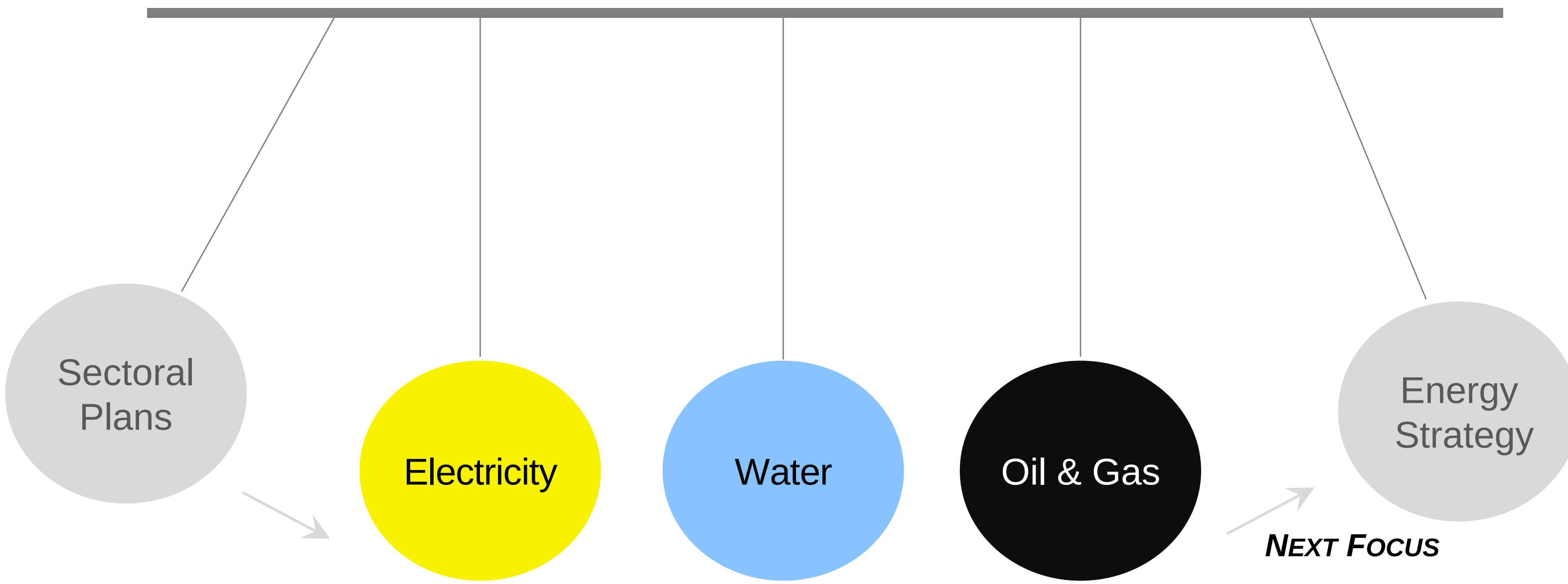
A NATIONAL ENERGY STRATEGY FOR LEBANON

Lebanese National Energy (LNE) Conference

César Abi Khalil
Minister of Energy and Water
28 October 2017

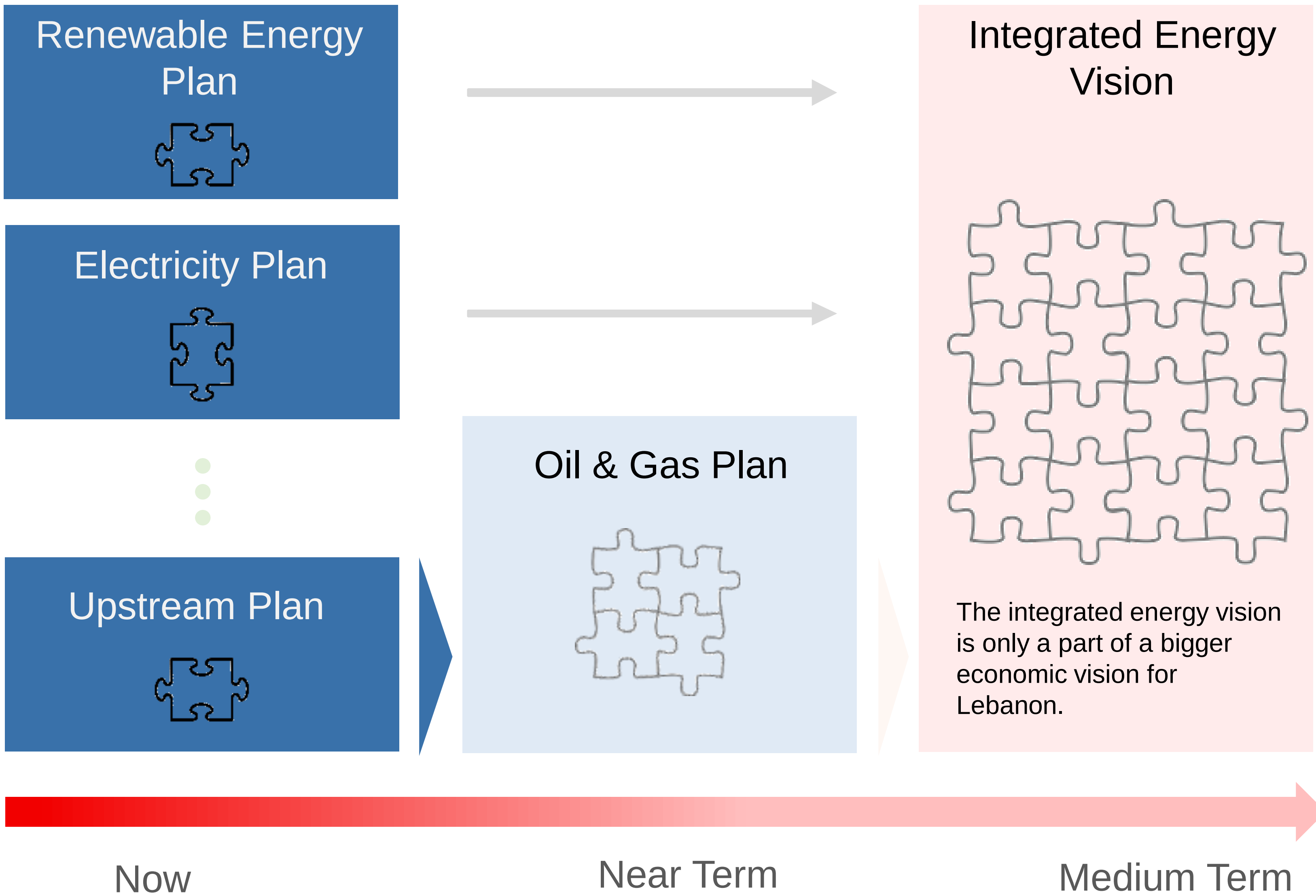
NATIONAL ENERGY VISION & STRATEGY

Since 2009, the Ministry of Energy & Water has implemented sectoral action plans in the electricity, water and oil & gas sectors

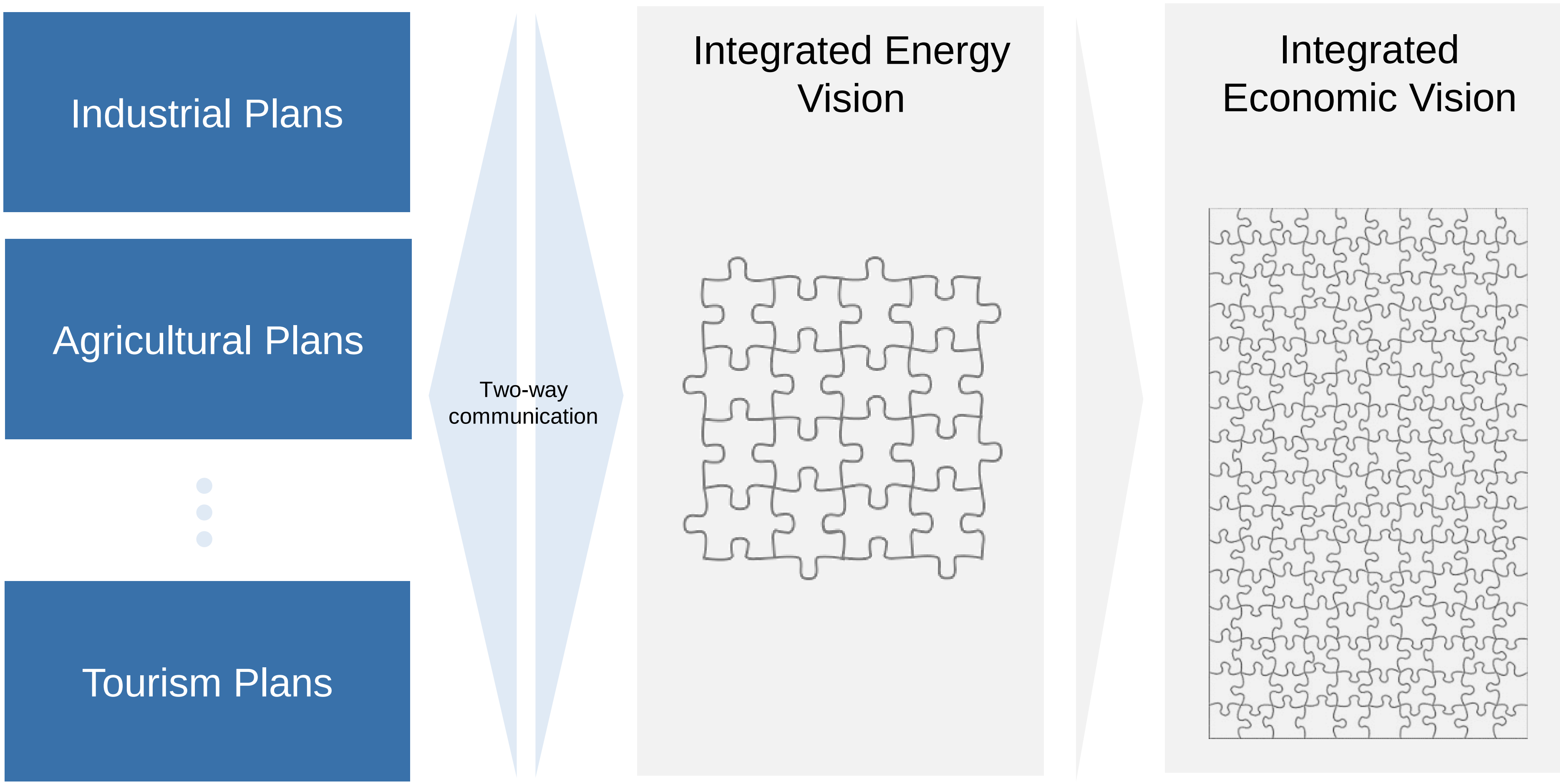


Sectoral Plans			
	Generation	**Water Distribution Network**	**De-risking above & below the ground**
	Transmission	Rehabilitation of 50% of the distribution network	**Attract international companies**
	Distribution	**Plans for New Dams**	**First Licensing Round**
	Renewable Energy	**Legal Framework**	

The Different Sectoral Plans Should All Fit into an Integrated Energy Vision for Lebanon.



