
<td>36800</td>
<td>76860</td>
</tr>
</tbody>
</table>
Cooperation with Foreign Projects

• Partnership
  – Water Saving in Mediterranean Area “WASAMED” (EU, IAM-Bari, LARI) – Ended
  – Improvement of Irrigation Water Management in Lebanon and Jordan “IRWA” (EU, AVSI, ICU, CESAL, NCARTT)
  – Towards an ecosystem approach to the sustainable management of the Litani Watershed (IDRC, CNRS, DSA)
  – Sustainable Organic Agriculture in South Lebanon (USAid, World Vision)
  – Litani Water Quality Management Project “LWQM” (USAid) - Ended
Cooperation with Foreign Projects

• Partnership
  - Mediterranean dialogue on integrated water management “MELIA” (EU Project)
  - Sustainable orchard irrigation for improving fruit quality and safety “IRRIQUAL” (EU, CSIC, INRA)
  - Science-Policy Interfacing in support of the Water Framework
  - Directive implementation “SPI-Water” (EU Project)

• Collaboration
  - Institutional and Social Innovation in Irrigation Mediterranean Management “ISIIM” (CE, Agropolis, Chambre d’agriculture de Zahleh)- Ended
Thank You