



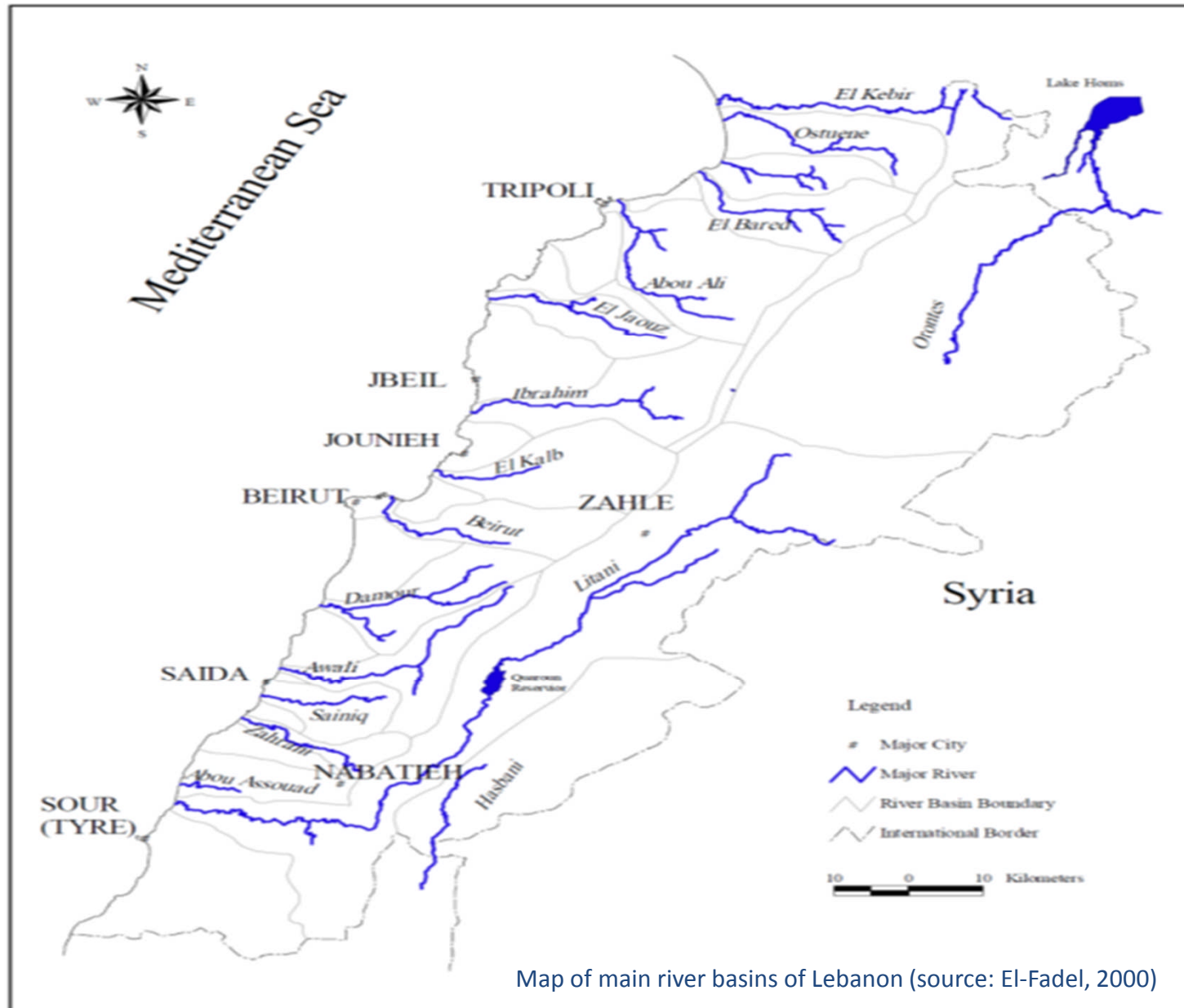
**LEBANESE REPUBLIC
MINISTRY OF ENERGY
AND WATER**

Hydropower Electricity in Lebanon

**Legal and Administrative Barriers to the Development of
the National Hydropower Market for Lebanon**

Presented by Mr. Karim Osseiran – BEE
Advisor to H.E. the Minister of Energy & Water

Lebanon's Rivers



Main Stakeholders : Existing Hydro

Ministry of Energy & Water

General Directorate of Exploitation

Old Private Concessions with the majority of shares owned by EDL

El Bared Hydro Concession

Nahr El Bared

La Kadisha - Societe Anonyme D'Electricite du Liban Nord S.A.L.