The Integrated Energy Vision Depends on the Inputs of All the Energy-driven Sectors and is Part of a Bigger Economy Vision.



Lebanon's national aspirations from the energy sector can act as an umbrella for the development of an energy strategy in Lebanon

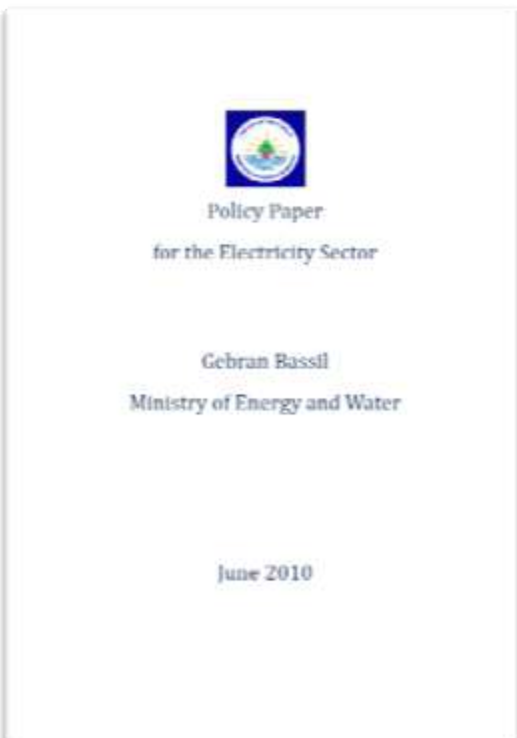
National Aspiration	Description
Improve Lebanon's energy security backed by indigenous sources	▪ Fill the energy gap and reduce Lebanon's current energy dependency on the external markets. ▪ Develop an indigenous & diversified energy that will support economic growth.
Build a fostering environment for investments & competition in energy	▪ Promote attractive investments for Lebanese & international companies. ▪ Adopt a competitive and open system to attract investors by developing PPP.
Optimize value out of energy activities for current & future generations	▪ Ensure that non-renewable energy resources benefit current and future generations. ▪ Establish financial instruments (eg. Sovereign Wealth Fund) that preserve wealth generated & transform it into renewable financial assets.
Promote sustainability	▪ Conduct energy development at a prudent pace that allows absorption, ie. the development of local industries, & the education & employment of Lebanese. ▪ Define & implement best QHSE practices.
Govern the energy sector with transparency & accountability	▪ Adopt good governance and transparency practices in the regulatory framework. ▪ Enforce specific accountability measures. ▪ Communicate and consult with all stakeholders in an inclusive approach.

ELECTRICITY

The Planning

An Integrated Electricity Strategy was set within the Electricity Reform Paper . This was projected into 4 different sub-sectoral action plans

General plan for the reform of the whole electricity sector

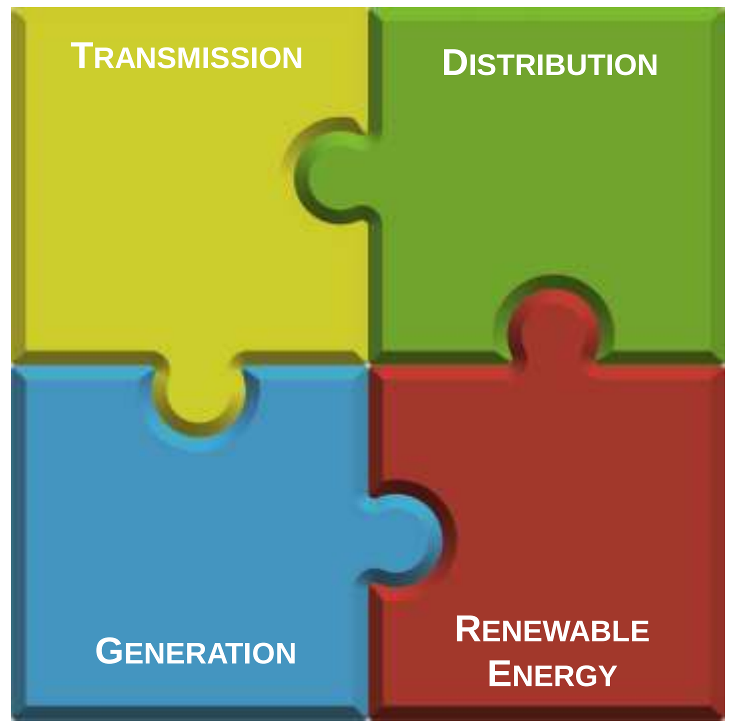

Policy Paper

for the Electricity Sector

Gebran Bassil

Ministry of Energy and Water

June 2010



The Planning

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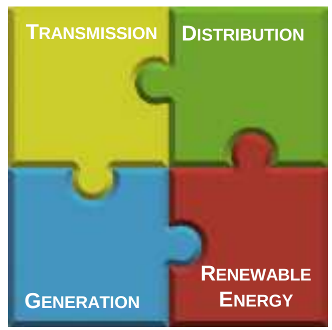
SUB-SECTORAL PLANS

- **A** Plan for the expansion of the transmission sector
- **B** Law 181 for project investment in transmission projects

- **A** Identification of a clear vision for the Generation Sector (2010)
- **B** Setting the priorities for short, medium & long term
- **C** Law 181 for project investment in generation projects



- **A** DSP projects in 3 zones
- **B** Implementing smart grid and reducing losses
- **C** Amelioration of customer service

12% TARGET

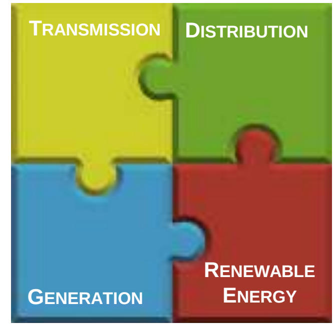
NEEAP 2011-2015

NEEAP 2016-2020

NREAP 2016-2020

The Implementation

Plans are not set to remain on paper
Executed projects during 2009-2016



Generation

- RE in Zouk and Jieh adding 272 MW
- Upgrading Deir Ammar and Zahrani adding 63 MW
- Power Rental from the floating power barges adding 370 MW

Transmission

- Complete execution of projects under law 181
- Adding 3 new GIS substations of 490 MVA
- Extending 8 existing substations of 1,200 MVA
- New lines of around 158 km adding a capacity of 350 MVA

Distribution

- Implementation of DSP over 4 years
- First PPP project in Lebanon
- More than 4750 smart meters installed as a pilot project
- Investments all over Lebanon around 200 Million USD
- Amelioration of the customer service experience
- Reduction of losses on distribution grid

Renewable Energy

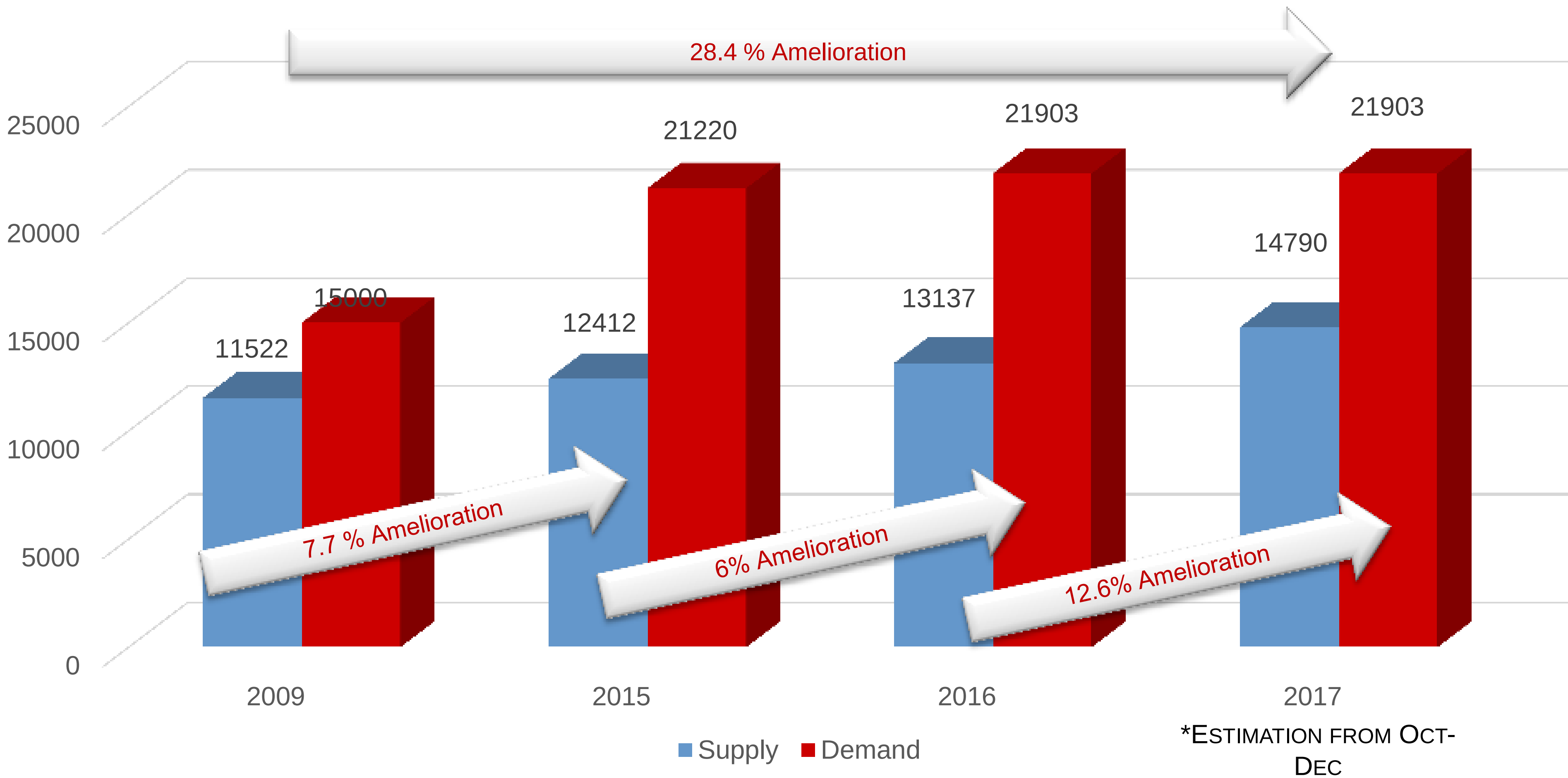
- 614,000 sqm of installed SWH
- More than 23 MWp of distributed solar PV installations with a 123% year to year growth
- 2 farms of 1 MWp each on the Beirut River (BRSS) and the Zahrani Oil installations
- 3 wind farms bid of more than 200 MW in its last stages with a PPA price of 10.45 USc/kWh
- First IPP licenses issued by the GoL for the 3 wind farms
- More than 500 Million USD loans granted to more than 330 RE and EE projects through NEEREA loans in collaboration with BdL