Nahr Abu Ali

Private Concession

Societe Phoeniciene des Forces de Nahr Ibrahim des Eaux et Electricite

Nahr Ibrahim

Public Establishments

Litani Water Authority

Nahr El Litani

Electricite du Liban (Richmaya Hydro Power Plant)

Nahr El Damour

Water Authority for Mount Lebanon

Nahr El Kelb

Electricite du Liban (Single Buyer)



Entity	Main Role	Interaction
Primary Stakeholders		
Ministry of Energy and Water	Energy & Water sectors policy making, planning, regulations and monitoring performance	Guardianship, planning and monitoring
Electricité du Liban	The single state-owned, vertically integrated utility and dominant energy supplier	EDL is the majority shareholder in the previously private-owned Kadisha company and El-Bared company & purchases power from hydroelectric producers (PPA's)
The Litani River Authority	Independent Public institution that implements the Litani Projects	Irrigation, Drinking water and Electricity projects
Private concessionaires	Private concessionaires are private companies that run and maintain public electricity facilities	EDL pays private concessionaire tariffs to produce energy (PPA's)
Ministry of Finance	Controlling the usage of public funds, economic reform and the management of fiscal policy and public debt	Financial guardianship and funding
Ministry of Agriculture	Agriculture policy making, planning, regulations and monitoring performance	Governs the irrigation channels and related basins

Entity	Main Role	Interaction
Secondary Stakeholders		
<p style="text-align: center;">Council of Development and Reconstruction</p>	<p style="text-align: center;">Public entity providing financing for sector reform initiatives</p>	<p style="text-align: center;">Funding and project management of related projects for the benefit of the public entities</p>
<p style="text-align: center;">Council of Ministers</p>	<p style="text-align: center;">Highest executive authority in Lebanon. Its role includes arbitrating any disagreement between public entities</p>	<p style="text-align: center;">Approval of Policies, Issuance of Decrees</p>
<p style="text-align: center;">Ministry of Environment</p>	<p style="text-align: center;">Setting and enforcing environmental regulations</p>	<p style="text-align: center;">Environmental control</p>
<p style="text-align: center;">Public Water and Wastewater Establishments</p>	<p style="text-align: center;">Water Operators, responsible for drinking water supply, irrigation and wastewater treatment</p>	<p style="text-align: center;">Own Hydro facilities in some cases</p>

Main Barriers for Existing Hydro's

- **Low Tariff:** The PPA's between EDL and the hydro producers are old and the financial remuneration is not anymore sufficient for the hydro operators to invest on development activities
- **Lack of effective monitoring and supervision of PPA's**
- **Irregular Payments:** EDL being the single buyer of hydroelectricity and suffering from a poor financial status, payments are not always honored in a timely manner
- **Close Expiry of Concessions** prevents these from investing on development due to hydro investments long pay back periods
- **Insufficient financial incentives from GoL:** Limited financial resources of the public sector to properly support and promote the development of hydro projects

What about New Hydro ?

Hydro Development Possibilities : Technical Potential

Installation of New Hydro Plants – Master Plan:

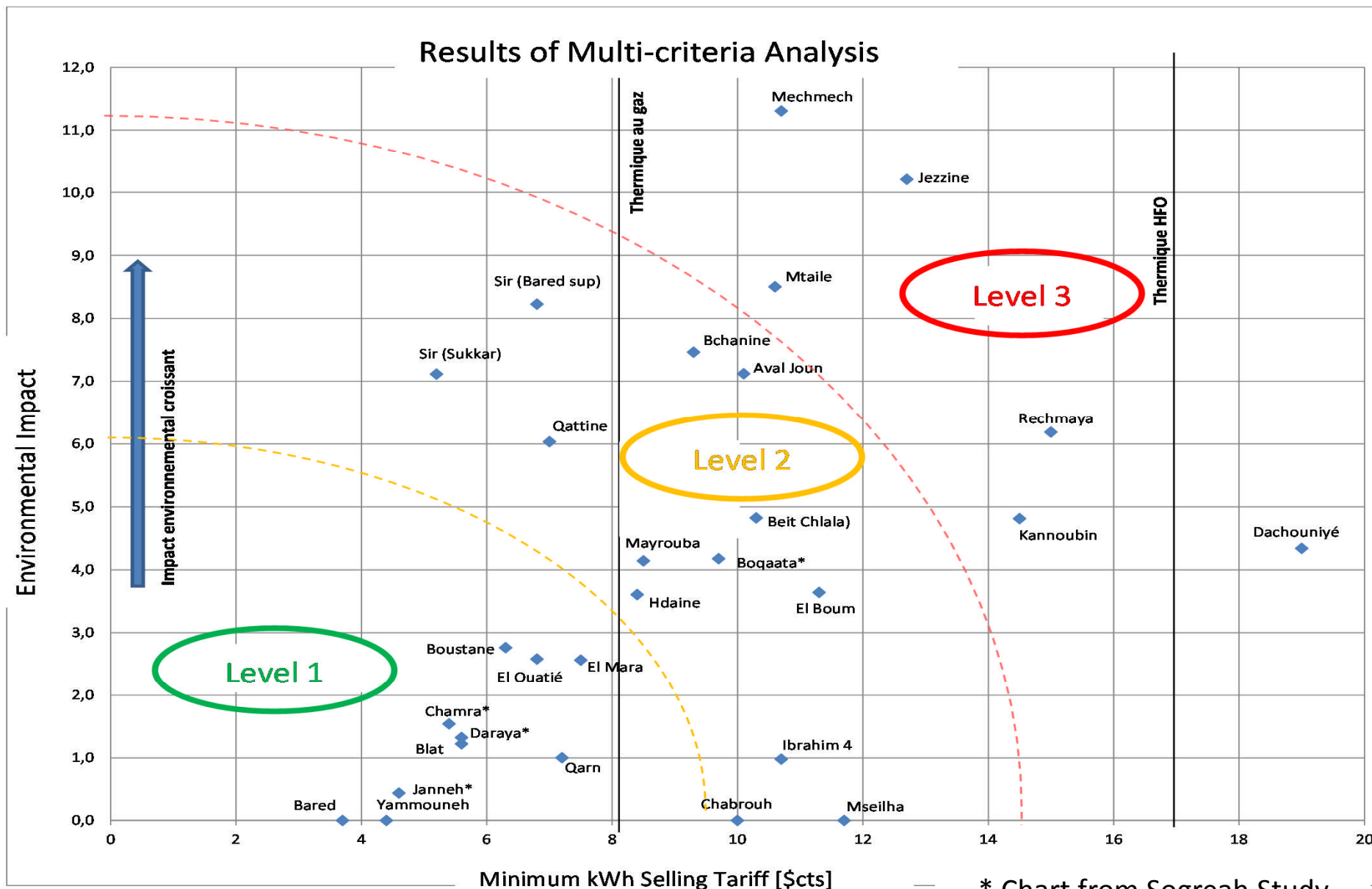
32 new sites were identified as follows:

- Around **263 MW (1,271 GWh/y) with a cost of 667 M.\$** in Run of River scheme
- Around **368 MW (1,363 GWh/y) with a cost of 772 M.\$** in Peak scheme

25 of these are economically viable with Minimum Selling Tariff
less than 12 \$c/kWh:

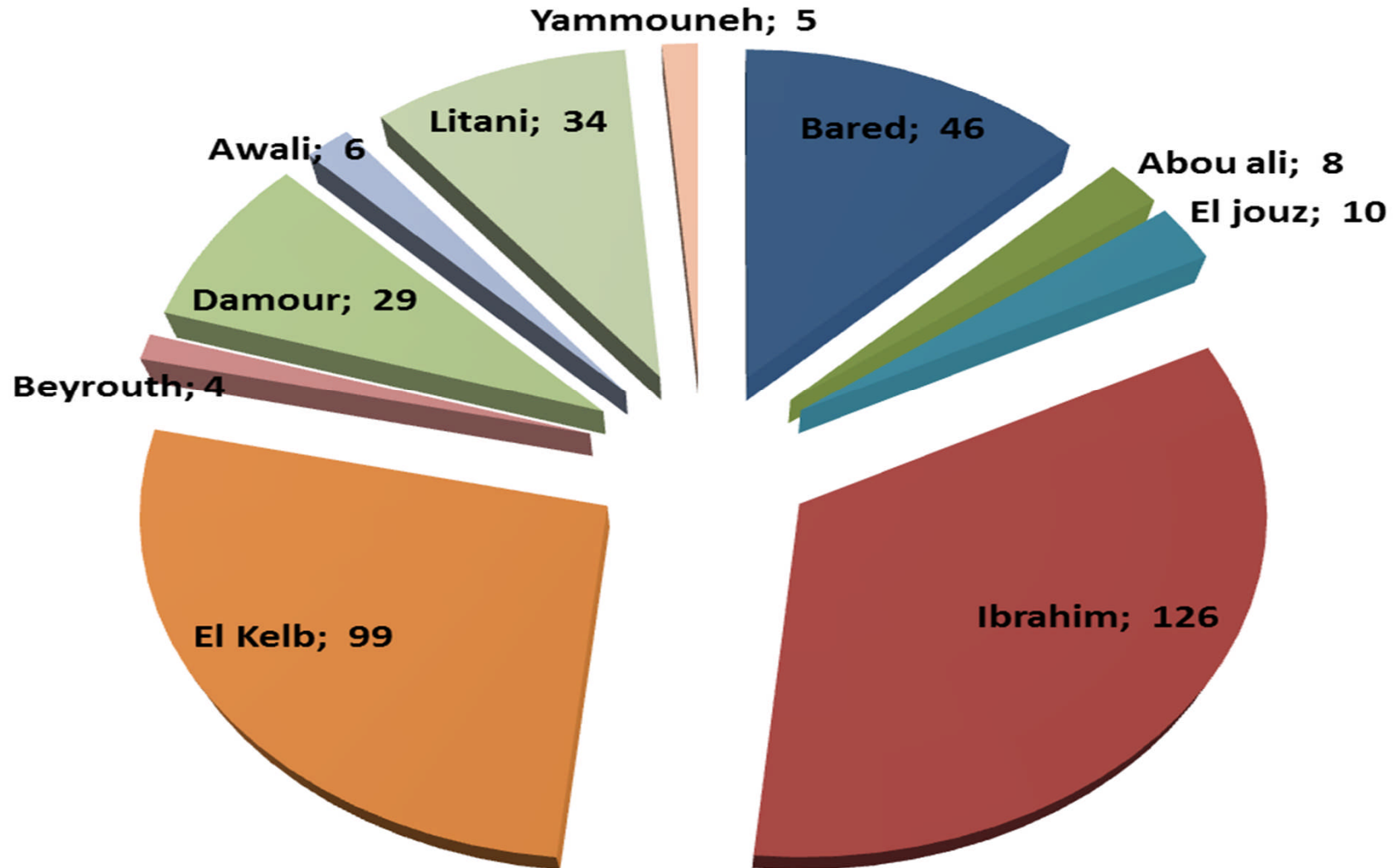
- Around **233 MW (1,126 GWh/y) with a cost of 560 M.\$** in Run of River scheme
- Around **315 MW (1,217 GWh/y) with a cost of 665 M.\$** in Peak scheme

New Sites Feasibility Multi-Criteria Chart



* Chart from Sogreah Study

New Hydro 368 MW Capacity Distribution



* Chart from Sogreah Study

General Typical Challenges of Hydro Development

Resource Availability Risk : Due to uncertainty of precipitations and lower ranking of hydro in the priorities setting for the resource usage (1st Potable/Urban Water → 2nd Irrigation → 3rd Hydroelectricity)

High CAPEX : Average investment costs for small hydropower projects is between USD 1,300/kW and USD 8,000/kW