*Estimation from Oct-Dec

The Implementation

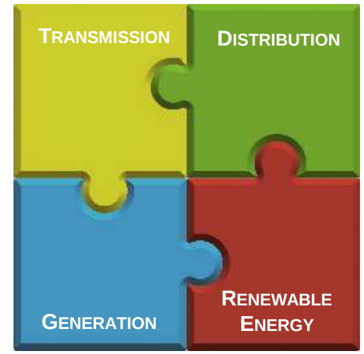
Plans are not set to remain on paper

Executed projects during 2009-2016



The Vision

Planning is an iterative process - Vision 2017-2030

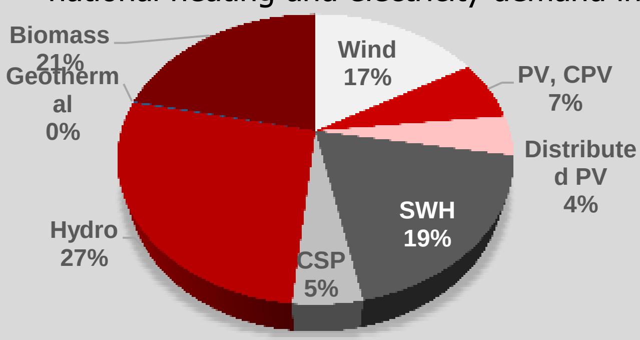


Generation

- Deir Ammar 2 adding 550 MW
- Two IPP power plants in Zahrani and Selaata adding around 1,000 MW
- Power rental of around 800 to 1,000 MW
- New power plant in Jieh adding around 550 MW
- Rehabilitation of Zouk adding 300 MW
- Adding two new IPP power plants in Selaata and Zahrani around 1,000 MW
- Two more power plants of around 1,000 MW to be decided

Renewable Energy

- 12% is the projected share of renewable energy production of the total national heating and electricity demand in 2020
- 15% is the projected share of renewable energy production of the total national heating and electricity demand in 2030



- 2020 Renewable Energy Mix by 2020
- 1.7 Billion USD

Transmission

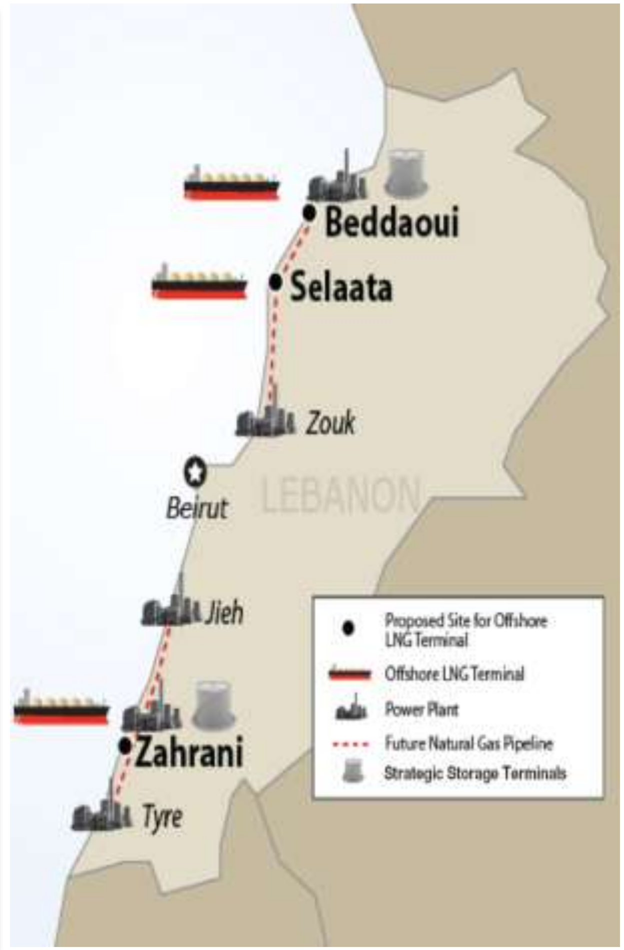
- Master Plan approved by the GoL
- First time since 21 years (1996)
- Investments 353 Million USD (2018 – 2023)
- Second phase 200 Million USD (2023 – 2030)
- Total around 600 Million USD (2018 – 2030)
- Marina Substation

The Vision

Planning is an iterative process - Vision 2017-2030

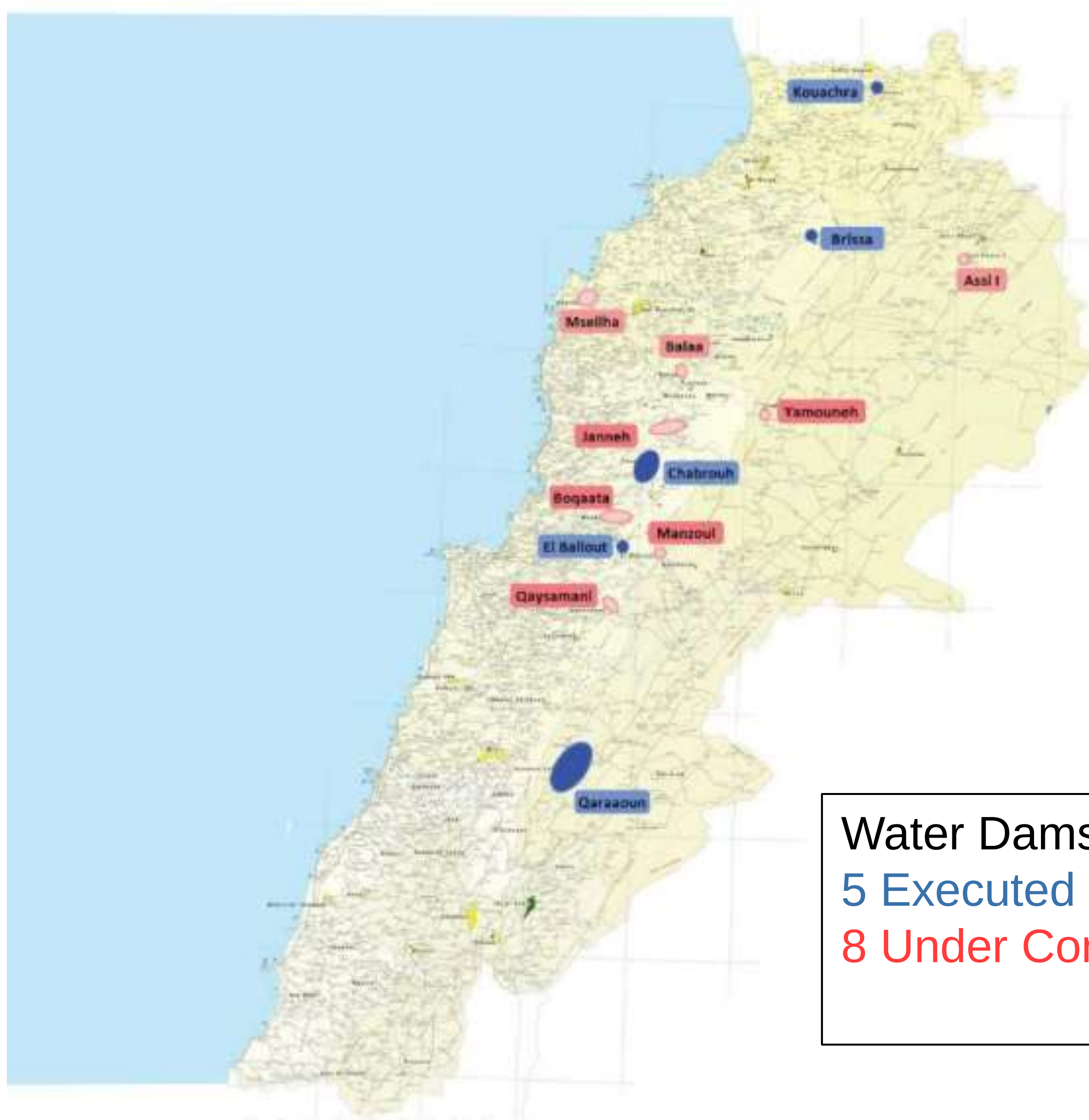
Fuel Sourcing Strategy

- **Policy for the use of Natural Gas in Two Thirds of the power production**
- **On the Short-term:**
  - Procurement of NG through 3 offshore LNG regasification terminals:
    - Deir Ammar
    - Selaata
    - Zahrani
  - Supply of NG to all coastal power plants through 4 NG pipelines:
    - Deir Ammar – Selaata
    - Selaata – Zouk
    - Jieh – Zahrani
    - Zahrani – Sour
  - **Securing the supply of Liquid fuels through Strategic Storage Projects at the Oil Installations in Lebanon:**
    - Up to 2.5 million cubic meters of storage capacity in Tripoli and Zahrani
    - First phase 430,000 cubic meters in Tripoli Oil Installations
- **On the Medium to Long-term:**
  - Improving Energy Security by Reducing Fuel Demand through Electric Mobility
  - Use of the Lebanese indigenous Natural Gas to replace most of the imports



Source: Lebanese Republic – Ministry of Energy & Water

A series of water dams are planned and some are under construction, with hydropower capacities

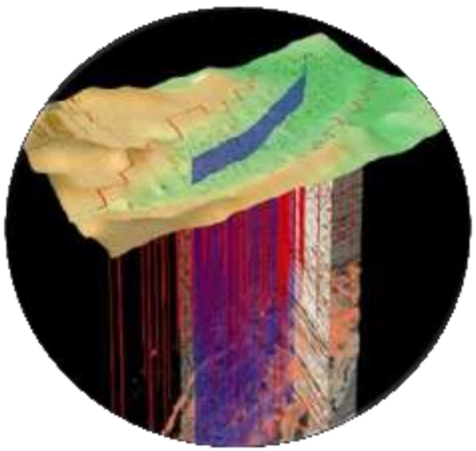


Water Dams
5 Executed
8 Under Contsruction

OIL & GAS

Oil & Gas sectoral plan
We worked on De-risking the sector on the subsurface & surface, reaching the first licensing round