Financial Risk : The CAPEX being significant and the lifetime of the equipment being long, the Hydropower Economics are sensitive to changes in precipitation and runoff

Lebanon: Main Administrative Barriers

- **Complex inter-relationship** of heterogeneous public and private stakeholders with **no dedicated institutions for hydro development**
- **Urban water** supply and **Irrigation** are the two main water uses examined in an uncorrelated way by various public establishments and **possible hydropower generation is not usually considered for optimizing water use**
- Power generation and transmission are the prerogative of EDL whereas **Water** & **Land** rights in relation to rivers are managed in a separate way by **various administrations** in the MoEW

Main Financial Barriers

- **Poor financial status of EDL** being the single buyer of hydroelectricity
- **Low attractiveness of projects** for private investors due to the uniform fixed financial compensation (Low Tariff of PPA's)
- **Insufficient financial incentives from GoL.** Limited financial resources of the public sector to properly support and promote the respective hydro projects
- Due to the lack of sufficient generation capacity to cover the country's demand, public financing will be channeled to the increase of thermal generation capacity putting **hydro development at a low priority** which presents longer term payback periods
- **Absence of a Financing mechanism that mitigates the risks** incurred by the sector developer

Main Policy Barriers

- **Priorities on Water use** are such that exploitation of hydraulic resources for electricity production is considered as lower priority
- **Absence of Regulatory Authority for Energy** that can support market opening by introducing a modernized tendering procedure (capitalizing on the lessons learnt from other countries), for the issuance of licenses, setting of general policies, development plans, auctioning procedure, financial obligations and guarantee provisions, presentation of the economic, technical data and real conditions of the projects, pricing schemes, monitoring and evaluation procedure, incentive schemes, penalties etc.)

Main Legal Barriers

- The law detailing the framework for **Public-Private Partnership is not yet enacted** to enable private generators.
- **Water Code** is not promulgated. There is a need for a detailed legislation to allow the efficient use of waters by describing the way the costs and benefits allocated to each of the water uses, i.e. power generation, irrigation, potable water, other uses, in order to maximize the output from using the waters, in an economic, environment friendly and long term sustainable manner
- **Absence of continuous monitoring of the overall legal framework related to power market operation and water use**, in order to allow timely adjustments of the PPA agreements if need be, assuring that the PPA agreements retain their basic technical and economic characteristics but comply also with the new legal environment and real conditions (could be done by ERA)

Main Recommendations (1 of 3)

- Establishing a **Hydroelectricity Development Unit – HDU** an entity dedicated & specialized for the hydropower sector to undertake the key role and responsibility for the sector development by enhancing MoEW's capacity towards the management and monitoring of hydropower projects. This entity is expected to give credence and robustness to the functioning of the sector and act as a balancing driver for further promotion of private investing
- Establishment of a **Special Financial Set Up** dedicated for the transactions related to potential Hydro PPA's in order to minimize the exposure to the liabilities of the overall energy market. This set up can reduce financial uncertainties and increase the prospects for a sustainable remuneration/financing mechanism

Main Recommendations (2 of 3)

- **Enhancement of the Private Sector participation** at the technical, investment and financing levels via the establishment of the proper regime for attracting investments in the hydro sector:
 - ✓ **Consolidating the PPA's** through the introduction of state Guarantees for Payments secured by the BDL & the MoF
 - ✓ Raising the Hydro Tariff (Upon the increase of EDL Tariff)
- Opening the access to **BDL financing facilities** through circular No.313 to No.318 to the Hydro Developers

Main Recommendations (3 of 3)

- Use **Minimum regulatory preconditions** for immediate initiation of development (based on existing laws)
- **Stepwise Hydro development** taking into consideration the termination of the existing concessions
- **Selection of Peak load** vs run-of-river schemes to provide reserve generation capacity for reliable backup power & for balancing the intermittent electricity generation from other renewable sources
- **Singular approach for each basin** and the exposition of an action plan from this stand point



Yahchouch Dam – Nahr Ibrahim

**Thank You for your
Attention 😊**

**Karim Osseiran , B.E.E.
karim.m.osseiran@gmail.com**