De-Risking work
below & above the ground



First Licensing Round
Applicants per Block

Objectives of Lebanon’s 1st offshore licensing round

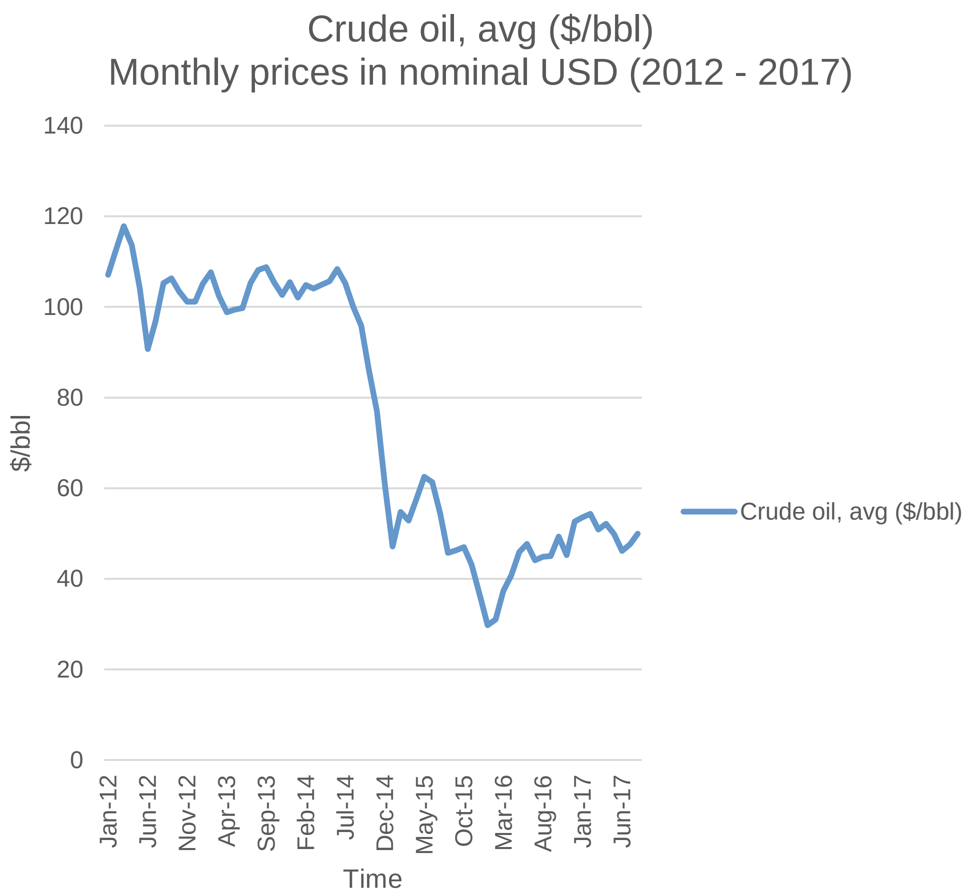
Striking commercial discoveries in Lebanon’s Exclusive Economic Zone

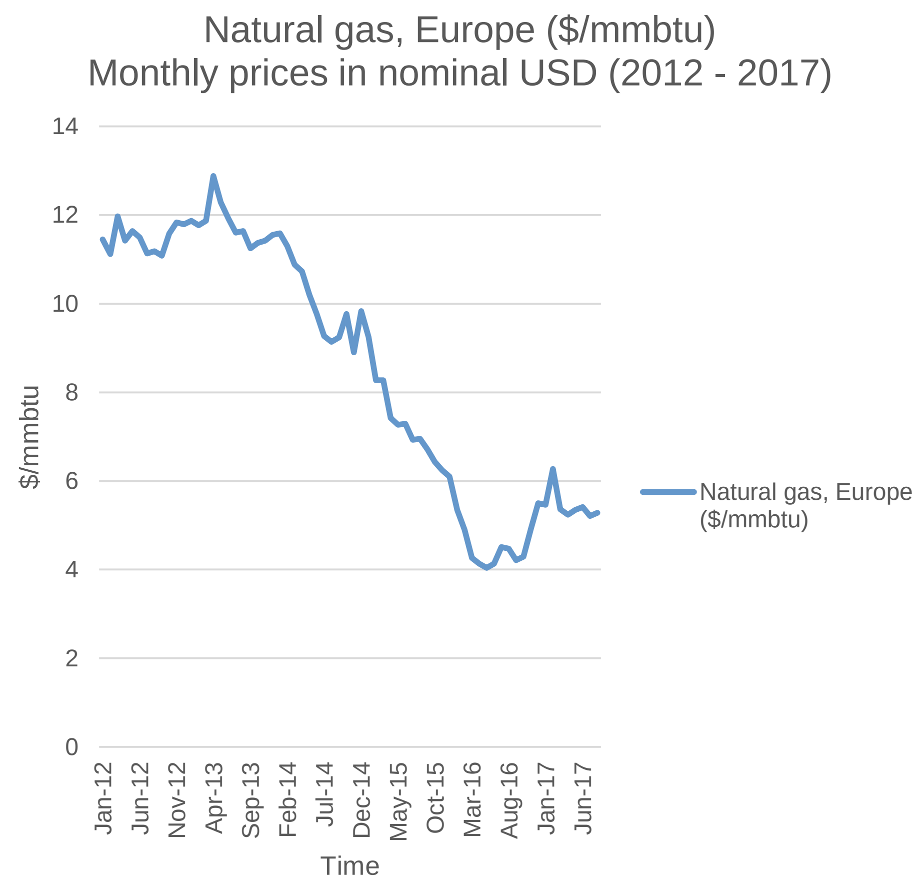
Retaining Lebanon’s sovereign rights with respect to its wealth around the borders

Open blocks that received offers

Oil and gas industry context

Significant change in market conditions with the approximate 50% drop in oil prices between 2012 and 2017





Source: World Bank Commodity Price Data

Price drop effect on IOCs exploration budgets

Lebanon is facing a more stringent competition with other countries compared to 2013 as International Oil Companies (IOCs) exploration budgets also dropped by about 58%.

In the current global environment, IOCs main challenge is to strategically assess existing projects and to identify new investments in future projects.

Regional context

	Cyprus	Occupied Palestine	Lebanon
1st Licensing Round	11 Blocks Open 1 Consortium Awarded	Direct Award 1 Operator	5 Blocks Open 1 Consortium applied for 2 blocks
Existing Operators in 2017	4	1	-
Drilled Wells	5	>50	-
Discovered Gas Volumes	4 tcf	33 tcf	-
Export projects under consideration	Pipeline connecting: • Occupied Palestine-Cyrprus-Greece • Aphrodite-Egypt	Pipeline connecting: • Occupied Palestine-Cyrprus-Greece • Occupied Palestine-Turkey • Jordan	-

Where does Lebanon stand?

- Real competition took place during the prequalification rounds (2013 and 2017).

- Most stringent criteria in the East Med resulted in screening major IOCs:
  - 13 Right Holders Operators
  - 34 Right Holders Non Operators

- Bidders in Lebanon are 2 out of 3 major IOCs traditionally operating in the East Med, namely Total and Eni.

- Given this is the 1st Licensing Round and given the small size of the Lebanese offshore, Lebanon attracted a higher number of companies than its neighboring countries which confirms the interest in our EEZ and its prospectivity.

Promising but uncertain sector
drilling a well will de-risk it and explore its potential

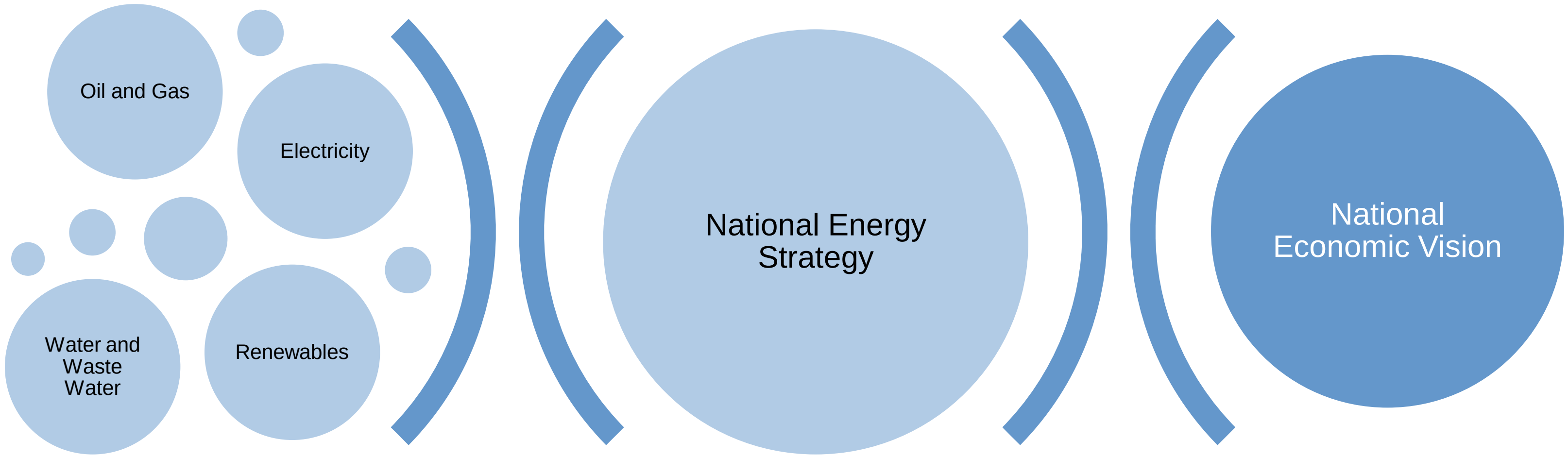
Availability of a local market to monetize the prospective gas over short, medium and long terms.

- Alleviate energy insecurity and promote Lebanon as a regional energy player.
- Reduce fiscal burden resulting from energy import bill.
- Increase employment, value added and national revenue.
- Test the efficiency of the system and improve conditions during subsequent licensing rounds.

Opportunity cost of not moving forward

- Losing credibility to attract exploration investments and become energy independent.
- Losing opportunity to join regional petroleum producing countries that are establishing an integrated East Med gas market.
- Losing market access and opportunity to export the prospective gas.

The Way forward



Implementing current and planned programmes

Participatory approach and cooperation among all sectors

Inputs from all sectors

Public and Private Sectors Joining Efforts and Pro-actively Contributing

THANK YOU

LEBANESE REPUBLIC
MINISTRY OF ENERGY AND WATER